EQUUS
Environmental, LLC

May 5, 2020

Dylan Rose-Coss
Hydrologist
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Sixth Annual Groundwater Monitoring Report
State M Lease (AP-72)
Lea County, New Mexico

Dear Mr. Rose-Coss:

Equus Environmental, LLC (Equus), on behalf of our client Chesapeake Energy Corporation (Chesapeake), is pleased to submit to the New Mexico Oil Conservation Division (NMOCD) in electronic format the ***Sixth Annual Groundwater Monitoring Report*** (Report) detailing the sixth year of groundwater monitoring and remediation activities conducted at the State M Lease (AP-72) located in the SE-SW-SE of Section 18, Township 17 South, Range 36 East, Lea County, New Mexico. These activities were conducted in accordance with the Stage 2 Abatement Plan for the Site approved by the NMOCD on June 27, 2013.

If you have any questions or comments regarding this Report, please do not hesitate to contact me at (918) 906-6780.

Sincerely,
Equus Environmental, LLC

Bruce E. McKenzie, P.G.
Senior Principal

Enclosure: Sixth Annual Groundwater Monitoring Report

xc: Patrick McMahon - Heidel, Samberson, Newell, Cox & McMahon
Chase Acker - Chesapeake Energy

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SIXTH ANNUAL GROUNDWATER MONITORING REPORT
CHESAPEAKE ENERGY CORPORATION
STATE M LEASE (AP-72)
LEA COUNTY, NEW MEXICO

Prepared for:

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May 5, 2020

EQUUS
Environmental, LLC

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SIXTH ANNUAL GROUNDWATER MONITORING REPORT
CHESAPEAKE ENERGY CORPORATION
STATE M LEASE (AP-72)
LEA COUNTY, NEW MEXICO
MAY 5, 2020

1.0 INTRODUCTION

Chesapeake Energy Corporation (Chesapeake) has retained Equus Environmental, LLC (Equus), to perform impacted groundwater monitoring and light non-aqueous phase liquid (LNAPL) hydrocarbon remediation at Chesapeake's former State M Lease site (Site) located in Lea County, New Mexico. The Site is located approximately 8 miles south-southwest of Lovington, New Mexico in the SE-SW-SE of Section 18, Township 17 South, Range 36 East, Lea County, New Mexico (coordinates 32.828061º latitude, -103.391012º longitude). The Site location and topographic features are shown on **Figure 1**. An oil and gas production tank battery was formerly located at the Site. Chesapeake purchased the Site in 2004, but never operated the tank battery. Chesapeake began abandonment and environmental investigation activities at the Site in 2007.

Initial Site investigation activities were conducted in May 2007. These investigation activities consisted of conducting EM-31 and EM-34 ground conductivity surveys, the collection of soil samples from nine boreholes, and the installation and sampling of seven groundwater monitoring wells. Following the investigation in August 2007, Chesapeake submitted to the New Mexico Oil Conservation Division (NMOCD) a Stage 1 Abatement Plan for the Site. In May 2010, the NMOCD responded to Chesapeake that the agency was not adequately staffed to review the abatement plan in a timely manner and advised Chesapeake that they could proceed with abatement operations at risk. In July 2010, Chesapeake notified the NMOCD of their intent to proceed with the Stage 1 Abatement activities. On March 20, 2012, following implementation of these activities, Chesapeake submitted the Stage 1 Abatement Report for the Site.

On March 27, 2012, Chesapeake submitted to the NMOCD the ***Stage 2 Abatement Plan*** (Plan) for the Site. A copy of the Plan is provided in **Appendix A**. In this Plan, Chesapeake proposed the following abatement activities at the Site:

- Excavate and remove the near-surface soils at the Site containing concentrations of chloride exceeding 1,000 milligrams per kilogram (mg/kg),
- Excavate and remove the near-surface soils at the Site containing concentrations of TPH exceeding 1,000 mg/kg,
- Install clay liners in areas where chloride and/or TPH concentrations exceed 1,000 mg/kg at depths greater than five feet below ground level (bgl),
- Install one additional groundwater monitoring well downgradient of the Site,
- Monitor the groundwater at the Site until the concentrations of chloride and benzene are below the New Mexico Water Quality Control Commission standards.

On March 7, 2013, NMOCD notified Chesapeake that the Plan was administratively complete and that Chesapeake should proceed with public notice of the Plan. On March 30, 2013, Chesapeake published a notice of the proposed activities in the Albuquerque Journal, the Hobbs-Daily News Sun and the Lovington Leader. In addition, written notification of the Plan submittal was sent to all surface owners of record within a 1-mile radius of the Site. On June 27, 2013 upon completion of the notification activities, the NMOCD approved the Plan for the Site. A copy of the NMOCD correspondence approving the Plan is included in **Appendix B**.

The soil remediation activities outlined in the Plan were conducted at the Site during the period January 15, 2014 through March 27, 2014. The soil remediation activities were summarized in the document titled ***Soil Remediation Summary Report***, submitted to the NMOCD on August 6, 2014.

This ***Sixth Annual Groundwater Monitoring Report*** (Report) summarizes the groundwater monitoring activities conducted at the Site during the following quarterly sampling events:

- Twenty-First Event - June 4-5, 2019,
- Twenty-Second Event - September 4-5, 2019,
- Twenty-Third Event - December 6, 2019,
- Twenty-Fourth Event - March 5, 2020.

2.0 REMEDIATION

2.1 SVE SYSTEM

As documented in the ***First Annual Groundwater Monitoring Report***, dated May 19, 2015, during the period May 12-14, 2014, a soil vapor extraction (SVE) remediation system (System) was installed and made operational at the Site. The System is comprised of 8 SVE wells connected through a manifold system constructed of two- and three-inch Schedule 80 PVC piping and plumbed to a 10-horsepower 3-phase SVE Regenerative Blower housed within the System Building. The location of the System Building is shown on attached **Figure 2**. Within the System, soil vapor from the SVE wells is drawn through a moisture knock out/separator and a particulate filter prior to reaching the blower. An air-flow meter is installed downstream of the blower in the air-exhaust line and an air sample port is located on the air-exhaust line at a location upstream of its exit from the System Building.

System start-up was conducted on June 6, 2014. Routine checks of the System are conducted to record the blower run times, discharge rate/ACFM and VOC concentration of the discharge-air stream. These field readings are used to calculate the approximate weight of VOCs extracted from the subsurface and discharged from the System. The field PID data are entered into to a spreadsheet to calculate the VOC discharge rate and approximate total pounds removed by the System. The approximate total VOC discharges for each quarter are then summed to provide a cumulative VOC discharge total. These data are summarized in **Table 1**. Through March 23, 2020, the field PID data suggest that approximately 7,577 pounds of VOCs have been removed from the subsurface and discharged from the System.

During the reporting period, discharge-air samples were collected quarterly in laboratory-provided Suma canisters, shipped under chain-of-custody control to TestAmerica Laboratories, Inc. (West Sacramento, California) and analyzed for VOC compounds and total VOCs as hexane by Method TO-15.

During the twenty-first quarter, no discharge-air sample was collected due to laboratory container shipping issues.

During the twenty-second quarter, discharge-air sample 20190905-M-SVE was collected on September 5, 2019. On this date, the System had been running for a total of 46,980 hours, was operating at 227 ACFM and had a field reading of 79 PPM from the discharge air stream.

Laboratory analytical results for this discharge-air sample indicated a total VOC as Hexane concentration of 69,000 PPB V/V (69.0 PPM V/V).

During the twenty-third quarter, discharge-air sample 20200122-M1-SVE was collected on January 22, 2020. On this date, the System had been running for approximately 49,722 hours. No field data is available for the date on which this discharge-air sample was taken. Laboratory analytical results for this discharge-air sample indicated a total VOC as Hexane concentration of 14,000 PPB V/V (14.0 PPM V/V).

During the twenty-fourth quarter, discharge-air sample 20200305-M-SVE was collected on March 5, 2020. On this date, the System had been running for a total of 50,000 hours, was operating at 194 ACFM and had a field reading of 38 PPM from the discharge air stream. Laboratory analytical results for this discharge-air sample indicated a total VOC as Hexane concentration of 26,000 PPB V/V (26.0 PPM V/V).

A summary of the laboratory analytical results for the discharge-air samples is presented in **Table 2**, and complete copies of the laboratory analytical reports and chain-of-custody documentation are provided in **Appendix C**. The discharge-air analytical data are used to compute a correlation factor for the field PID readings to more accurately calculate the total VOC discharged.

Field PID instrument readings are typically lower than laboratory analysis for total VOCs. To compensate for the low field PID readings, a correlation factor is calculated based upon the ratio of the laboratory analytical value versus the field PID value. The correlation factor is then used to multiply the field PID readings and calculate the total VOC discharge. To accurately reflect the total VOC discharge from the System during a given period, **Table 1** includes the calculated unique correlation factor for each quarterly air-discharge sampling event. This unique correlation factor is then utilized to calculate the total VOC discharge from the System for the period in which that particular air-discharge sample was collected. Utilizing the noted correlation factors, approximately 13,401 pounds of VOCs have been removed from the subsurface at the Site.

Figure 3 presents a graph of the VOC concentrations observed in the discharge air stream versus time. As can be seen on this figure, the levels of VOC observed in the air discharge stream have decreased dramatically since startup. These data indicate that the System is effective at removing the hydrocarbon vapors from the subsurface. Removal of hydrocarbon

vapors coupled with the influx of oxygen drawn into the impacted area by the System enhances biodegradation of the hydrocarbon impacts observed in this area.

2.2 MW-1R LNAPL RECOVERY

As documented in the ***First Annual Groundwater Monitoring Report***, dated May 19, 2015, to enhance LNAPL recovery in the MW-1R area, 2-inch diameter monitoring well MW-1 was plugged and replaced with 4-inch diameter monitoring well MW-1R. On June 5, 2014, a QED Environmental Genie LNAPL recovery pump was placed and made operational in monitoring well MW-1R. The Genie LNAPL recovery pump is an air-actuated bladder pump with a floating intake (skimmer), set at a depth that produces the maximum amount of LNAPL recovery per cycle. Air is provided to the Genie LNAPL recovery pump from a compressor located within the System Building.

During the reporting period, approximately 0.5 drums (25 gallons) of LNAPL were recovered from monitoring well MW-1R. Since start-up of the Genie LNAPL recovery pump, a total of approximately 15 drums (822.5 gallons) of LNAPL have been recovered from the Site. During each quarterly monitoring event, the recovery pump and controller is inspected, cleaned and adjusted to maximize LNAPL recovery.

3.0 QUARTERLY GROUNDWATER MONITORING

This Report describes the findings from four quarterly groundwater sampling events conducted at the Site from June 4, 2019 through March 5, 2020.

3.1 GROUNDWATER MONITORING METHODOLOGY

Prior to collecting groundwater samples during each quarterly event, EQUUS gauged all 8 monitoring wells (MW-1R through MW-8) at the Site using an electronic interface probe to determine the depth-to-water (DTW) and LNAPL thickness within each well. The locations of these monitoring wells are shown on **Figure 2**. DTWs were measured from the surveyed top-of-casing (TOC) of each well and converted to elevations relative to mean sea level. These data are presented in **Table 3**. Potentiometric surface maps were constructed utilizing these data to illustrate the groundwater flow direction within the shallow groundwater system beneath the Site. These potentiometric surface maps are presented on **Figures 4** through **7**. It should be noted that DTW measurements collected from monitoring well MW-1R are not honored for generating potentiometric surfaces due to the influence of LNAPL present in the monitoring well and the potential influence of the SVE system on groundwater levels. As can be seen on the figures, groundwater flow at the Site is, in general, from the northwest to the southeast.

Upon completion of DTW measurement activities, Equus field personnel collected groundwater samples per the Plan. As specified in the Plan, chloride is the primary constituent of concern (COC) at the Site until the LNAPL has been adequately eliminated from monitoring well MW-1R. When the LNAPL has been adequately eliminated from monitoring well MW-1R, the groundwater within this well will be monitored for benzene, toluene, ethylbenzene and total xylenes (BTEX) until the levels of BTEX fall below the Limits of 0.01 mg/L, 0.75 mg/L, 0.75 mg/L and 0.62 mg/L, respectively.

The laboratory analytical results for chloride from these sampling events are screened against *the* ***New Mexico Administrative Code 20.6.2, Standards for Groundwater of 10,000 mg/L TDS Concentration or Less*** for chloride of 250 mg/L (Limit). According to the remediation goals set in the Plan, each monitoring well is required to exhibit eight consecutive monitoring events where chloride is below the Limit of 250 mg/L. When these remediation goals are met, Chesapeake will cease groundwater sampling activities for chloride.

As recommended in the ***Fifth Annual Groundwater Monitoring Report***, dated May 20, 2019, during this reporting period groundwater samples were only collected from monitoring wells

MW-4 and MW-8 for chloride analysis due to the remaining monitoring wells having already achieved the abatement goal of eight consecutive quarters of chloride concentrations below 250 mg/L.

The groundwater samples from monitoring wells MW-4 and MW-8 were collected utilizing EPA approved low-flow purging/sampling methodologies. Field parameters consisting of pH, specific conductivity, temperature, and dissolved oxygen (DO) were measured during field activities utilizing a multi-parameter meter and air-tight flow-through cell. Upon stabilization of the field parameters, groundwater samples were collected into laboratory prepared containers, labeled as to source and contents, placed on ice for preservation, placed under chain-of-custody control and shipped via overnight courier to the analytical laboratory (TestAmerica Inc., Nashville, Tennessee). As per the Plan, groundwater samples collected from these monitoring wells were analyzed for chloride by EPA Method 300.0. A summary of the laboratory analytical results for chloride analyses is presented in **Table 4**, and complete copies of the laboratory analytical reports and chain-of-custody documentation is provided in **Appendix C**.

3.2 TWENTY-FIRST QUARTERLY GROUNDWATER SAMPLING RESULTS

The twenty-first groundwater sampling event was conducted at the Site during the period June 4-5, 2019. As can be seen in **Table 4**, the groundwater samples collected from monitoring wells MW-4 (392 mg/L) and MW-8 (283 mg/L) during this sampling event exhibited concentrations of chloride that exceed the Limit of 250 mg/L.

During the twenty-first quarterly groundwater sampling event, LNAPL was observed in monitoring well MW-1R at a thickness of 2.26 feet. During this monitoring event, the LNAPL skimmer pump within monitoring well MW-1R was re-installed with a rebuilt pump and adjusted after sampling to maximize the efficiency of LNAPL removal.

3.3 TWENTY-SECOND QUARTERLY GROUNDWATER SAMPLING RESULTS

The twenty-second quarterly groundwater sampling event was conducted at the Site during the period September 4-5, 2018. As can be seen in **Table 4**, the groundwater sample collected from monitoring well MW-4 (404 mg/L) exhibited a chloride concentration that exceeds the Limit of 250 mg/L. The groundwater sample collected from monitoring well MW-8 (223 mg/L) exhibited a chloride concentration that was less than the Limit of 250 mg/L.

During the twenty-second quarterly groundwater sampling event, LNAPL was observed in monitoring well MW-1R at a thickness of 0.79 feet.

3.4 TWENTY-THIRD QUARTERLY GROUNDWATER SAMPLING RESULTS

The twenty-third quarterly groundwater sampling event was conducted at the Site on December 6, 2019. As can be seen in **Table 4**, the groundwater sample collected from monitoring well MW-4 (421 mg/L) exhibited a chloride concentration that exceeds the Limit of 250 mg/L. The groundwater sample collected from monitoring well MW-8 (198 mg/L) exhibited a chloride concentration that was less than the Limit of 250 mg/L.

During the twenty-third quarterly groundwater sampling event, LNAPL was observed in monitoring well MW-1R at a thickness of 0.30 feet.

3.5 TWENTY-FOURTH QUARTERLY GROUNDWATER SAMPLING RESULTS

The twenty-fourth quarterly groundwater sampling event was conducted at the Site on March 5, 2020. As can be seen in **Table 4**, the groundwater sample collected from monitoring well MW-4 (443 mg/L) exhibited a chloride concentration that exceeds the Limit of 250 mg/L. The groundwater sample collected from monitoring well MW-8 (118 mg/L) exhibited a chloride concentration that was less than the Limit of 250 mg/L. **Figure 8** presents an isopleth of the chloride concentrations observed in the groundwater samples collected during this sampling event. As can be seen on this figure, the highest levels of chloride observed in Site groundwater are observed in monitoring wells MW-4 and MW-8, in the southeast portion of the Site. To complete the chloride isopleth, Equus utilized the chloride concentrations detected in the groundwater samples collected from monitoring wells MW-1 through MW-3 and MW-5 through MW-7 during the March 2018 sampling event. It should be noted that concentrations of chloride in monitoring well MW-8 have been less than the Limit during the last three groundwater monitoring events.

Figure 9 presents chloride concentration trend graphs for each of the monitoring wells sampled at the Site. A review of this figure indicates that the chloride concentration trends observed in the groundwater samples are, in general, decreasing in monitoring wells MW-4 and MW-8. The soil remediation activities conducted at the Site in the first quarter of 2014 have removed the continuing source of chloride impacts to the groundwater at the Site. Source removal has facilitated the physical natural attenuation mechanisms of dispersion and dilution on remnant chloride concentrations present in Site groundwater.

During the twenty-fourth quarterly groundwater sampling event, LNAPL was observed in monitoring well MW-1R at a thickness of 0.57 feet.

4.0 CONCLUSIONS

Based upon the data presented herein, the following conclusions are presented:

- Groundwater beneath the Site is encountered at depths ranging from approximately 46 to 49 feet from the surveyed tops-of-casing of the Site monitoring wells.
- The direction of groundwater flow at the Site is, in general, from the northwest to the southeast.
- During the reporting period, concentrations of chloride greater than the Limit of 250 mg/L were observed in the groundwater samples collected from monitoring wells MW-4 (ranging from 392 mg/L to 443 mg/L) and MW-8 (ranging from 118 mg/L to 283 mg/L). Concentrations of chloride less than the Limit have been observed in monitoring well MW-8 during the last three monitoring events/
- The SVE System is operating as designed and has removed approximately 13,401 pounds of VOCs since start-up on June 6, 2014.
- During the reporting period, approximately 0.5 drums (25 gallons) of LNAPL were recovered from monitoring well MW-1R.

5.0 RECOMMENDATIONS

Based upon a review of the data presented within this report, the following recommendations have been developed:

- Operation of the SVE System at the Site should continue until the LNAPL observed on the groundwater in the monitoring well MW-1R area has been adequately eliminated.

- As specified in the Plan, LNAPL recovery within monitoring well MW-1R should be continued until the LNAPL observed within this well has been adequately eliminated. Efforts to optimize LNAPL recovery while minimizing pump down-time should be implemented.

- As specified in the Plan, when the LNAPL has been adequately eliminated from monitoring well MW-1R, the groundwater within this well should be monitored for BTEX until the levels of these constituents fall below the Limits of 0.01 mg/L, 0.75 mg/L, 0.75 mg/L and 0.62 mg/L, respectively, for eight quarters.

- The groundwater within monitoring wells MW-4 and MW-8 should continue to be monitored on a quarterly basis for chloride until eight quarterly sampling events result in chloride levels less than the New Mexico Water Quality Control Commission standards. The next groundwater monitoring event at the Site is scheduled to be conducted in June 2020.

TABLES

Table 1 : Summary of SVE System Field Readings
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Date	Time	Run Time Reading	Operating Hours		Discharge Readings		VOC Discharge				Calculated Correlation Factor
			since last reading	Total	PPM	CFM	lbs/Hr	lbs since last Reading	Total lbs	Total Tons	
06/07/14	8:00	4131.73	19.73	20	596	519	2.281	44.99	44.99	0.02	
06/08/14	7:10	4154.69	22.96	43	398	483	1.416	32.50	77.50	0.04	
06/08/14	9:15	4156.94	2.25	45	5000	489	18.021	40.55	118.05	0.06	
06/12/14	12:40	4256.45	99.51	144	1817	120	1.607	159.92	277.96	0.14	
06/12/14	12:43	4259.65	3.20	148	1561	117	1.346	4.31	282.27	0.14	
06/13/14	7:15	4274.90	18.45	163	1804	122	1.622	29.93	307.89	0.15	
06/13/14	7:17	4276.27	1.37	164	3390	121	3.023	4.14	312.03	0.16	
06/13/14	7:18	4277.08	0.81	165	2301	120	2.035	1.65	313.68	0.16	
06/19/14	12:05	4422.02	144.94	310	1153	120	1.020	147.81	461.49	0.23	
06/19/14	13:30	4423.74	1.72	312	1117	107	0.881	1.52	463.00	0.23	
06/19/14	16:00	4426.00	2.26	314	1448	121	1.291	2.92	465.92	0.23	0.98
06/24/14	12:05	4543.27	117.27	431	*1440*	*120*	1.274	149.36	615.28	0.31	
06/26/14	12:40	4591.01	165.01	479	1970	127	1.844	304.28	919.56	0.46	
06/26/14	12:42	4593.20	2.19	481	1968	120	1.741	3.81	923.37	0.46	
07/03/14	9:35	4755.92	162.72	644	1650	126	1.532	249.34	1172.71	0.59	
07/03/14	9:37	4757.95	2.03	646	1318	126	1.224	2.48	1175.20	0.59	
07/09/14	11:40	4901.77	143.82	790	875	126	0.812	116.80	1292.00	0.65	
07/09/14	11:42	4903.69	1.92	792	795	124	0.727	1.40	1293.39	0.65	
07/17/14	12:33	5094.48	190.79	982	*790*	124	0.722	137.75	1431.15	0.72	
07/17/14	12:34	5095.13	0.65	983	*790*	127	0.739	0.48	1431.63	0.72	
07/17/14	12:36	5097.75	2.62	986	*790*	127	0.739	1.94	1433.56	0.72	
08/01/14	11:00	5452.10	354.35	1,340	1078	139	1.104	391.35	1824.91	0.91	
08/01/14	11:42	5454.03	1.93	1,342	938	150	1.037	2.00	1826.91	0.91	
08/01/14	11:44	5456.32	2.29	1,344	2314	14	0.239	0.55	1827.46	0.91	
10/10/14	13:00	7118.38	1662.06	3,006	130	51	0.049	81.70	1909.16	0.95	
10/10/14	13:02	7120.15	1.77	3,008	216	58	0.093	0.16	1909.32	0.95	1.86
10/31/14	13:00	7622.85	502.70	3,511	161	48	0.057	28.63	1937.95	0.97	
10/31/14	13:04	7624.49	1.64	3,512	78	54	0.031	0.05	1938.00	0.97	
12/11/14	13:50	8607.53	983.04	4,496	352	***131***	0.340	334.10	2272.11	1.14	
01/15/15	10:11	9441.32	833.79	5,329	47	131	0.045	37.60	2309.70	1.15	
01/15/15	10:12	9442.31	0.99	5,330	173	152	0.194	0.19	2309.89	1.15	
01/15/15	10:15	9445.26	2.95	5,333	388	136	0.389	1.15	2311.04	1.16	
01/29/15	11:50	9778.04	332.78	5,666	240	54	0.095	31.49	2342.53	1.17	
01/29/15	11:52	9780.13	2.09	5,668	239	50	0.088	0.18	2342.72	1.17	0.21
02/26/15	11:00	10448.98	668.85	6,337	72	137	0.073	48.63	2391.35	1.20	
02/26/15	11:02	10450.10	1.12	6,338	178	155	0.204	0.23	2391.57	1.20	
03/12/15	10:15	10780.66	330.56	6,669	483	***155***	0.552	182.40	2573.97	1.29	
04/28/15	8:30	11901.34	1120.68	7,789	126	114	0.106	118.86	2692.84	1.35	
04/28/15	8:36	11907.42	6.08	7,795	132	126	0.123	0.75	2693.58	1.35	
05/14/15	9:05	12285.12	377.70	8,173	96	55	0.039	14.68	2708.26	1.35	
05/14/15	9:10	12290.05	4.93	8,178	105	58	0.045	0.22	2708.48	1.35	1.10
05/28/15	11:30	12623.70	333.65	8,512	6	150	0.006	2.07	2710.55	1.36	
06/11/15	10:39	12650.70	27.00	8,539	318	172	0.403	10.88	2721.43	1.36	
07/02/15	11:00	13154.04	503.34	9,042	85	112	0.070	35.32	2756.75	1.38	
09/03/15	8:00	14662.17	1508.13	10,550	249	104	0.191	287.85	3044.60	1.52	0.76
12/10/15	13:00	17015.28	2353.11	12,903	162	95	0.113	266.92	3311.52	1.66	0.86

Table 1 : Summary of SVE System Field Readings
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Date	Time	Run Time Reading	Operating Hours		Discharge Readings		VOC Discharge				Calculated Correlation Factor
			since last reading	Total	PPM	CFM	lbs/Hr	lbs since last Reading	Total lbs	Total Tons	
03/10/16	12:00	17899.58	884.30	13,788	209	105	0.162	143.03	3454.55	1.73	1.78
06/29/16	8:00	20558.59	2659.01	16,447	156	101	0.116	309.58	3764.13	1.88	3.77
07/27/16	12:30	21232.43	673.84	17,120	126	103	0.095	64.20	3828.33	1.91	
08/25/16	11:00	21927.96	695.53	17,816	115	270	0.229	159.45	3987.78	1.99	1.55
09/22/16	10:20	22596.81	668.85	18,485	169	220	0.274	183.07	4170.85	2.09	
12/08/16	9:30	24443.73	1846.92	20,332	109	220	0.177	327.03	4497.88	2.25	6.59
01/10/17	12:23	24758.20	314.47	20,646	173	233	0.297	93.37	4591.25	2.30	
01/25/17	10:56	25115.43	357.23	21,003	206	179	0.271	96.95	4688.20	2.34	3.06
02/22/17	10:35	25786.27	670.84	21,674	248	214	0.391	262.30	4950.50	2.48	
03/09/17	11:04	26146.82	360.55	22,035	321	209	0.495	178.51	5129.01	2.56	
04/05/17	11:55	26792.33	645.51	22,680	454	113	0.378	244.08	5373.09	2.69	
05/16/17	7:00	26967.77	175.44	22,856	61	198	0.089	15.69	5388.79	2.69	5.78
06/07/17	13:00	27495.83	528.06	23,384	54	221	0.087	46.02	5434.80	2.72	
09/07/17	11:36	29698.50	2202.67	25,587	62	200	0.091	201.31	5636.11	2.82	
09/22/17	11:30	30057.43	358.93	25,945	56	211	0.087	31.26	5667.37	2.83	
10/04/17	10:15	30344.40	286.97	26,232	57	198	0.083	23.87	5691.24	2.85	0.81
11/02/17	13:00	31042.78	698.38	26,931	58	185	0.079	55.23	5746.48	2.87	
12/01/17	12:30	31739.31	696.53	27,627	59	192	0.083	58.16	5804.63	2.90	
12/06/17	12:40	31859.62	120.31	27,748	6	270	0.011	1.36	5806.00	2.90	
12/18/17	15:00	32149.36	289.74	28,037	60	208	0.092	26.65	5832.65	2.92	
01/09/18	10:00	32672.25	522.89	28,560	52	189	0.072	37.88	5870.52	2.94	
01/26/18	10:15	33080.48	408.23	28,968	48	172	0.061	24.84	5895.36	2.95	
02/09/18	13:10	33416.85	336.37	29,305	32	220	0.052	17.45	5912.82	2.96	0.19
02/23/18	11:15	33753.60	336.75	29,642	34	186	0.047	15.70	5928.51	2.96	
03/07/18	10:55	34040.75	287.15	29,929	52	227	0.087	24.98	5953.50	2.98	
03/16/18	13:03	34251.67	210.92	30,140	48	195	0.069	14.55	5968.05	2.98	
04/13/18	9:15	34970.90	719.23	30,859	46	200	0.068	48.77	6016.82	3.01	
04/30/18	13:16	35332.87	361.97	31,221	46	200	0.068	24.54	6041.36	3.02	
05/15/18	13:34	35692.17	359.30	31,580	48	200	0.071	25.42	6066.78	3.03	
05/29/18	14:20	36028.04	335.87	31,916	48	200	0.071	23.77	6090.55	3.05	0.65
06/04/18	16:30	36169.50	141.46	32,058	71	200	0.105	14.81	6105.35	3.05	
06/20/18	14:30	36556.30	386.80	32,444	48	200	0.071	27.37	6132.72	3.07	
07/03/18	10:30	36865.13	308.83	32,753	56	520	0.215	66.28	6199.01	3.10	
07/19/18	10:40	37249.27	384.14	33,137	46	486	0.165	63.30	6262.30	3.13	
08/09/18	12:30	37754.97	505.70	33,643	58	386	0.165	83.45	6345.75	3.17	2.13
09/06/18					36						
09/19/18	12:00	38730.31	975.34	34,618	46	405	0.137	133.93	6479.67	3.24	
10/04/18	15:30	39093.45	363.14	34,981	73	425	0.227	82.47	6562.14	3.28	
10/18/18	13:00	39428.14	334.69	35,316	42	261	0.081	27.04	6589.19	3.29	
10/31/18	13:40	39716.90	288.76	35,605	52	317	0.121	35.08	6624.27	3.31	
11/16/18	8:00	39983.80	266.90	35,872	68	156	0.078	20.87	6645.14	3.32	1.19
11/16/18	9:54	39985.70	1.90	35,874	77	264	0.149	0.28	6645.42	3.32	
12/11/18	14:20	40585.95	600.25	36,474	90	150	0.099	59.53	6704.95	3.35	
12/27/18	13:40	40965.57	379.62	36,854	72	310	0.165	62.45	6767.40	3.38	

Table 1 : Summary of SVE System Field Readings
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Date	Time	Run Time Reading	Operating Hours		Discharge Readings		VOC Discharge				Calculated Correlation Factor
			since last reading	Total	PPM	CFM	lbs/Hr	lbs since last Reading	Total lbs	Total Tons	
01/24/19	14:58	41636.05	670.48	37,524	63	275	0.128	85.62	6853.01	3.43	
02/05/19	12:02	41919.95	283.90	37,808	48	251	0.088	25.08	6878.09	3.44	
02/21/19	12:00	42303.95	384.00	38,192	26	218	0.042	16.10	6894.20	3.45	
03/07/19	7:00	42632.85	328.90	38,521	80	208	0.122	40.29	6934.48	3.47	0.97
03/22/19	11:09	42986.51	353.66	38,875	47	177	0.062	21.78	6956.26	3.48	
04/03/19	15:00	43277.65	291.14	39,166	58	440	0.186	54.29	7010.55	3.51	
04/18/19	12:00	43634.32	356.67	39,522	105	450	0.348	124.21	7134.76	3.57	
05/17/19	13:30	44330.99	696.67	40,219	39	365	0.104	72.34	7207.11	3.60	
06/12/19	17:00	44952.75	621.76	40,841	6	170	0.008	4.67	7211.78	3.61	
06/25/19	11:00	45283.69	330.94	41,172	23	445	0.075	24.97	7236.75	3.62	
07/09/19	13:30	45573.87	290.18	41,462	27	360	0.072	20.79	7257.53	3.63	
07/22/19	14:00	45906.56	332.69	41,795	27	425	0.083	27.62	7285.15	3.64	0.87
08/05/19	11:30	46239.45	332.89	42,127	37	462	0.126	41.94	7327.09	3.66	
08/19/19	11:00	46575.01	335.56	42,463	23	533	0.090	30.32	7357.41	3.68	
09/03/19	15:15	46937.77	362.76	42,826	31	455	0.104	37.71	7395.12	3.70	
09/05/19	7:30	46980.41	42.64	42,868	79	227	0.133	5.65	7400.77	3.70	
09/16/19	11:30	47242.95	262.54	43,131	21	372	0.058	15.12	7415.89	3.71	
09/30/19	11:00	47576.43	333.48	43,464	24	355	0.063	20.94	7436.83	3.72	
10/16/19	12:00	47958.94	382.51	43,847	22	280	0.045	17.37	7454.20	3.73	
10/28/19	11:45	48246.61	287.67	44,135	16	326	0.038	11.06	7465.26	3.73	
11/11/19	11:00	48581.38	334.77	44,469	35	488	0.127	42.56	7507.82	3.75	
11/11/19	12:10	48582.46	1.08	44,470	27	188	0.037	0.04	7507.86	3.75	0.88
11/26/19	11:20	48916.78	334.32	44,805	16	284	0.033	10.95	7518.82	3.76	
11/26/19	11:50	48917.34	0.56	44,805	26	472	0.089	0.05	7518.87	3.76	
12/11/19	10:30	49294.17	376.83	45,182	30	214	0.047	17.79	7536.65	3.77	
12/22/19	11:00	49558.50	264.33	45,447	16	462	0.054	14.40	7551.05	3.78	
12/30/19	14:00	49631.20	72.70	45,519	30	462	0.102	7.43	7558.48	3.78	
01/12/20	13:00	49682.50	51.30	45,571	19	282	0.039	2.01	7560.49	3.78	
02/10/20	11:00	49806.20	123.70	45,694	19	145	0.021	2.55	7563.04	3.78	
03/05/20	12:40	50000.00	193.80	45,888	38	197	0.055	10.66	7573.71	3.79	0.69
03/09/20	12:10	50070.44	70.44	45,958	23	250	0.041	2.92	7576.62	3.79	
03/23/20	11:45	50083.25	12.81	45,971	25	323	0.060	0.76	7577.39	3.79	
							Corrected Total:		13,401.38	6.79	

Notes:

1. Color shading indicates air sampling period with a unique correlation factor.
2. During the June 24 & July 17, 2014 site visit the field readings were not recorded. The italicized values presented above for these dates are conservative estimated values based upon last known readings.

Table 2 : Summary of Laboratory Analytical Results for Discharge Air Samples
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Parameters	Sample ID:	SVE	Canister #34000823 Serial C8528 2014-12-11	CANISTER #C8522	Canister #8408 2015-06-11 Air Sample	Canister #5451 Batch #320-14155 9-3-15	CANISTER #34000512 BATCH ID #320-15930	STATE M-1 LEASE	20160629 M SVE	20160922 M SVE	20161208 M SVE	20170309 M SVE
	Sample Date:	1-Aug-14	11-Dec-14	12-Mar-15	11-Jun-15	3-Sep-15	10-Dec-15	10-Mar-16	29-Jun-16	22-Sep-16	8-Dec-16	9-Mar-17
Volatile Organic Compounds by TO-15												
Acetone	ppb v/v	<2000	<615	<965	<860	<615	<370	<915	<280	<175	<106	<203
Benzene	ppb v/v	**8,820**	**2,960**	**533**	**3,630**	**312**	**194**	**1,070**	**2,600**	**853**	**373**	**550**
Benzyl chloride	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
Bromodichloromethane	ppb v/v	<120	<36.9	<57.9	<51.6	<36.9	<22.2	<54.9	<16.8	103.5	<6.33	<12.2
Bromoform	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Bromomethane	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
2-Butanone (MEK)	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
Carbon disulfide	ppb v/v	**1,800**	**272**	<154	<138	<98.4	<59.2	<146	**177**	<27.9	<16.9	<32.4
Carbon tetrachloride	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
Chlorobenzene	ppb v/v	<120	<36.9	<57.9	<51.6	<36.9	<22.2	<54.9	<16.8	<10.5	<6.33	<12.2
Dibromochloromethane	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Chloroethane	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
Chloroform	ppb v/v	<120	<36.9	<57.9	<51.6	<36.9	<22.2	<54.9	<16.8	<10.5	<6.33	<12.2
Chloromethane	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
1,2-Dibromoethane	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
1,2-Dichlorobenzene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,3-Dichlorobenzene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,4-Dichlorobenzene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Dichlorodifluoromethane	ppb v/v	**1,980**	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,1-Dichloroethane	ppb v/v	<120	<36.9	<57.9	<51.6	<36.9	<22.2	<54.9	<16.8	<10.5	<6.33	<12.2
1,2-Dichloroethane	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
1,1-Dichloroethene	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
cis-1,2-Dichloroethene	ppb v/v	<160	<49.2	**84.5**	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
trans-1,2-Dichloroethene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,2-Dichloropropane	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
cis-1,3-Dichloropropene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
trans-1,3-Dichloropropene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Ethylbenzene	ppb v/v	**13,500**	**3,830**	**799**	**2,890**	**731**	**723**	**446**	**2,530**	**1,390**	**531**	**908**
4-Ethyltoluene	ppb v/v	**974**	**533**	**164**	**299**	**256**	**186**	<73.2	**660**	**497**	**135**	**263**
Hexachlorobutadiene	ppb v/v	<800	<246	<386	<344	<246	<148	<366	<112	<69.8	<42.2	<81.0
2-Hexanone	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Methylene Chloride	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
4-Methyl-2-pentanone	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Styrene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,1,2,2-Tetrachloroethane	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	**41.1**	<14.0	<8.44	**20.0**
Tetrachloroethene	ppb v/v	<160	**71.9**	<77.2	<68.8	<49.2	<29.6	**92.9**	<22.4	<14.0	<8.44	<16.2
Toluene	ppb v/v	**4,020**	**1,040**	**228**	**1,480**	<49.2	<29.6	**120**	**975**	**380**	**164**	**193**

Table 2 : Summary of Laboratory Analytical Results for Discharge Air Samples
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Parameters	*Sample ID:*	SVE	Canister #34000823 Serial C8528 2014-12-11	CANISTER #C8522	Canister #8408 2015-06-11 Air Sample	Canister #5451 Batch #320-14155 9-3-15	CANISTER #34000512 BATCH ID #320-15930	STATE M-1 LEASE	20160629 M SVE	20160922 M SVE	20161208 M SVE	20170309 M SVE
	Sample Date:	**1-Aug-14**	**11-Dec-14**	**12-Mar-15**	**11-Jun-15**	**3-Sep-15**	**10-Dec-15**	**10-Mar-16**	**29-Jun-16**	**22-Sep-16**	**8-Dec-16**	**9-Mar-17**
1,2,4-Trichlorobenzene	ppb v/v	<800	<246	<386	<344	<246	<148	<366	<112	<69.8	<42.2	<81.0
1,1,1-Trichloroethane	ppb v/v	<120	<36.9	<57.9	<51.6	<36.9	<22.2	<54.9	<16.8	<10.5	<6.33	<12.2
1,1,2-Trichloroethane	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Trichloroethene	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
Trichlorofluoromethane	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,1,2-Trichloro-1,2,2-trifluoroethane	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.4	<14.0	<8.44	<16.2
1,2,4-Trimethylbenzene	ppb v/v	**2,020**	**648**	**299**	**774**	<98.4	**355**	<146	**968**	**740**	**228**	**411**
1,3,5-Trimethylbenzene	ppb v/v	**821**	**385**	**172**	**353**	**73.0**	**247**	<73.2	**727**	**541**	**192**	**397**
Vinyl acetate	ppb v/v	<320	<98.4	<154	<138	<98.4	<59.2	<146	<44.8	<27.9	<16.9	<32.4
Vinyl chloride	ppb v/v	<160	<49.2	<77.2	<68.8	<49.2	<29.6	<73.2	<22.8	<14.0	<8.44	<16.2
m,p-Xylene	ppb v/v	**12,700**	**4,680**	**1,110**	**3,920**	**1,140**	**1,380**	**609**	**5,050**	**2,550**	**870**	**1,510**
o-Xylene	ppb v/v	**4,520**	**1,190**	**286**	**1,120**	**164**	**194**	**107**	**720**	**419**	**177**	**337**
Total VOC as Hexane (C6-C12)	ppb v/v	**1,060,000**	**655,000**	**99,400**	**351,000**	**190,000**	**140,000**	**371,000**	**590,000**	**262,000**	**117,000**	**167,000**

Table 2 : Summary of Laboratory Analytical Results for Discharge Air Samples
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Parameters	Sample ID:	20170607 M SVE	20170907 M SVE	20171206 -M-SVE	20180307 -M-SVE	20180604 -M-SVE	20180906 -M-SVE	20181211 -M-SVE	20190307 M SVE	20190905 M SVE	20200122 M1-SVE	20200305 M SVE
	Sample Date:	7-Jun-17	7-Sep-17	6-Dec-17	7-Mar-18	4-Jun-18	6-Sep-18	11-Dec-18	7-Mar-19	5-Sep-19	22-Jan-20	5-Mar-20
Volatile Organic Compounds by TO-15												
Acetone	ppb v/v	<76.0	<116	<20.0	**5.67**	<78.0	<124	<178	<22.3	<84	<17	<78
Benzene	ppb v/v	**180**	**143**	**1.77**	**24.5**	**87.9**	**112**	**137**	**40.1**	**140**	**3.7**	**42**
Benzyl chloride	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<8.4	<1.7	<7.8
Bromodichloromethane	ppb v/v	<4.56	<6.93	<1.20	<0.300	<4.68	<7.43	<10.7	<1.34	<8.4	<1.7	<7.8
Bromoform	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Bromomethane	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<84	<17	<78
2-Butanone (MEK)	ppb v/v	<12.2	**178**	<3.20	<0.800	<12.5	<19.8	<28.4	**5.97**	<34	<6.7	<31
Carbon disulfide	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<34	<6.7	<31
Carbon tetrachloride	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<8.4	<1.7	<7.8
Chlorobenzene	ppb v/v	<4.56	<6.93	<1.20	<0.300	<4.68	<7.43	<10.7	<1.34	<8.4	<1.7	<7.8
Dibromochloromethane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Chloroethane	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<34	<6.7	<31
Chloroform	ppb v/v	<4.56	<6.93	<1.20	<0.300	<4.68	<7.43	<10.7	<1.34	<8.4	<1.7	<7.8
Chloromethane	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<84	<17	<78
1,2-Dibromoethane	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<8.4	<1.7	<7.8
1,2-Dichlorobenzene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,3-Dichlorobenzene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,4-Dichlorobenzene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Dichlorodifluoromethane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,1-Dichloroethane	ppb v/v	<4.56	<6.93	<1.20	<0.300	<4.68	<7.43	<10.7	<1.34	<8.4	<1.7	<7.8
1,2-Dichloroethane	ppb v/v	<12.2	<18.5	<3.20	**0.881**	<12.5	<19.8	<28.4	<3.56	<8.4	<1.7	<7.8
1,1-Dichloroethene	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<8.4	<1.7	<7.8
cis-1,2-Dichloroethene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
trans-1,2-Dichloroethene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,2-Dichloropropane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
cis-1,3-Dichloropropene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
trans-1,3-Dichloropropene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Ethylbenzene	ppb v/v	**229**	**219**	**4.75**	**25.4**	**250**	**334**	**363**	**284**	**270**	**33**	**120**
4-Ethyltoluene	ppb v/v	**58.5**	**45.1**	**2.38**	**3.74**	**42.7**	**89.2**	**76.7**	**167**	**180**	**25**	**100**
Hexachlorobutadiene	ppb v/v	<30.4	<46.2	<8.00	<2.00	<31.2	<49.5	<71.0	<8.90	<34	<6.7	<31
2-Hexanone	ppb v/v	<6.08	<9.24	<1.60	<0.400	<4.68	<9.91	<14.2	<1.78	<34	<6.7	<31
Methylene Chloride	ppb v/v	<6.08	<9.24	<1.60	**0.540**	<6.24	<9.91	<14.2	<1.78	<84	<17	<78
4-Methyl-2-pentanone	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Styrene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,1,2,2-Tetrachloroethane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Tetrachloroethene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Toluene	ppb v/v	**68.4**	**49.2**	<1.60	**6.92**	**34.4**	**44.3**	**41.0**	**38.8**	**30**	**3.1**	<7.8

Table 2 : Summary of Laboratory Analytical Results for Discharge Air Samples
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Parameters	*Sample ID:*	20170607 M SVE	20170907 M SVE	20171206 -M-SVE	20180307 -M-SVE	20180604 -M-SVE	20180906 -M-SVE	20181211 -M-SVE	20190307 M SVE	20190905 M SVE	20200122 M1-SVE	20200305 M SVE
	Sample Date:	7-Jun-17	7-Sep-17	6-Dec-17	7-Mar-18	4-Jun-18	6-Sep-18	11-Dec-18	7-Mar-19	5-Sep-19	22-Jan-20	5-Mar-20
1,2,4-Trichlorobenzene	ppb v/v	<30.4	<46.2	<8.00	<2.00	<31.2	<49.5	<71.0	<8.90	<34	<6.7	<31
1,1,1-Trichloroethane	ppb v/v	<4.56	<6.93	<1.20	<0.300	<4.68	<7.43	<10.7	<1.34	<8.4	<1.7	<7.8
1,1,2-Trichloroethane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
Trichloroethene	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	**20**
Trichlorofluoromethane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,1,2-Trichloro-1,2,2-trifluoroethane	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
1,2,4-Trimethylbenzene	ppb v/v	**85.9**	**50.3**	**7.35**	**9.05**	**71.3**	**134**	**124**	**83.0**	**75**	**10**	**59**
1,3,5-Trimethylbenzene	ppb v/v	**53.6**	**45.5**	**6.18**	**5.81**	**46.2**	**88.6**	**102**	**67.0**	**69**	**9.1**	**43**
Vinyl acetate	ppb v/v	<12.2	<18.5	<3.20	<0.800	<12.5	<19.8	<28.4	<3.56	<8.4	<6.7	<31
Vinyl chloride	ppb v/v	<6.08	<9.24	<1.60	<0.400	<6.24	<9.91	<14.2	<1.78	<8.4	<1.7	<7.8
m,p-Xylene	ppb v/v	**322**	**330**	**10.3**	**48.7**	**376**	**501**	**544**	**442**	**440**	**66**	**210**
o-Xylene	ppb v/v	**98.4**	**96.4**	**2.54**	**15.6**	**107**	**133**	**158**	**137**	**120**	**55**	**50**
Total VOC as Hexane (C6-C12)	ppb v/v	**54,500**	**40,900**	**4,630**	**9,930**	**46,500**	**76,600**	**107,000**	**77,900**	**69,000**	**14,000**	**26,000**

Table 3 : Summary of Liquid Level Measurements
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Monitoring Well	Top of Casing Elevation (AMSL-Feet)	Depth to Liquid Measurement Date	Depth to LNAPL (Feet-TOC)	Depth to Groundwater (Feet-TOC)	LNAPL Thickness (Feet)	Groundwater Elevation (AMSL-Feet)
MW-1R	3888.97	06/03/14	44.57	49.89	5.32	3839.08
	3888.97	09/22/14	44.87	48.91	4.04	3840.06
	3888.97	12/10/14	45.80	46.30	0.50	3842.67
	3888.97	03/11/15	45.12	46.83	1.71	3842.14
	3888.97	06/10/15	45.54	46.31	0.77	3842.66
	3888.97	09/02/15	45.81	47.37	1.56	3841.60
	3888.97	12/09/15	45.22	49.07	3.85	3839.90
	3888.97	03/09/16	45.30	47.18	1.88	3841.79
	3888.97	06/28/16	45.75	47.02	1.27	3841.95
	3888.97	09/21/16	46.10	46.38	0.28	3842.59
	3888.97	12/07/16	46.13	46.88	0.75	3842.09
	3888.97	03/08/17	46.14	46.57	0.43	3842.40
	3888.97	06/06/17	45.82	48.86	3.04	3840.11
	3888.97	09/08/17	46.30	46.63	0.33	3842.34
	3888.97	12/04/17	46.36	46.77	0.41	3842.20
	3888.97	03/05/18	46.47	46.81	0.34	3842.16
	3888.97	06/05/18	46.56	46.93	0.37	3842.04
	3888.97	09/05/18	46.31	48.81	2.50	3840.16
	3888.97	12/11/18	46.34	49.11	2.77	3839.86
	3888.97	03/06/19	46.48	49.20	2.72	3839.77
	3888.97	06/04/19	46.58	48.84	2.26	3840.13
	3888.97	09/04/19	47.88	48.67	0.79	3840.30
	3888.97	12/06/19	47.13	47.43	0.30	3841.54
	3888.97	03/05/20	47.11	47.68	0.57	3841.29
MW-2	3890.51	06/03/14	--	47.23	--	3843.28
	3890.51	09/22/14	--	46.37	--	3844.14
	3890.51	12/10/14	--	45.91	--	3844.60
	3890.51	03/11/15	--	46.03	--	3844.48
	3890.51	06/10/15	--	46.38	--	3844.13
	3890.51	09/02/15	--	46.44	--	3844.07
	3890.51	12/09/15	--	46.51	--	3844.00
	3890.51	03/09/16	--	46.61	--	3843.90
	3890.51	06/28/16	--	46.70	--	3843.81
	3890.51	09/21/16	--	46.80	--	3843.71
	3890.51	12/07/16	--	46.82	--	3843.69
	3890.51	03/08/17	--	46.88	--	3843.63
	3890.51	06/06/17	--	46.98	--	3843.53
	3890.51	09/08/17	--	47.06	--	3843.45
	3890.51	12/04/17	--	47.11	--	3843.40
	3890.51	03/05/18	--	47.22	--	3843.29
	3890.51	06/05/18	--	47.31	--	3843.20
	3890.51	09/05/18	--	47.36	--	3843.15
	3890.51	12/11/18	--	47.46	--	3843.05
	3890.51	03/06/19	--	47.51	--	3843.00
	3890.51	06/04/19	--	47.61	--	3842.90
	3890.51	09/04/19	--	47.76	--	3842.75
	3890.51	12/06/19	--	47.81	--	3842.70
	3890.51	03/05/20	--	47.91	--	3842.60

Table 3 : Summary of Liquid Level Measurements
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Monitoring Well	Top of Casing Elevation (AMSL-Feet)	Depth to Liquid Measurement Date	Depth to LNAPL (Feet-TOC)	Depth to Groundwater (Feet-TOC)	LNAPL Thickness (Feet)	Groundwater Elevation (AMSL-Feet)
MW-3	3889.34	06/03/14	--	46.35	--	3842.99
	3889.34	09/22/14	--	46.49	--	3842.85
	3889.34	12/10/14	--	46.08	--	3843.26
	3889.34	03/11/15	--	46.28	--	3843.06
	3889.34	06/10/15	--	46.51	--	3842.83
	3889.34	09/02/15	--	46.60	--	3842.74
	3889.34	12/09/15	--	46.68	--	3842.66
	3889.34	03/09/16	--	46.72	--	3842.62
	3889.34	06/28/16	--	46.85	--	3842.49
	3889.34	09/21/16	--	46.96	--	3842.38
	3889.34	12/07/16	--	47.02	--	3842.32
	3889.34	03/08/17	--	47.11	--	3842.23
	3889.34	06/06/17	--	47.13	--	3842.21
	3889.34	09/08/17	--	47.23	--	3842.11
	3889.34	12/04/17	--	47.28	--	3842.06
	3889.34	03/05/18	--	47.44	--	3841.90
	3889.34	06/05/18	--	47.48	--	3841.86
	3889.34	09/05/18	--	47.55	--	3841.79
	3889.34	12/11/18	--	47.60	--	3841.74
	3889.34	03/06/19	--	47.68	--	3841.66
	3889.34	06/04/19	--	47.80	--	3841.54
	3889.34	09/04/19	--	47.95	--	3841.39
	3889.34	12/06/19	--	48.00	--	3841.34
	3889.34	03/05/20	--	48.03	--	3841.31
MW-4	3888.90	06/03/14	--	46.38	--	3842.52
	3888.90	09/22/14	--	46.50	--	3842.40
	3888.90	12/10/14	--	46.14	--	3842.76
	3888.90	03/11/15	--	46.35	--	3842.55
	3888.90	06/10/15	--	46.49	--	3842.41
	3888.90	09/02/15	--	46.57	--	3842.33
	3888.90	12/09/15	--	46.68	--	3842.22
	3888.90	03/09/16	--	46.75	--	3842.15
	3888.90	06/28/16	--	46.87	--	3842.03
	3888.90	09/21/16	--	46.94	--	3841.96
	3888.90	12/07/16	--	47.03	--	3841.87
	3888.90	03/08/17	--	47.08	--	3841.82
	3888.90	06/06/17	--	47.15	--	3841.75
	3888.90	09/08/17	--	47.24	--	3841.66
	3888.90	12/04/17	--	47.29	--	3841.61
	3888.90	03/05/18	--	47.38	--	3841.52
	3888.90	06/05/18	--	47.50	--	3841.40
	3888.90	09/05/18	--	47.53	--	3841.37
	3888.90	12/11/18	--	47.62	--	3841.28
	3888.90	03/06/19	--	47.72	--	3841.18
	3888.90	06/04/19	--	47.80	--	3841.10
	3888.90	09/04/19	--	47.98	--	3840.92
	3888.90	12/06/19	--	48.00	--	3840.90
	3888.90	03/05/20	--	48.07	--	3840.83

Table 3 : Summary of Liquid Level Measurements
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Monitoring Well	Top of Casing Elevation (AMSL-Feet)	Depth to Liquid Measurement Date	Depth to LNAPL (Feet-TOC)	Depth to Groundwater (Feet-TOC)	LNAPL Thickness (Feet)	Groundwater Elevation (AMSL-Feet)
MW-5	3890.41	06/03/14	--	46.56	--	3843.85
	3890.41	09/22/14	--	46.70	--	3843.71
	3890.41	12/10/14	--	46.29	--	3844.12
	3890.41	03/11/15	--	46.44	--	3843.97
	3890.41	06/10/15	--	46.69	--	3843.72
	3890.41	09/02/15	--	46.79	--	3843.62
	3890.41	12/09/15	--	46.85	--	3843.56
	3890.41	03/09/16	--	46.90	--	3843.51
	3890.41	06/28/16	--	47.08	--	3843.33
	3890.41	09/21/16	--	47.13	--	3843.28
	3890.41	12/07/16	--	47.14	--	3843.27
	3890.41	03/08/17	--	47.23	--	3843.18
	3890.41	06/06/17	--	47.32	--	3843.09
	3890.41	09/08/17	--	47.40	--	3843.01
	3890.41	12/04/17	--	47.27	--	3843.14
	3890.41	03/05/18	--	47.54	--	3842.87
	3890.41	06/05/18	--	47.66	--	3842.75
	3890.41	09/05/18	--	47.72	--	3842.69
	3890.41	12/11/18	--	47.80	--	3842.61
	3890.41	03/06/19	--	47.85	--	3842.56
	3890.41	06/04/19	--	47.98	--	3842.43
	3890.41	09/04/19	--	48.15	--	3842.26
	3890.41	12/06/19	--	48.17	--	3842.24
	3890.41	03/05/20	--	48.23	--	3842.18
MW-6	3888.25	06/03/14	--	46.25	--	3842.00
	3888.25	09/22/14	--	46.39	--	3841.86
	3888.25	12/10/14	--	46.09	--	3842.16
	3888.25	03/11/15	--	46.23	--	3842.02
	3888.25	06/10/15	--	46.32	--	3841.93
	3888.25	09/02/15	--	46.48	--	3841.77
	3888.25	12/09/15	--	46.57	--	3841.68
	3888.25	03/09/16	--	46.62	--	3841.63
	3888.25	06/28/16	--	46.74	--	3841.51
	3888.25	09/21/16	--	46.81	--	3841.44
	3888.25	12/07/16	--	46.90	--	3841.35
	3888.25	03/08/17	--	46.93	--	3841.32
	3888.25	06/06/17	--	47.08	--	3841.17
	3888.25	09/08/17	--	47.12	--	3841.13
	3888.25	12/04/17	--	47.21	--	3841.04
	3888.25	03/05/18	--	47.30	--	3840.95
	3888.25	06/05/18	--	47.36	--	3840.89
	3888.25	09/05/18	--	47.43	--	3840.82
	3888.25	12/11/18	--	47.52	--	3840.73
	3888.25	03/06/19	--	47.60	--	3840.65
	3888.25	06/04/19	--	47.71	--	3840.54
	3888.25	09/04/19	--	47.81	--	3840.44
	3888.25	12/06/19	--	47.90	--	3840.35
	3888.25	03/05/20	--	47.98	--	3840.27

Table 3 : Summary of Liquid Level Measurements
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

Monitoring Well	Top of Casing Elevation (AMSL-Feet)	Depth to Liquid Measurement Date	Depth to LNAPL (Feet-TOC)	Depth to Groundwater (Feet-TOC)	LNAPL Thickness (Feet)	Groundwater Elevation (AMSL-Feet)
MW-7	3889.23	06/03/14	--	45.94	--	3843.29
	3889.23	09/22/14	--	46.08	--	3843.15
	3889.23	12/10/14	--	45.70	--	3843.53
	3889.23	03/11/15	--	45.36	--	3843.87
	3889.23	06/10/15	--	46.08	--	3843.15
	3889.23	09/02/15	--	46.14	--	3843.09
	3889.23	12/09/15	--	46.24	--	3842.99
	3889.23	03/09/16	--	46.30	--	3842.93
	3889.23	06/28/16	--	46.42	--	3842.81
	3889.23	09/21/16	--	46.52	--	3842.71
	3889.23	12/07/16	--	46.59	--	3842.64
	3889.23	03/08/17	--	46.65	--	3842.58
	3889.23	06/06/17	--	46.73	--	3842.50
	3889.23	09/08/17	--	46.80	--	3842.43
	3889.23	12/04/17	--	46.88	--	3842.35
	3889.23	03/05/18	--	46.96	--	3842.27
	3889.23	06/05/18	--	47.04	--	3842.19
	3889.23	09/05/18	--	47.11	--	3842.12
	3889.23	12/11/18	--	47.20	--	3842.03
	3889.23	03/06/19	--	47.27	--	3841.96
	3889.23	06/04/19	--	47.37	--	3841.86
	3889.23	09/04/19	--	47.50	--	3841.73
	3889.23	12/06/19	--	47.58	--	3841.65
	3889.23	03/05/20	--	47.66	--	3841.57
MW-8	3887.06	06/03/14	--	44.94	--	3842.12
	3887.06	09/22/14	--	45.11	--	3841.95
	3887.06	12/10/14	--	44.79	--	3842.27
	3887.06	03/11/15	--	44.94	--	3842.12
	3887.06	06/10/15	--	45.22	--	3841.84
	3887.06	09/02/15	--	45.21	--	3841.85
	3887.06	12/09/15	--	45.29	--	3841.77
	3887.06	03/09/16	--	45.35	--	3841.71
	3887.06	06/28/16	--	45.56	--	3841.50
	3887.06	09/21/16	--	45.67	--	3841.39
	3887.06	12/07/16	--	45.64	--	3841.42
	3887.06	03/08/17	--	45.68	--	3841.38
	3887.06	06/06/17	--	45.78	--	3841.28
	3887.06	09/08/17	--	45.82	--	3841.24
	3887.06	12/04/17	--	45.91	--	3841.15
	3887.06	03/05/18	--	46.03	--	3841.03
	3887.06	06/05/18	--	46.12	--	3840.94
	3887.06	09/05/18	--	46.16	--	3840.90
	3887.06	12/11/18	--	46.26	--	3840.80
	3887.06	03/06/19	--	46.33	--	3840.73
	3887.06	06/04/19	--	46.42	--	3840.64
	3887.06	09/04/19	--	46.53	--	3840.53
	3887.06	12/06/19	--	46.62	--	3840.44
	3887.06	03/05/20	--	46.71	--	3840.35

Notes:

1. TOC : Measured from top of casing.
2. LNAPL : Light non aqueous phase liquid.
3. -- : Denotes Not Measured.
4. AMSL : Denotes above mean sea level (AMSL)

Table 4 : Summary of Laboratory Analytical Results for Groundwater Samples
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

	Chloride (mg/L)															
	June 2014	Sept. 2014	Dec. 2014	March 2015	June 2015	Sept. 2015	Dec. 2015	March 2016	June 2016	Sept. 2016	Dec. 2016	March 2017	June 2017	Sept. 2017	Dec. 2017	March 2018
MW-1R	---	51.4	116	39.0	24.6	21.6	23.5	34.8	24.9	28.5	44.8	32.0	28.6	29.3	29.0	33.7
MW-2	17.7	17.4	18.3	16.6	16.8	16.6	15.4 *	13.5	18.9	17.6	18.2	15.0	15.9	15.2	16.2	16.6
MW-3	59.7	59.7	58.9	57.0	57.1	56.3	50.5 *	49.3	51.5	52.0	55.1	50.0	53.7	49.5	58.1	64.3
MW-4	**586**	**534**	**535**	**543**	**556**	**567**	**546 ***	**525**	**527**	**569**	**605**	**500**	**493**	**465**	**492**	**484**
MW-5	28.6	27.3	27.9	26.1	26.2	25.8	22.4 *	22.4	26.1	26.2	27.8	23.1	24.7	20.4	25.4	25.9
MW-6	**282**	**263**	**268**	**261**	**253**	**277**	197 *	150	128	128	125	94.4	86.3	79.3	71.8	64.7
MW-7	42.7	29.6	36.0	39.7	36.2	35.2	28.8 *	27.7	36.0	38.2	39.6	24.2	23.8	24.0	27.7	31.6
MW-8	**409**	**442**	**463**	**485**	**558**	**327**	**499**	**504**	**539**	**490**	**768**	**489**	**531**	**573**	**570**	**587**

Notes:

1. mg/L : milligrams per liter.
2. < : Analyte not detected at the laboratory reporting limit.
3. All analyses performed by TestAmerica Laboratories in Nashville, Tennessee.
4. Cells shaded in blue indicate results that are above the laboratory reporting limit.
5. Cells with text **bolded** indicate results that exceed the New Mexico Administrative Code 20.6.2.3103, Standards for Groundwater: chloride (250.0 mg/L).
6. --- : Analysis not performed.
7. * : Analysis performed outside of holding time.
8. December 2016 results for MW-1R and MW-8 were confirmed by laboratory. reanalysis.
9. Sample MW-1R was collected in December 2017 under sample ID MW-R1 as shown on the COC and in the field book.
10. Beginning with the September 2019 sampling event, Eurofins TestAmerica (Edison, NJ) became the Project Laboratory.

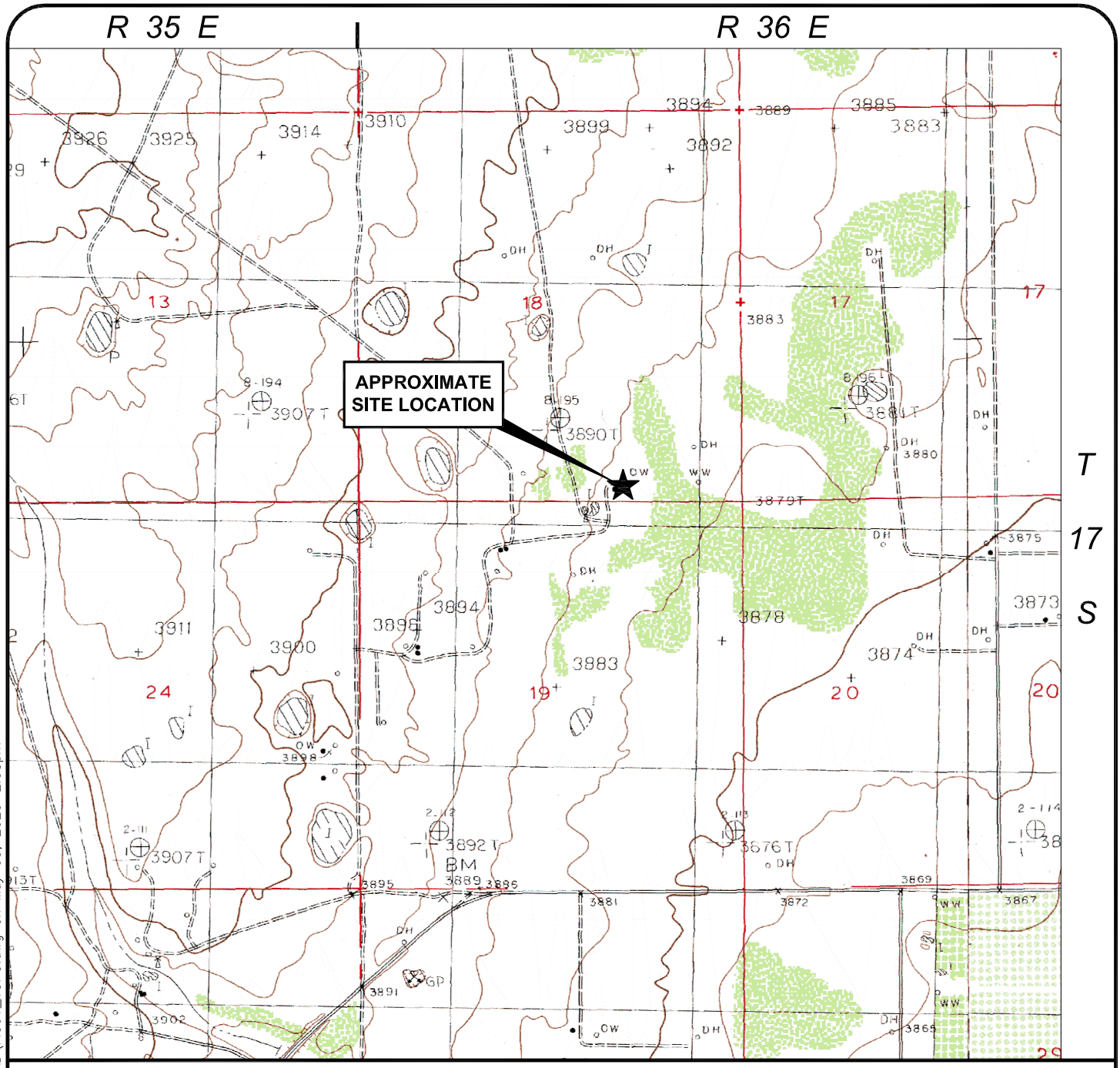
Table 4 : Summary of Laboratory Analytical Results for Groundwater Samples
Chesapeake Energy Corporation, State M Lease (AP-72)
Lea County, New Mexico

	Chloride (mg/L)							
	June 2018	Sept. 2018	Dec. 2018	March 2019	June 2019	Sept. 2019	Dec. 2019	March 2020
MW-1R	---	---	---	---	---	---	---	---
MW-2	---	---	---	---	---	---	---	---
MW-3	---	---	---	---	---	---	---	---
MW-4	**413**	**387**	**373**	**617**	**392**	**404**	**421**	**443**
MW-5	---	---	---	---	---	---	---	---
MW-6	---	---	---	---	---	---	---	---
MW-7	---	---	---	---	---	---	---	---
MW-8	**539**	**398**	**474**	**308**	**283**	**223**	**198**	**118**

Notes:

1. mg/L : milligrams per liter.
2. < : Analyte not detected at the laboratory reporting limit.
3. All analyses performed by TestAmerica Laboratories in Nashville, Tennessee.
4. Cells shaded in blue indicate results that are above the laboratory reporting limit.
5. Cells with text **bolded** indicate results that exceed the New Mexico Administrative Code 20.6.2.3103, Standards for Groundwater: chloride (250.0 mg/L).
6. --- : Analysis not performed.
7. * : Analysis performed outside of holding time.
8. December 2016 results for MW-1R and MW-8 were confirmed by laboratory. reanalysis.
9. Sample MW-1R was collected in December 2017 under sample ID MW-R1 as shown on the COC and in the field book.
10. Beginning with the September 2019 sampling event, Eurofins TestAmerica (Edison, NJ) became the Project Laboratory.

FIGURES



SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLES
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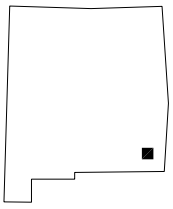
LOVINGTON SE, NEW MEXICO - PROVISIONAL EDITION 1985

NEW MEXICO



SCALE
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CLIENT CHESAPEAKE ENERGY CORPORATION, LLC OKLAHOMA CITY, OKLAHOMA	FIGURE TITLE ***SITE LOCATION AND TOPOGRAPHIC FEATURES***
LOCATION STATE M LEASE (AP-72) SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO	DOCUMENT TITLE SIXTH ANNUAL GROUNDWATER MONITORING REPORT

Equus Environmental, LLC
1323 East 71st Street, Suite 200
Tulsa, Oklahoma 74136-5065
918.921.5331
www.EQUUSENV.com

		DESIGNED BY	MNM
DATE	5/5/2020	APPROVED BY	MNM
SCALE	AS SHOWN	DRAWN BY	SKG
PROJECT NUMBER		FIGURE NUMBER	
CHKSTATM:H19001		1	

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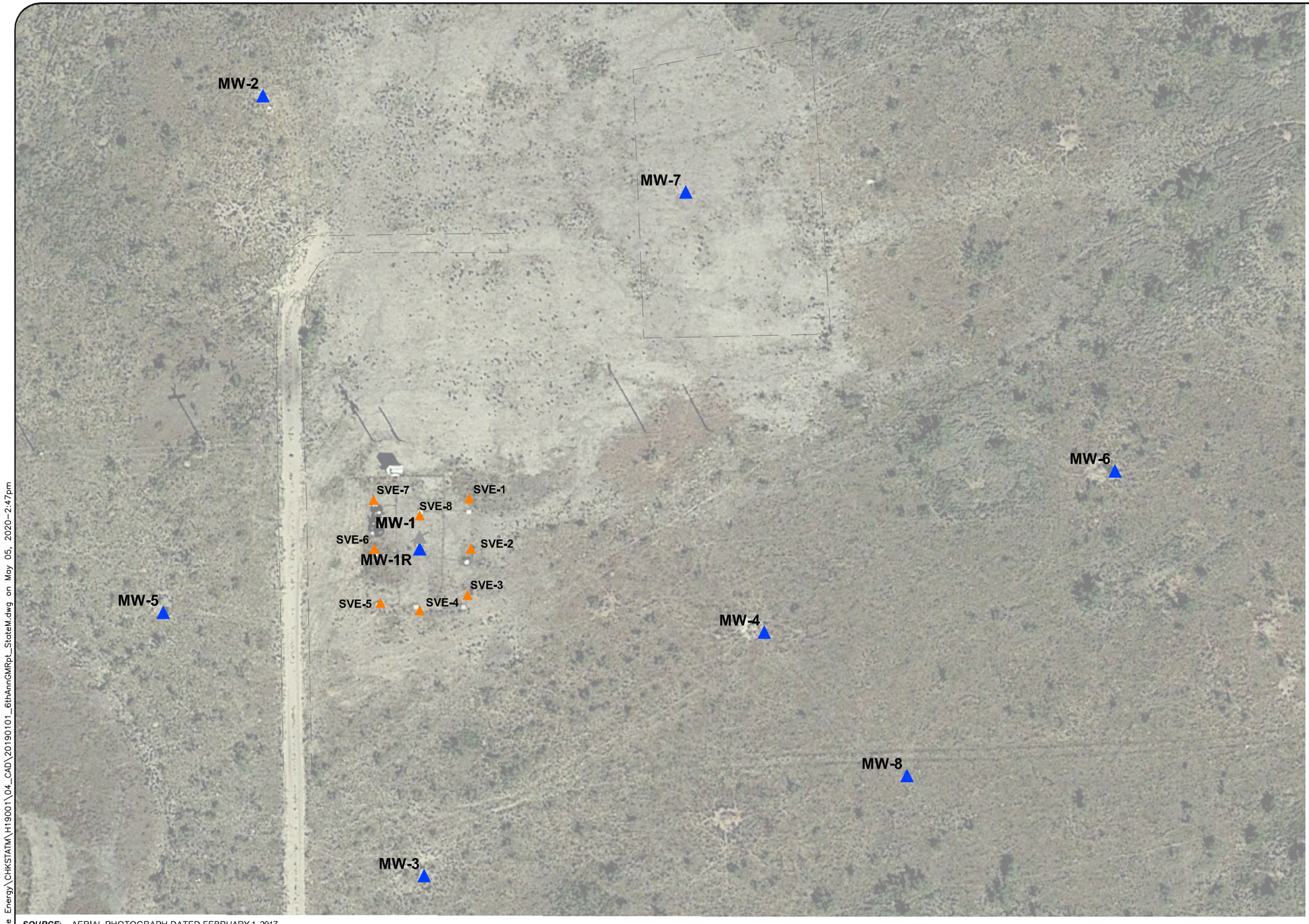

LEGEND

- MW-5 — LOCATION OF MONITORING WELL
- MW-1 — LOCATION OF PLUGGED AND ABANDONED MONITORING WELL
- SVE-1 — LOCATION OF SVE SYSTEM WELL

N

30 0 30 60
SCALE FEET

SOURCE: AERIAL PHOTOGRAPH DATED FEBRUARY 1, 2017, GOOGLE EARTH PRO SCREEN CAPTURE

H:\PROJECTS\Chesapeake Energy\CHKSTATM\H19001\04_CAD\20190101_6thAnnGMRpt_StateM.dwg on May 05, 2020 - 2:47pm

EQUUS Environmental, LLC
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Tulsa, Oklahoma 74136-5065
918.921.5331
www.EQUUSENV.com

DOCUMENT TITLE: SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE: ***SITE BASE MAP***

CLIENT: CHESAPEAKE ENERGY CORPORATION, OKLAHOMA CITY, OKLAHOMA

LOCATION: STATE M LEASE (AP-72), SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	MNM		
APPROVED BY	MNM	SCALE	1"= 60'
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
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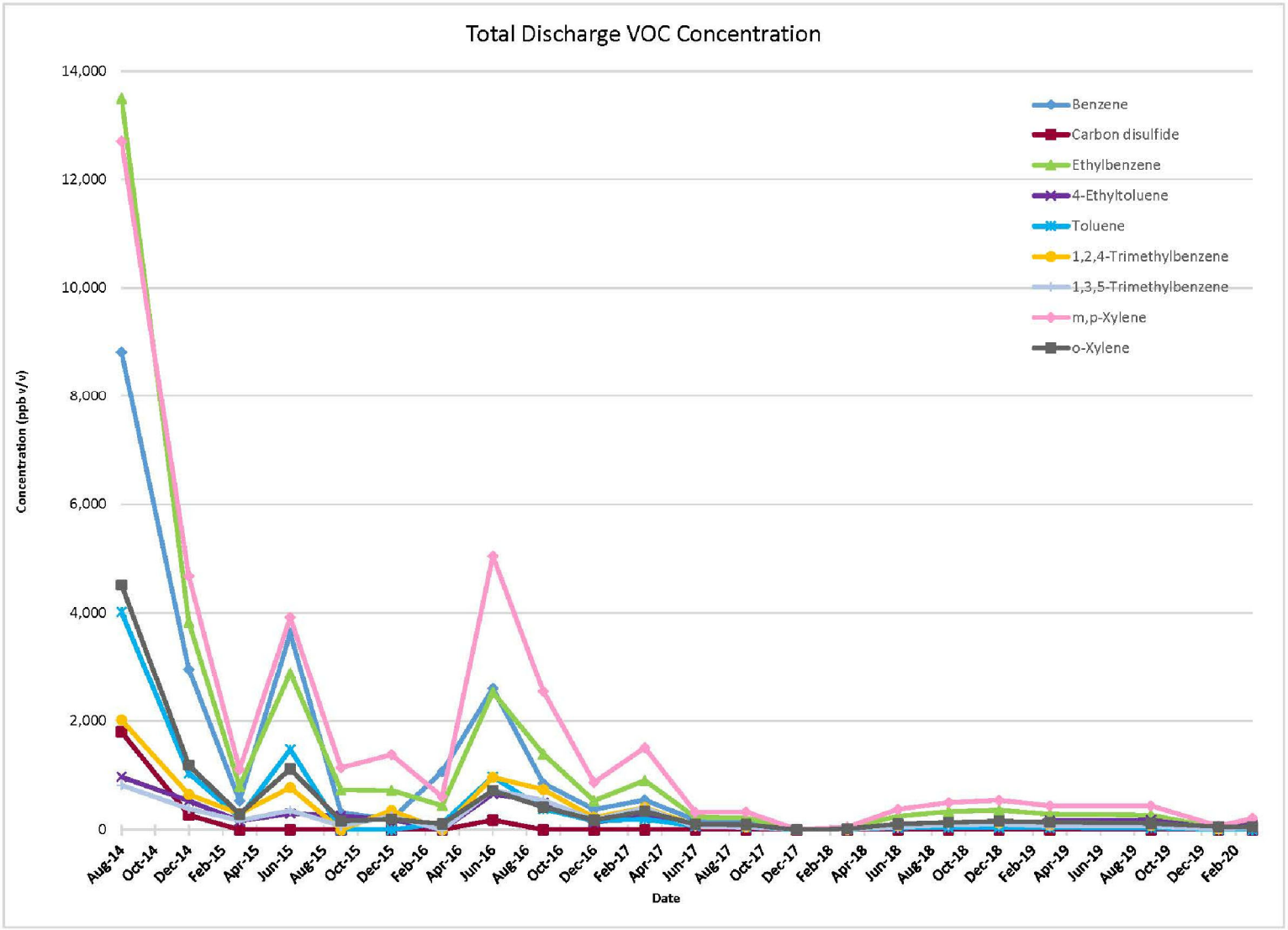

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918.921.5331
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DOCUMENT TITLE
SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE
SVE SYSTEM VOC DISCHARGE CONCENTRATIONS VERSUS TIME

CLIENT CHESAPEAKE ENERGY CORPORATION
OKLAHOMA CITY, OKLAHOMA

LOCATION STATE M LEASE (AP-72)
SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	JEC		
APPROVED BY	MNM	SCALE	NTS
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
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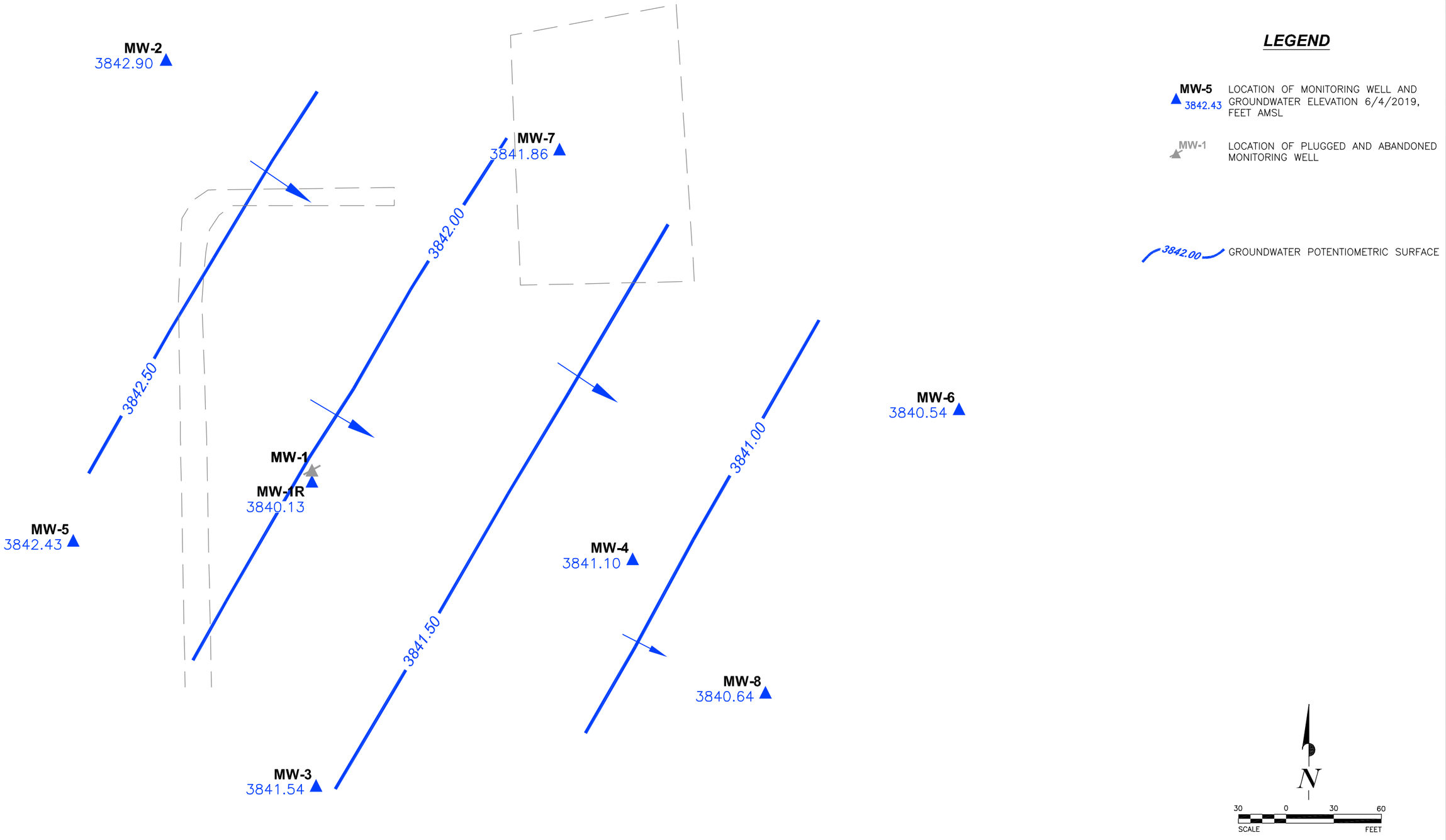

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DOCUMENT TITLE: SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE: ***GROUNDWATER POTENTIOMETRIC SURFACE, JUNE 4, 2019***

CLIENT: CHESAPEAKE ENERGY CORPORATION
OKLAHOMA CITY, OKLAHOMA

LOCATION: STATE M LEASE (AP-72)
SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	MNM		
APPROVED BY	MNM	SCALE	1"= 60'
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
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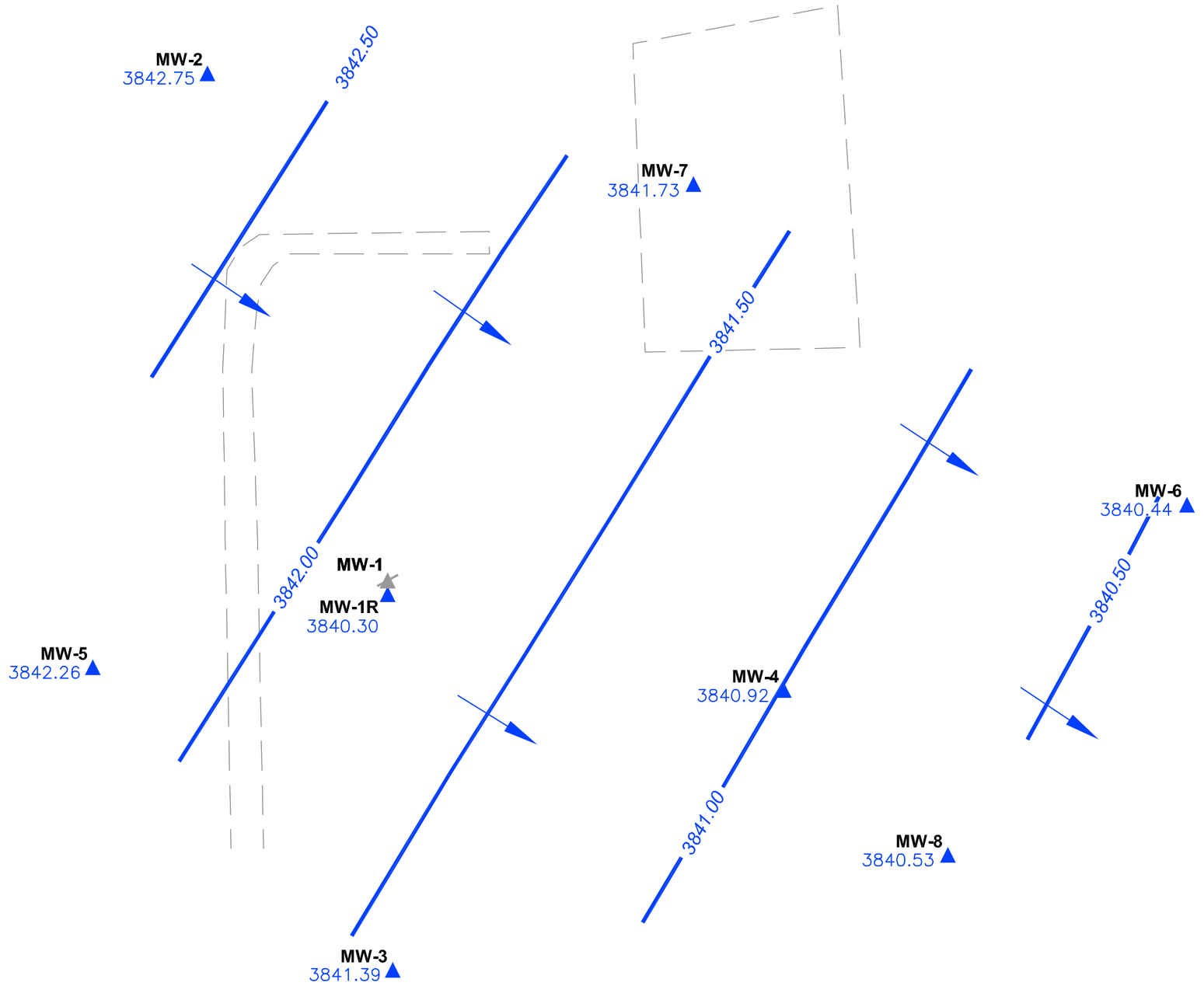

LEGEND

- **MW-5** 3842.26 — LOCATION OF MONITORING WELL AND GROUNDWATER ELEVATION 9/4/2019, FEET AMSL
- MW-1 — LOCATION OF PLUGGED AND ABANDONED MONITORING WELL
- 3842.00 — GROUNDWATER POTENTIOMETRIC SURFACE

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SCALE FEET

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DOCUMENT TITLE: SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE: ***GROUNDWATER POTENTIOMETRIC SURFACE, SEPTEMBER 4, 2019***

CLIENT: CHESAPEAKE ENERGY CORPORATION, OKLAHOMA CITY, OKLAHOMA

LOCATION: STATE M LEASE (AP-72), SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	MNM		
APPROVED BY	MNM	SCALE	1"= 60'
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
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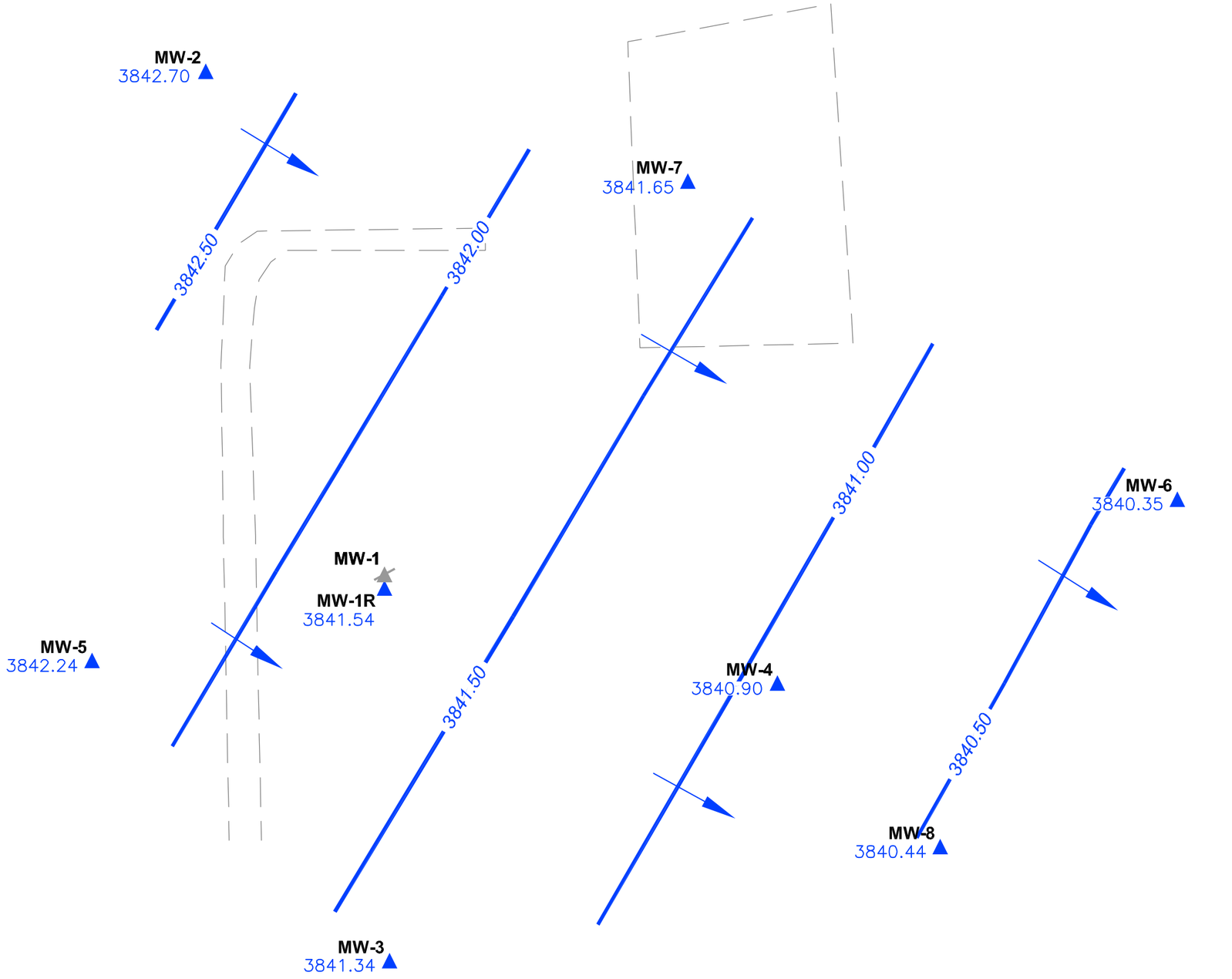

LEGEND

- **MW-5** 3842.24 — LOCATION OF MONITORING WELL AND GROUNDWATER ELEVATION 12/6/2019, FEET AMSL
- MW-1 — LOCATION OF PLUGGED AND ABANDONED MONITORING WELL
- 3842.00 — GROUNDWATER POTENTIOMETRIC SURFACE

N

30 0 30 60
SCALE FEET

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918.921.5331
www.EQUUSENV.com

DOCUMENT TITLE: SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE: ***GROUNDWATER POTENTIOMETRIC SURFACE, DECEMBER 6, 2019***

CLIENT: CHESAPEAKE ENERGY CORPORATION
OKLAHOMA CITY, OKLAHOMA

LOCATION: STATE M LEASE (AP-72)
SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	MNM		
APPROVED BY	MNM	SCALE	1"= 60'
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
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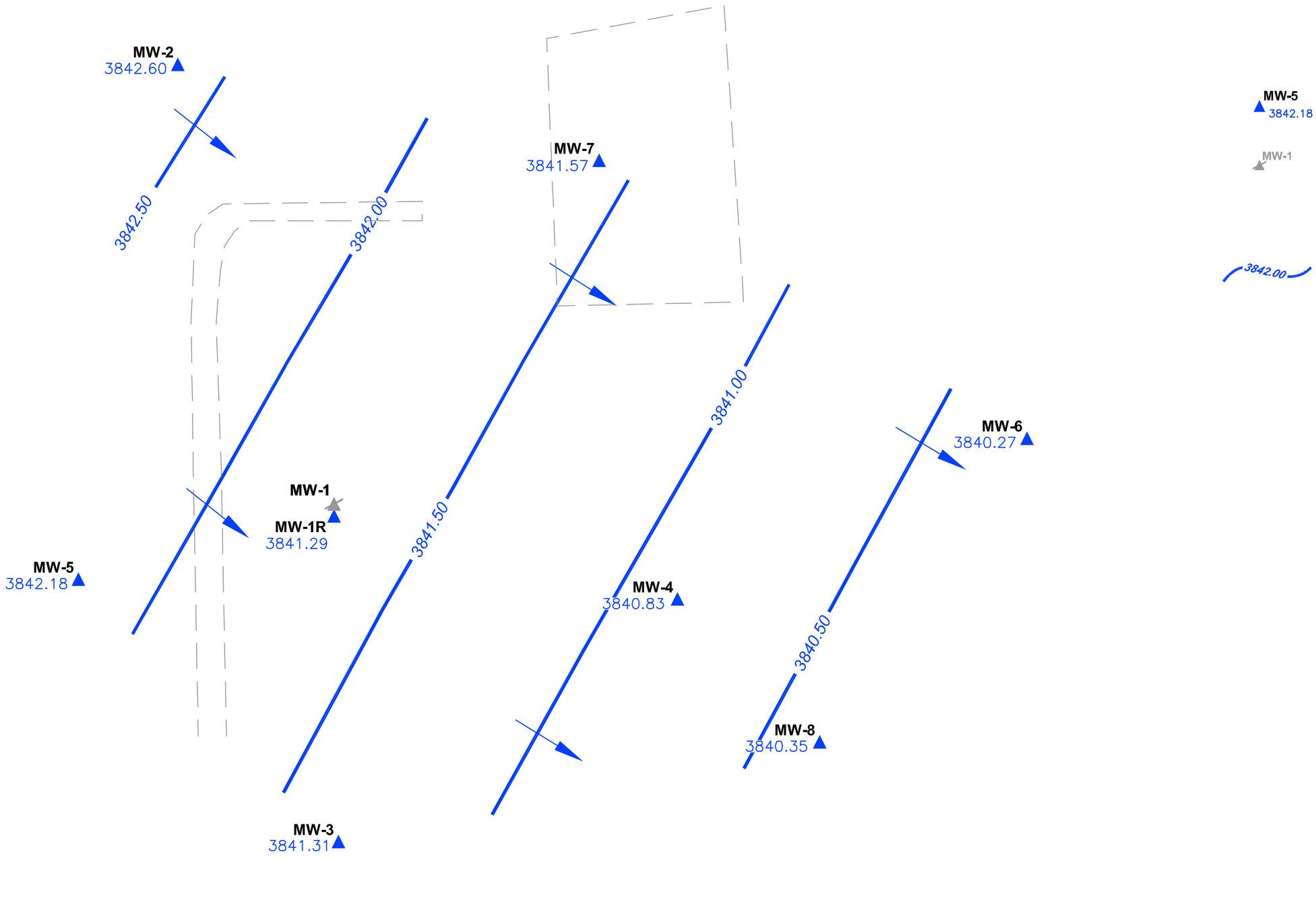

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1323 East 71st Street, Suite 200
Tulsa, Oklahoma 74136-5065
918.921.5331
www.EQUUSENV.com

DOCUMENT TITLE: SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE: ***GROUNDWATER POTENTIOMETRIC SURFACE, MARCH 5, 2020***

CLIENT: CHESAPEAKE ENERGY CORPORATION, OKLAHOMA CITY, OKLAHOMA

LOCATION: STATE M LEASE (AP-72), SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	MNM		
APPROVED BY	MNM	SCALE	1"= 60'
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
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EQUUS Environmental, LLC
1323 East 71st Street, Suite 200
Tulsa, Oklahoma 74136-5065
918.921.5331
www.EQUUSENV.com

DOCUMENT TITLE: SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE: *ISOPLETH OF CHLORIDE CONCENTRATIONS IN GROUNDWATER, MARCH 5, 2020*

CLIENT: CHESAPEAKE ENERGY CORPORATION
OKLAHOMA CITY, OKLAHOMA

LOCATION: STATE M LEASE (AP-72)
SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	MNM		
APPROVED BY	MNM	SCALE	1"= 60'
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
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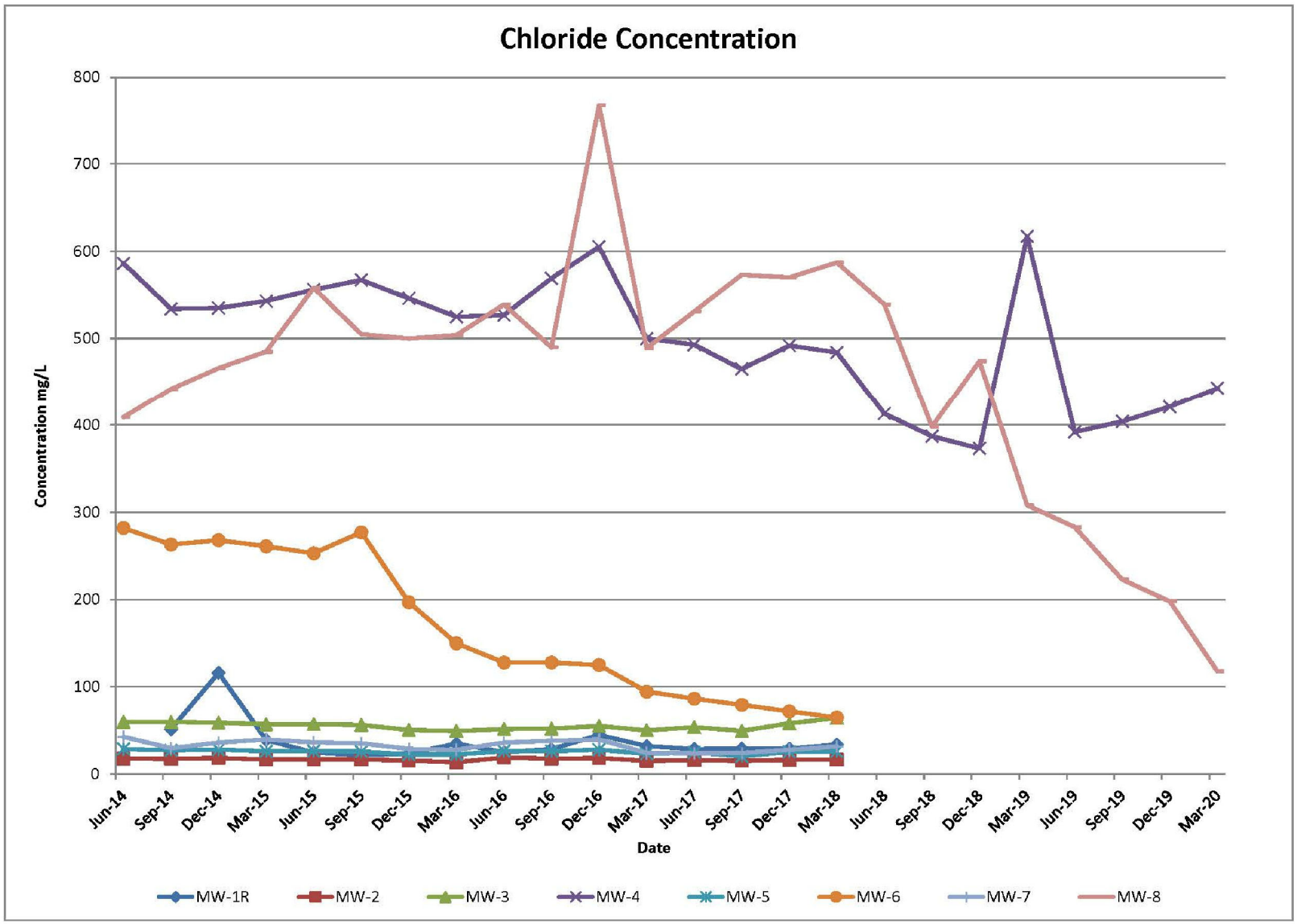

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918.921.5331
www.EQUUSENV.com

DOCUMENT TITLE
SIXTH ANNUAL GROUNDWATER MONITORING REPORT

FIGURE TITLE
CHLORIDE CONCENTRATION TREND GRAPHS

CLIENT CHESAPEAKE ENERGY CORPORATION
OKLAHOMA CITY, OKLAHOMA

LOCATION STATE M LEASE (AP-72)
SEC. 18, T17S, R36E, LEA COUNTY, NEW MEXICO

DESIGNED BY	CNA		
APPROVED BY	MNM	SCALE	NTS
DRAWN BY	SKG	DATE	5/5/2020

PROJECT NUMBER	FIGURE NUMBER
CHKSTATM:H19001	9

APPENDICES

APPENDIX A

STAGE 2 ABATEMENT PLAN

ARCADIS
Infrastructure · Water · Environment · Buildings

ARCADIS U.S., Inc.
1004 North Big Spring Street
Suite 300
Midland
Texas 79701
Tel 432 687 5400
Fax 432 687 5401
www.arcadis-us.com

ENVIRONMENT

Mr. Glenn Von Gonten
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Subject:
State M-1 AP-072
Stage 2 Abatement Plan

Date:
March 27, 2012

Dear Mr. Von Gonten:

On behalf of Chesapeake Energy Corporation, ARCCADIS U.S. Inc. respectfully submits the enclosed Stage 2 Abatement plan for the State M-1 site (AP-072). A Stage 1 Abatement Plan Report was submitted on March 20, 2012. Your review and approval of this Abatement Plan will be appreciated. The landowner, Darr Angell, is anxious for us to complete soil remediation at this site.

If you have any questions please do not hesitate to contact Bradley Blevins at (575) 391-1462 or via e-mail at bblevins@chkenergy or me at (432) 687-5400, e-mail address shall@aracdis-us.com.

Contact:
Sharon Hall

Phone:
432 687-5400

Email:
shall@aracdis-us.com

Our ref:
MT001088

ARCADIS U.S., Inc.
TX Engineering License # F-533

Sincerely,

ARCADIS U.S., Inc.

Sharon E. Hall

Sharon E. Hall
Associate Vice President

Copies:
Bradley Blevins- Chesapeake, Hobbs

Imagine the result

g:\aproject\chesapeake\m-1 stage 2 plan\transmitall letter.doc

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

Chesapeake Energy Corporation

State M-1 AP-072
Stage 2 Abatement
Plan Proposal

Hobbs, New Mexico

March 27, 2012

ARCADIS

Sharon Hall
Associate Vice President

State M-1 AP-072

Stage 2 Abatement
Plan Proposal

Prepared for:
Chesapeake Energy
Corporation
Hobbs, New Mexico

Prepared by:
ARCADIS U.S., Inc.
1004 North Big Spring Street
Suite 300
Midland
Texas 79701
Tel 432 687 5400
Fax 432 687 5401

Our Ref.:
MT001088.0001.00001

Date:
March 27, 2012

Table of Contents

Figures

Appendices

ARCADIS

1. INTRODUCTION

The subject site is a former tank battery site located east of Buckeye, New Mexico. The site was purchased by Chesapeake Energy Corporation (Chesapeake) in April 2004. Chesapeake did not operate the tank battery or the associated well field and began the process of facility abandonment in 2007.

Seven monitor wells and nine soil borings have been drilled at the site. Elevated chloride concentrations and limited hydrocarbon compounds were detected in soil samples collected from soil borings and monitoring wells. Elevated chlorides were detected in the down gradient monitor wells and light non-aqueous phase liquid (LNAPL) occurs in monitoring well MW-1. LNAPL recovery activities have been piloted at the site and will commence again upon completion of surface reclamation activities.

2. SUMMARY OF STAGE 1 ABATEMENT ACTIVITIES

Initial site investigation activities were conducted in May of 2007 following abandonment of the tank battery. Stage 1 Abatement activities were conducted during the period of May 2007 through September 2011. Stage 1 Abatement activities included drilling and soil sampling of nine boreholes, drilling and sampling of seven monitor wells, EM 31 and EM 34 surveys, conversion of one monitoring well into a recovery well and recovery of phase-separated hydrocarbons from the recovery well.

New Mexico Oil Conservation Division (NMOCD) was notified of impacts to groundwater at the site via e-mail on May 30, 2007. NMOCD notified Chesapeake in a letter dated June 19, 2007 that a Stage 1 Abatement Plan was required for the site in accordance with Rule 19.

The Stage 1 Abatement Plan was submitted to NMOCD on August 22, 2007. The plan summarized site activities taken to date. The plan proposed the drilling and sampling of a minimum of three additional soil borings and installation and sampling of nine groundwater monitoring wells.

BBC contacted NMOCD via email on April 24, 2010 to inquire about the status of the Stage 1 Abatement Plan approval and Chesapeake's desire to conduct the proposed Stage 1 Abatement Plan activities. On May 27, 2010, NMOCD responded via email that the State was not staffed to review the Abatement Plans (APs) in a timely manner. On June 23, 2010, BBC contacted NMOCD via email to request a waiver of the Public Notice requirement and inform NMOCD that Chesapeake and the landowner were

anxious to move forward with the proposed AP activities. NMOCD replied via email on June 23, 2010 stating they were still understaffed to review the AP and could not waive the Public Notice requirement. They advised BBC that Chesapeake could proceed "at risk." On July 12, 2010 BBC informed NMOCD by registered letter that Chesapeake was planning to start the Stage 1 Assessment on or about August 23, 2010. They further informed NMOCD they would be submitting the required Public Notices, a copy of which was attached to the letter. NMOCD did not respond to the registered letter.

The public notices were published in the Hobbs News-Sun and Lovington Leader on July 22, 2010 and the Albuquerque Journal on July 24, 2010. No comments were received from the public or NMOCD during the 30-day comment period and Chesapeake proceeded with the proposed Stage 1 Abatement Plan activities on August 26, 2010. Copies of correspondence and Public Notice are included in Appendix A.

A detailed description of site activities and results can be found in the report submitted to NMOCD dated March 20, 2012 entitled State M-1 AP-072, Stage 1 Abatement Report (Site Assessment Investigation). Analytical results for soil and groundwater sampling are summarized on Figure 1.

3. STAGE 2 ABATEMENT PLAN PROPOSAL

After review of various remedial options, we propose the following Stage 2 Abatement Plan. The plan addresses soil and groundwater remediation.

3.1 Soil Remediation

The selected remedial option will be the excavation of near-surface soils and installation of clay liners. The anticipated extent and depth of excavation is based on assessment activities (laboratory analysis and visual observation) and is shown in Figure 2. Near surface soils (to a depth of 5 feet below ground surface) with chloride concentrations in excess of 1,000 milligrams per kilogram (mg/kg) and a Total Petroleum Hydrocarbons (TPH) concentration in excess of 1,000 mg/kg will be excavated and disposed. Excavated soils will be disposed at Lea Land Landfill.

Areas where chloride or TPH concentrations are expected to exceed 1,000 mg/kg at depths greater than 5 feet below ground surface soils will be excavated to a depth of 5

feet below ground surface. Soils will be screened in the field for chlorides using chloride field test kits and for TPH using a photoionization. Critical samples (samples used to delineate the excavations) will be submitted for laboratory analysis of chlorides and/or TPH. Following excavation, a 12-inch compacted clay layer that meets or exceeds a permeability of equal to or less than 1×10^{-8} centimeters per second will be installed in the excavations. The lined excavations will be backfilled with four feet of locally obtained native soil. All of the excavated areas will be re-seeded with native vegetation. Areas that are supporting vegetation will not be disturbed.

Use of the USEPA Multi-Med model demonstrates that the clay liners will mitigate the leaching of chlorides to groundwater. The model predicts that after 7000 years of infiltration through the liner the maximum concentration of chlorides in groundwater will be 221.8 milligrams per liter (mg/L). The Multi-Med inputs and outputs are included in Appendix A.

3.2 Groundwater Remediation and Monitoring

One additional groundwater monitoring well will be installed downgradient of the site. The monitoring well will be designated MW-8.

Groundwater samples will be collected from all of the monitoring wells and analyzed for chlorides using USEPA method 9056 for each of four quarters. Based on sample results for one year (four quarters), sampling frequency will be reviewed and may be revised.

Sampling will be discontinued when eight quarters of sample results indicate chloride concentrations are below New Mexico Water Quality Control Commission, Title 20, Chapter 6, Part 2 standards. Sample results will be submitted to the NMOCD annually on June 15.

Following removal of LNAPL from MW-1, groundwater samples will be collected from MW-1 and analyzed for benzene, toluene ethylbenzene and xylenes (BTEX) using USEPA method 8260B for each of four quarters. Based on sample results for one year (four quarters), sampling frequency will be reviewed and may be revised.

Sampling of MW-1 for BTEX will be discontinued when eight quarters of sample results indicate BTEX concentrations are below New Mexico Water Quality Control Commission, Title 20, Chapter 6, Part 2 standards. Sample results will be submitted to

the NMOCD annually on June 15. Proposed groundwater remediation is presented in Sections 3.2.1 and 3.2.2.

3.2.1 Chlorides

Chloride concentrations in groundwater exceed New Mexico Water Quality Control Commission standards in two wells (MW-1 411mg/L and MW-4 472mg/L).

Removal of near-surface soils that are a potential source of chlorides and BTEX in groundwater and lining of excavations with chloride and TPH concentrations in excess of 1,000 mg/kg will mitigate leaching of chlorides to groundwater. Considering the relatively low concentrations of chlorides in groundwater and the fact that soil removal and clay liner infiltration barrier installation will be conducted at this site, we propose monitoring the site for a period of two years before considering pumping of groundwater at this site. With the proposed source removal and mitigation and the severe drought conditions being experienced in this area, we believe it prudent to evaluate if chloride mass removal by pumping is warranted at this site.

3.2.2 Hydrocarbons

A pilot LNAPL recovery test will take place over a three week period and will be used to develop long-term recovery procedures. LNAPL will be recovered from MW-1 and disposed in a NMOCD approved facility. Additionally, two soil vent borings equipped with wind turbines will be installed in the area near MW-1.

4. PUBLIC NOTIFICATION

Written notification of submittal of the Stage 2 Abatement Plan Proposal and site activities will be sent to all surface owners of record within a one-mile radius of the site. NMOCD will be supplied with a list of parties to be notified. Publication of notice of activities will be published in a state-wide circulated newspaper, the Albuquerque Journal, and two county newspapers, the Hobbs-Daily News Sun and the Lovington Leader.

5. REMEDIATION WORK SCHEDULE

Soil remediation activities are expected to be completed in 15 working days (Monday through Friday). Groundwater remediation activities will be ongoing. An estimated completion date for groundwater remediation is not available.

6. REFERENCES

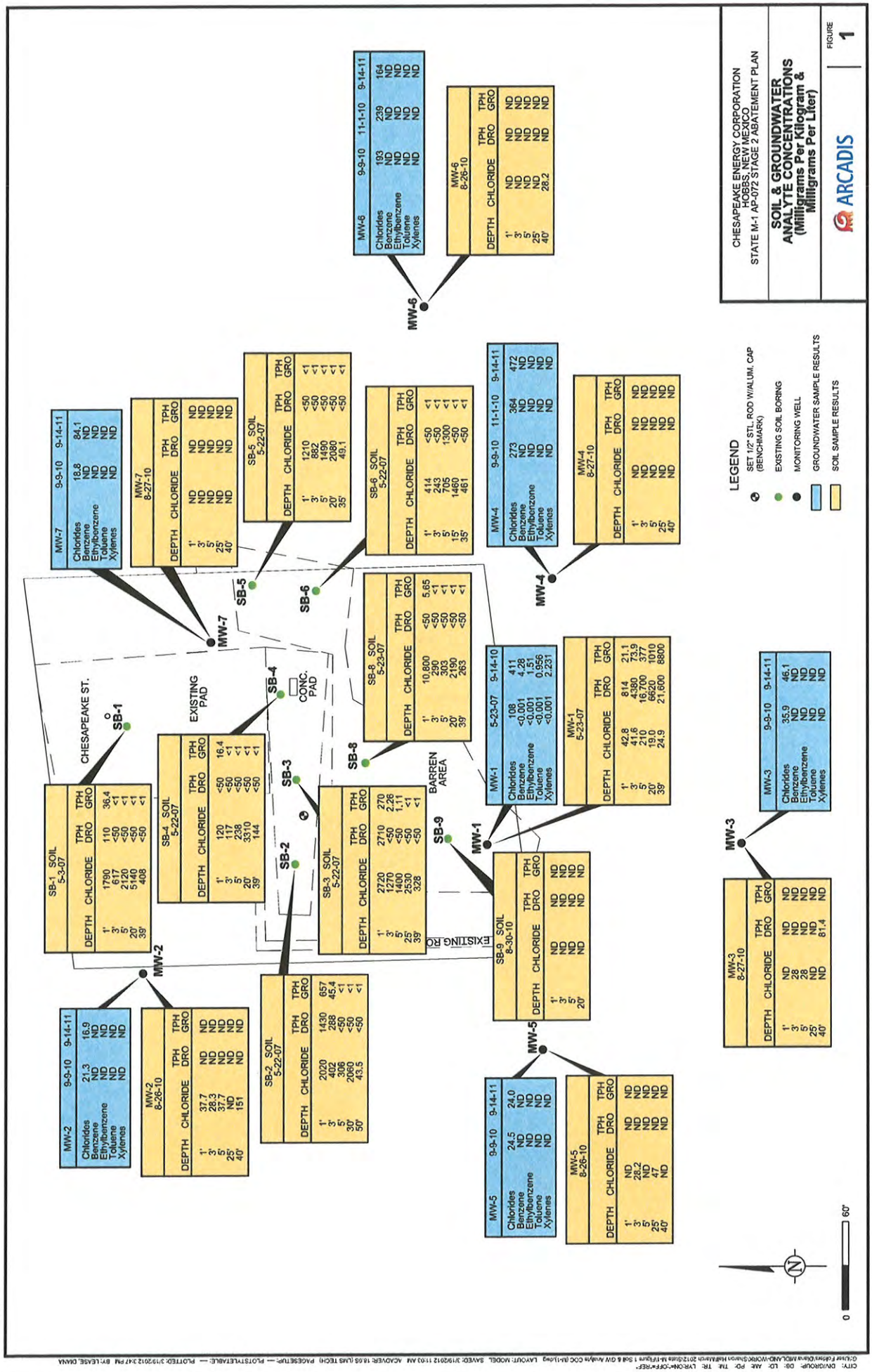
Groundwater Handbook; United States Environmental Protection Agency, Office of Research and Development, Center for Environmental Research Information; 1992

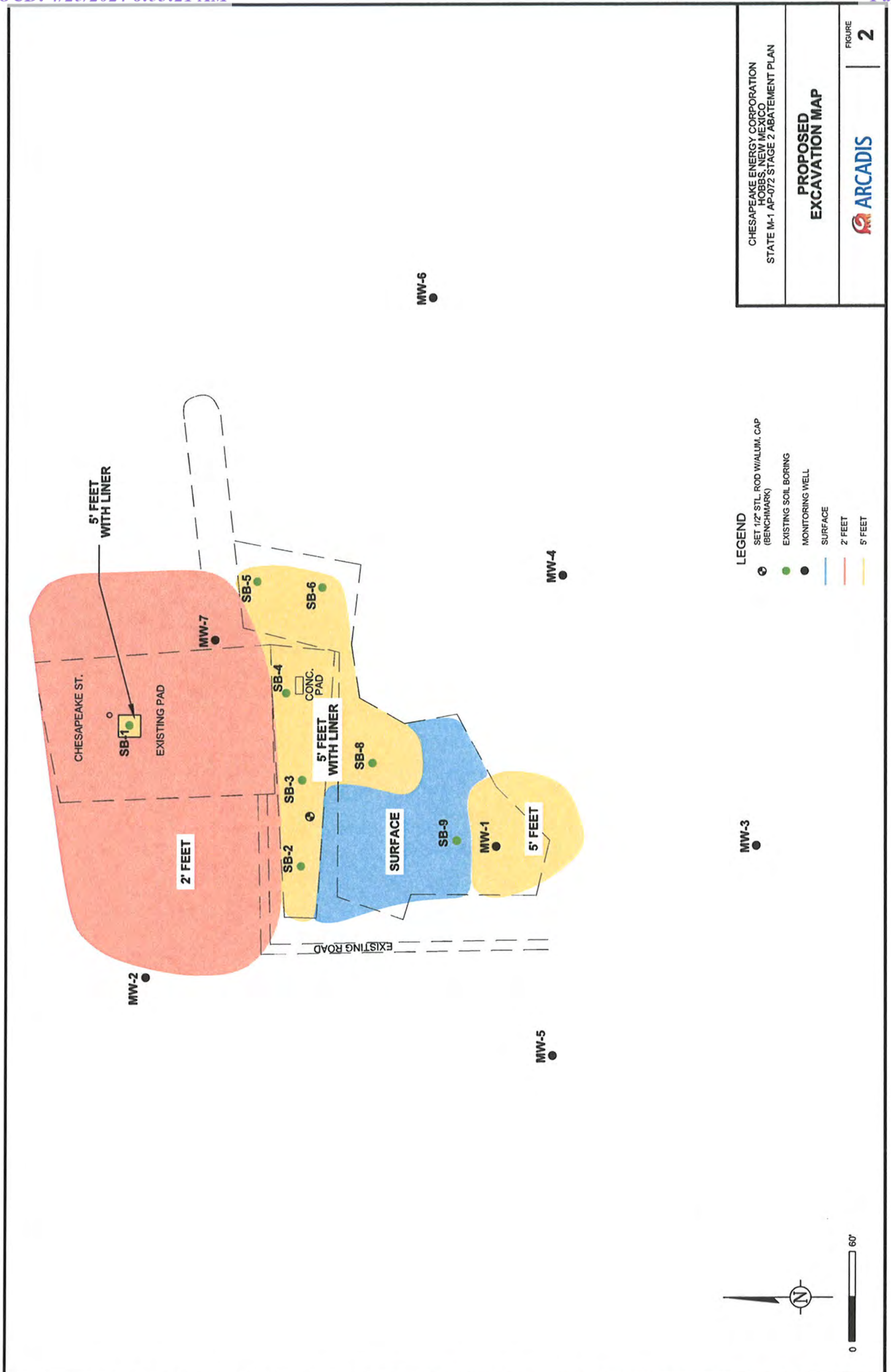
New Mexico Water Quality Control Commission, Title 20 Chapter 6, Part 2, Subpart I

State M-1 AP-072 Stage 1 Abatement Report (Site Assessment Investigation); ARCADIS; March 2012

State M-1Salt Water Disposal Tank Battery, Stage 1 Abatement Plan (Ap-072), BBC International; August 2007

New Mexico Water Quality Control Commission, Title 20 Chapter 6, Part 2, Subpart I


CHESAPEAKE ENERGY CORPORATION
HOBBS, NEW MEXICO
STATE M-1 AP-072 STAGE 2 ABATEMENT PLAN
SOIL & GROUNDWATER ANALYTE CONCENTRATIONS (Milligrams Per Kilogram & Milligrams Per Liter)
FIGURE 1
ARCADIS
LEGEND
SET 1/2" STL. ROD W/ALUM. CAP (BENCHMARK)
EXISTING SOIL BORING
MONITORING WELL
GROUNDWATER SAMPLE RESULTS
SOIL SAMPLE RESULTS
CHESAPEAKE ST.
EXISTING PAD
CONC. PAD
BARREN AREA
EXISTING ROAD
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
SB-1
SB-2
SB-3
SB-4
SB-5
SB-6
SB-8
SB-9
N
0
60'


CHESAPEAKE ENERGY CORPORATION
HOBBS, NEW MEXICO
STATE M-1 AP-072 STAGE 2 ABATEMENT PLAN
PROPOSED
EXCAVATION MAP
ARCADIS
FIGURE
2
LEGEND
SET 1/2" STL. ROD W/ALUM. CAP (BENCHMARK)
EXISTING SOIL BORING
MONITORING WELL
SURFACE
2' FEET
5' FEET
5' FEET WITH LINER
CHESAPEAKE ST.
EXISTING PAD
CONC. PAD
2' FEET
SURFACE
5' FEET
EXISTING ROAD
SB-1
SB-2
SB-3
SB-4
SB-5
SB-6
SB-8
SB-9
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
N
0
60'

ARCADIS

Appendix A

Multi-Med Model Inputs and Outputs

Chesapeake State M-1
Chesapeake Energy Corporation
Buckeye, Lea County, New Mexico
Multimed Model Input and Output (With Liner)

MODEL INPUT AND OUTPUT						MODEL RANGE	
INPUT PARAMETERS						Minimum	Maximum
Unsaturated Zone Flow Parameters							
Depth of Unsaturated Zone	m	45	feet	13.7	m	0.000000001	None
Hydraulic Conductivity	cm/hr	2	ft/day	2.54	cm/hr	0.00000000001	10,000
Unsaturated Zone Porosity	fraction	0.05	fraction	0.05	fraction	0.000000001	0.99
Residual Water Content	fraction	0.01	fraction	0.010	fraction	0.000000001	1
Unsaturated Zone Transport Parameters							
Thickness of Layer	m	45	feet	13.7	m	0.000000001	None
Percent of Organic Matter	%	2.6	%	2.6	%	0	100
Bulk Density	g/cm^3	1.35	g/cm^3	1.35	g/cm^3	0.01	5
Biological Decay Coefficient	1/yr	0	1/yr	0	1/yr	0	None
Aquifer Parameters							
Aquifer Porosity	fraction	0.25	fraction	0.25	fraction	0.000000001	0.99
Bulk Density	g/cm^3	1.35	g/cm^3	1.35	g/cm^3	0.01	5
Aquifer Thickness	m	50	ft	15.24	m	0.000000001	100,000
Hydraulic Conductivity	m/yr	2	ft/day	223	m/yr	0.0000001	100,000,000
Hydraulic Gradient	m/m	0.007	m/m	0.007	m/m	0.00000001	None
Organic Carbon Content	fraction	0.00315	fraction	0.00315	fraction	0.000001	1
Temperature of Aquifer	°C	14.4	°C	14.4	°C	0.00000001	None
pH		6.2		6.2		0.3	14
x-distance Radial Distance from Site to Receptor	m	1	m	1	m	1	None
Source Parameters							
Infiltration Rate from the Facility	m/yr	0.124	in/yr	0.00315	m/yr	0.0000000001	10,000,000,000
Area of Waste Disposal Unit	m^2	46,800	ft^2	4348	m^2	0.01	None
Length Scale of Facility	m	240	feet	73.2	m	0.000000001	10,000,000,000
Width Scale of Facility	m	195	feet	59.4	m	0.000000001	10,000,000,000
Recharge Rate into the Plume	m/yr	16.71	in/yr	0.4244	m/yr	0	10,000,000,000
Duration of Pulse	yr	8,000	yr	8000	yr	0.000000001	None
Initial Concentration at Landfill	mg/L	6,000	mg/L	6,000	mg/L	0	None
Additional Parameters							
Method				Gaussian		Gaussian	Patch
Name of Chemical Specified				Chloride			

MODEL OUTPUT			
Final Concentration at Landfill	mg/L	221.8	mg/L

MODEL OUTPUT				
Concentration at Landfill	0.0 mg/L	Time	1 yr
	0.0 mg/L		10 yr
	0.0 mg/L		20 yr
	18.9 mg/L		50 yr
	36.6 mg/L		70 yr
	45.4 mg/L		80 yr
	61.8 mg/L		100 yr
	123.4 mg/L		200 yr
	154.1 mg/L		300 yr
	166.3 mg/L		400 yr
	178.5 mg/L		500 yr
	190.7 mg/L		600 yr
	204.8 mg/L		800 yr
	211.1 mg/L		1,000 yr
	220.4 mg/L		2,000 yr
	221.6 mg/L		3,000 yr
	221.8 mg/L		4,000 yr
	221.8 mg/L		5,000 yr
	221.8 mg/L		6,000 yr
	221.8 mg/L		7,000 yr

Chesapeake State M-1
Chesapeake Energy Corporation
Buckeye, Lea County, New Mexico

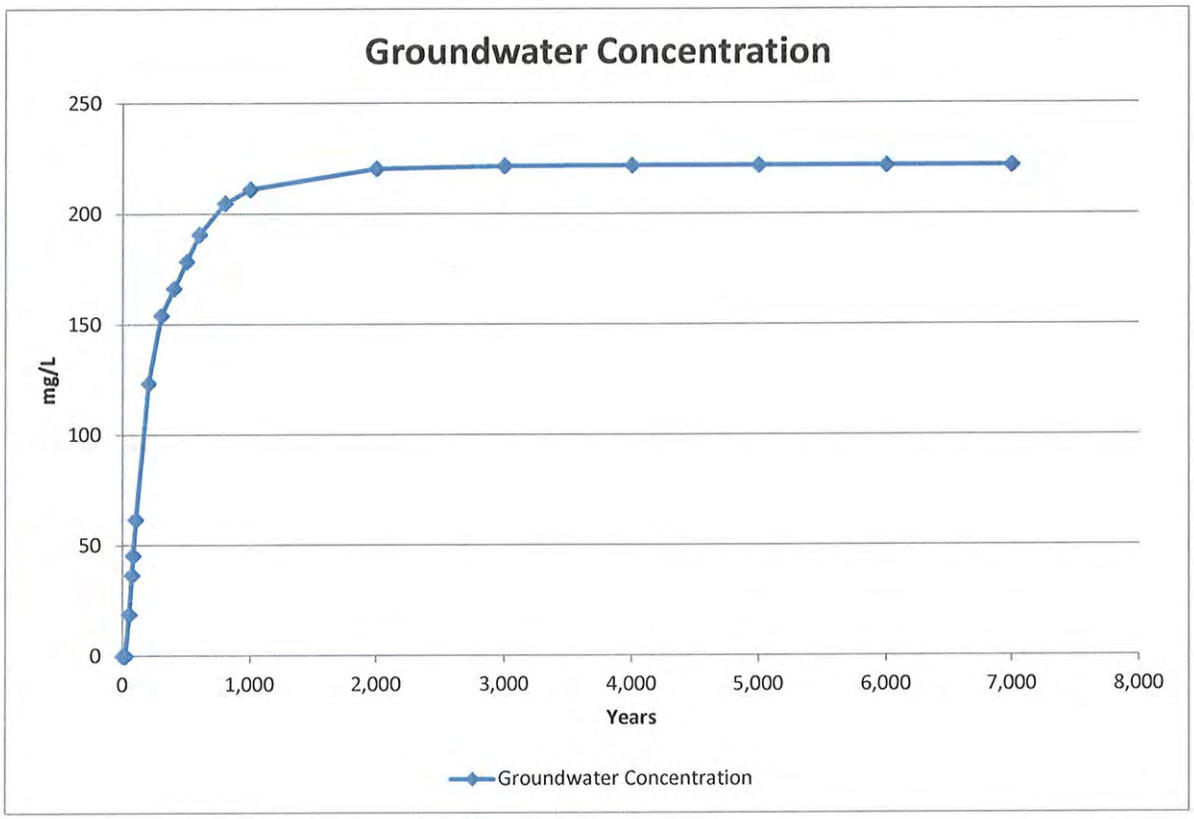


TABLE 6-3. TOTAL POROSITY OF VARIOUS MATERIALS

Material	No. of Analyses	Range	Arithmetic Mean
Igneous Rocks			
Weathered granite	8	0.34-0.57	0.45
Weathered gabbro	4	0.42-0.45	0.43
Basalt	94	0.03-0.35	0.17
Sedimentary Materials			
Sandstone	65	0.14-0.49	0.34
Siltstone	7	0.21-0.41	0.35
Sand (fine)	243	0.26-0.53	0.43
Sand (coarse)	26	0.31-0.46	0.39
Gravel (fine)	38	0.25-0.38	0.34
Gravel (coarse)	15	0.24-0.36	0.28
Silt	281	0.34-0.61	0.46
Clay	74	0.34-0.57	0.42
Limestone	74	0.07-0.56	0.3
Metamorphic Rocks			
Schist	18	0.04-0.49	0.38

Sources: From Mercer et al. (1982),
McWhorter and Sunada (1977),
Original reference Morris and Johnson, (1967).

Texture	Bulk Density g/cm^3	Average Wilting Point	Plant Available Water Inches/Ft
Sandy loam	1.6	0.057	1.66
Silt Loam	1.45	0.119	2
Loam	1.5	0.097	2.4
Sandy clay loam	1.45	0.137	1.66
Clay loam	1.45	0.157	1.9

TABLE 6-8. MEAN BULK DENSITY (g/cm3) FOR FIVE SOIL TEXTURAL CLASSIFICATIONSa,b

Soil Texture	Mean Value	Range Reported
Silt Loams	1.32	0.86 - 1.67
Clay and Clay Loams	1.3	0.94 - 1.54
Sandy Loams	1.49	1.25 - 1.76
Gravelly Silt Loams	1.22	1.02 - 1.58
Loams	1.42	1.16 - 1.58
All Soils	1.35	0.86 - 1.76

a Baes, C.F., III and R.D. Sharp. 1983. A Proposal for Estimation of Soil Leaching Constants for Use in Assessment Models. J. Environ. Qual. 12(1):17-28 (Original reference).

b From Dean et al. (1989)

TABLE 6-2. DESCRIPTIVE STATISTICS FOR SATURATED HYDRAULIC CONDUCTIVITY (cm hr-1)

Soil Type	Hydraulic Conductivity (Ks)* x	s	CV	n		
Clay**	0.2	0.42	210.3	114	cm/hr	17.52
Clay Loam	0.26	0.7	267.2	345	cm/hr	22.776
Loam	1.04	1.82	174.6	735	cm/hr	91.104
Loamy Sand	14.59	11.36	77.9	315	cm/hr	1278.084
Silt	0.25	0.33	129.9	88	cm/hr	21.9
Silt Loam	0.45	1.23	275.1	1093	cm/hr	39.42
Silty Clay	0.02	0.11	453.3	126	cm/hr	1.752
Silty Clay Loam	0.07	0.19	288.7	592	cm/hr	6.132
Sand	29.7	15.6	52.4	246	cm/hr	2601.72
Sandy Clay	0.12	0.28	234.1	46	cm/hr	10.512
Sandy Clay Loam	1.31	2.74	208.6	214	cm/hr	114.756
Sandy Loam	4.42	5.63	127	1183	cm/hr	387.192

* n = Sample size, = Mean, s = Standard deviation, CV = Coefficient of variation (percent)

** Agricultural soil, less than 60 percent clay

Sources: From Dean et al. (1989),
Original reference Carsel and Parrish (1988).

Saturated water content is the maximum volumetric amount of water in the soil when all pores are filled with water. Very often it is assumed that saturated water content equals the porosity n . However, in many cases qS is smaller than n due to the fact that small amounts of air will be trapped in very small pores. Residual water content can be defined as the asymptote of the pF-curve when h gets very high negative values. Usually qR is very small - on the order of 0.001--0.02 for coarse soils but gets as high values as 0.15..0.25 for heavy clay soils. Air entry point ha is

Soil texture. Fine-textured soils can hold much more organic matter than sandy soils for two reasons. First, clay particles form electrochemical bonds that hold organic compounds. Second, decomposition occurs faster in well-aerated sandy soils. A sandy loam rarely holds more than 2% organic matter.

The recharge rate in this model is the net amount of water that percolates directly into the aquifer system outside of the land disposal facility. The recharge is assumed to have no contamination and hence dilutes the groundwater contaminant plume. The recharge rate into the plume can be calculated in a variety of ways. One possibility is to use a model, such as HELP (Hydrologic Evaluation of Landfill Performance) (Schroeder et al., 1984), without any engineering controls (leachate collection system or a liner) to simulate the water balance for natural conditions.

The infiltration rate is the net amount of leachate that percolates into the aquifer system from a land disposal facility. Because of the use of engineering controls and the presence of non-native porous materials in the landfill facility, the infiltration rate will typically be different than the recharge rate. However, it can be estimated by similar

Most soils contain 2-10 percent organic matter. *The Importance of Soil Organic Matter: Key to Drought-Resistant Soil and Sustained Food Production. http://www.fao.org*

APPENDIX B

NMOCD APPROVAL OF STAGE 2 ABATEMENT PLAN

From:	Chase Acker
To:	Bruce McKenzie
Subject:	FW: Stage 2 Abatement Plan Approval: AP-72 Former State M-1 Tank Battery located in Unit Letter O of Section 18 in Township 17 South, Range 36 East, NMPM in Lea County, NM
Date:	Monday, April 14, 2014 1:56:01 PM

From: Griswold, Jim, EMNRD [mailto:Jim.Griswold@state.nm.us]
Sent: Thursday, June 27, 2013 5:14 PM
To: Larry Wooten
Cc: Hall, Sharon; Chase Acker
Subject: Stage 2 Abatement Plan Approval: AP-72 Former State M-1 Tank Battery located in Unit Letter O of Section 18 in Township 17 South, Range 36 East, NMPM in Lea County, NM

Mr. Wooten,

The Oil Conservation Division (OCD) has reviewed the Stage 2 Abatement Plan for the above-referenced site submitted on your behalf by Arcadis and dated 3/27/12. That plan has substantially met the requirements of 19.15.30 NMAC and is hereby approved. Please proceed with field activities.

Be advised this approval does not relieve Chesapeake of responsibility should the situation continue to pose a threat to groundwater, surface water, human health, or the environment. Furthermore, this approval does not relieve your responsibility for compliance with any federal, state, or local laws and/or regulations. Please retain a copy of this email for your files, as no hardcopy will be sent. If you have any questions, please feel free to contact me at any time.

Jim Griswold
Senior Hydrologist
EMNRD/Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
505.476.3465
email: jim.griswold@state.nm.us

APPENDIX C

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-96065-1
Laboratory Sample Delivery Group: Well Pad 908106
Client Project/Site: State M-1

For:
Chesapeake Energy Corporation
PO BOX 548806
Oklahoma City, Oklahoma 73154

Attn: Chase Acker

Cathy Gartner

Authorized for release by:
9/23/2019 11:17:00 AM

Cathy Gartner, Project Manager II
(615)301-5041
cathy.gartner@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

PA Lab ID: 02-00416

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Laboratory Job ID: 180-96065-1
SDG: Well Pad 908106

Table of Contents

Case Narrative

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-96065-1
SDG: Well Pad 908106

Job ID: 180-96065-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-96065-1

Comments
No additional comments.

Subcontract Work
Method TO 15: This method was subcontracted to Eurofins Air Toxics. The subcontract laboratory certification is different from that of the facility issuing the final report.

Definitions/Glossary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-96065-1
SDG: Well Pad 908106

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-96065-1
SDG: Well Pad 908106

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
Arkansas DEQ	State Program	88-0690	06-27-20
California	State	2891	04-30-20
California	State Program	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Connecticut	State Program	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Florida	NELAP	E871008	06-30-20
Illinois	NELAP	200005	06-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State Program	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-19
Kentucky (WW)	State Program	KY98043	12-31-19
Louisiana	NELAP	04041	06-30-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-19
Minnesota	NELAP	042-999-482	12-31-19
Nevada	State	PA00164	07-31-20
Nevada	State Program	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	03-31-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State Program	434	12-31-19
North Dakota	State	R-227	04-30-20
North Dakota	State Program	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20
Oregon	NELAP	PA-2151	02-06-20
Pennsylvania	NELAP	02-00416	04-30-20
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-30-19
Rhode Island	State Program	LAO00362	12-30-19
South Carolina	State Program	89014	04-30-20
Texas	NELAP	T104704528-15-2	03-31-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462015-4	05-31-20
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	460189	09-14-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	01-31-20
West Virginia DEP	State Program	142	01-31-20
Wisconsin	State	998027800	08-31-20
Wisconsin	State Program	998027800	08-31-20

Sample Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-96065-1
SDG: Well Pad 908106

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-96065-1	20190905MSVE	Air	09/05/19 07:40	09/23/19 12:02	

eurofins | Air Toxics

9/20/2019
Ms. Cathy Gartner
Eurofins Test America
2960 Foster Creighton Dr.

Nashville TN 37204

Project Name: CHK STATE M
Project #: CHKSTATM:H19001
Workorder #: 1909142

Dear Ms. Cathy Gartner

The following report includes the data for the above referenced project for sample(s) received on 9/9/2019 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Brian Whittaker

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1909142

Work Order Summary

CLIENT:	Ms. Cathy Gartner Eurofins Test America 2960 Foster Creighton Dr. Nashville, TN 37204	**BILL TO:**	Accounts Payable Eurofins Test America 4104 Shuffel St NW North Canton, OH 44720
PHONE:	800-765-0980	**P.O. #**	
FAX:	615-726-3404	**PROJECT #**	CHKSTATM:H19001 CHK STATE M
DATE RECEIVED:	09/09/2019	**CONTACT:**	Brian Whittaker
DATE COMPLETED:	09/20/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	20190905MSVE	TO-15	5.9 "Hg	5.3 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 09/20/19

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

eurofins | Air Toxics

LABORATORY NARRATIVE
EPA Method TO-15
Eurofins Test America
Workorder# 1909142

One 6 Liter Summa Canister sample was received on September 09, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

Sample identification for sample 20190905MSVE was not provided on the sample tag. Therefore the information on the Chain of Custody was used to process and report the sample.

Analytical Notes

TVOC (Total Volatile Organic Compounds) referenced to Hexane includes area counts for peaks that elute from Hexane minus 0.08 minutes to Naphthalene plus 0.08 minutes and quantitating the area based on the response factor of Hexane.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Dilution was performed on sample 20190905MSVE due to the presence of high level non-target species.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

eurofins | Air Toxics

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 20190905MSVE

Lab ID#: 1909142-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	8.4	140	27	450
Ethyl Benzene	8.4	270	37	1200
4-Ethyltoluene	8.4	180	42	880
Toluene	8.4	30	32	110
1,2,4-Trimethylbenzene	8.4	75	42	370
1,3,5-Trimethylbenzene	8.4	69	42	340
m,p-Xylene	8.4	440	37	1900
o-Xylene	8.4	120	37	510
TVOC Ref. to Hexane	170	69000	600	240000

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Client Sample ID: 20190905MSVE

Lab ID#: 1909142-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091818**	**Date of Collection:**	**9/5/19 7:40:00 AM**
Dil. Factor:	**16.9**	**Date of Analysis:**	**9/19/19 01:05 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	84	Not Detected	200	Not Detected
Benzene	8.4	140	27	450
alpha-Chlorotoluene	8.4	Not Detected	44	Not Detected
Bromodichloromethane	8.4	Not Detected	57	Not Detected
Bromoform	8.4	Not Detected	87	Not Detected
Bromomethane	84	Not Detected	330	Not Detected
2-Butanone (Methyl Ethyl Ketone)	34	Not Detected	100	Not Detected
Carbon Disulfide	34	Not Detected	100	Not Detected
Carbon Tetrachloride	8.4	Not Detected	53	Not Detected
Chlorobenzene	8.4	Not Detected	39	Not Detected
Dibromochloromethane	8.4	Not Detected	72	Not Detected
Chloroethane	34	Not Detected	89	Not Detected
Chloroform	8.4	Not Detected	41	Not Detected
Chloromethane	84	Not Detected	170	Not Detected
1,2-Dibromoethane (EDB)	8.4	Not Detected	65	Not Detected
1,2-Dichlorobenzene	8.4	Not Detected	51	Not Detected
1,3-Dichlorobenzene	8.4	Not Detected	51	Not Detected
1,4-Dichlorobenzene	8.4	Not Detected	51	Not Detected
1,1-Dichloroethane	8.4	Not Detected	34	Not Detected
Freon 12	8.4	Not Detected	42	Not Detected
1,2-Dichloroethane	8.4	Not Detected	34	Not Detected
1,1-Dichloroethene	8.4	Not Detected	34	Not Detected
cis-1,2-Dichloroethene	8.4	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	8.4	Not Detected	34	Not Detected
1,2-Dichloropropane	8.4	Not Detected	39	Not Detected
cis-1,3-Dichloropropene	8.4	Not Detected	38	Not Detected
trans-1,3-Dichloropropene	8.4	Not Detected	38	Not Detected
Freon 114	8.4	Not Detected	59	Not Detected
Ethyl Benzene	8.4	270	37	1200
4-Ethyltoluene	8.4	180	42	880
Hexachlorobutadiene	34	Not Detected	360	Not Detected
2-Hexanone	34	Not Detected	140	Not Detected
Methylene Chloride	84	Not Detected	290	Not Detected
4-Methyl-2-pentanone	8.4	Not Detected	35	Not Detected
Styrene	8.4	Not Detected	36	Not Detected
1,1,2,2-Tetrachloroethane	8.4	Not Detected	58	Not Detected
Tetrachloroethene	8.4	Not Detected	57	Not Detected
Toluene	8.4	30	32	110
1,2,4-Trichlorobenzene	34	Not Detected	250	Not Detected
1,1,1-Trichloroethane	8.4	Not Detected	46	Not Detected
1,1,2-Trichloroethane	8.4	Not Detected	46	Not Detected
Trichloroethene	8.4	Not Detected	45	Not Detected

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Client Sample ID: 20190905MSVE

Lab ID#: 1909142-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091818**	**Date of Collection: 9/5/19 7:40:00 AM**	
Dil. Factor:	**16.9**	**Date of Analysis: 9/19/19 01:05 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	8.4	Not Detected	47	Not Detected
Freon 113	8.4	Not Detected	65	Not Detected
1,2,4-Trimethylbenzene	8.4	75	42	370
1,3,5-Trimethylbenzene	8.4	69	42	340
Vinyl Acetate	34	Not Detected	120	Not Detected
Vinyl Chloride	8.4	Not Detected	22	Not Detected
m,p-Xylene	8.4	440	37	1900
o-Xylene	8.4	120	37	510
TVOC Ref. to Hexane	170	69000	600	240000

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	112	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1909142-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 11:50 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	5.0	Not Detected	12	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Freon 12	0.50	Not Detected	2.5	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1909142-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 11:50 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.50	Not Detected	2.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
TVOC Ref. to Hexane	10	Not Detected	35	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	91	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: CCV

Lab ID#: 1909142-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 10:10 AM**	

Compound	%Recovery
Acetone	86
Benzene	100
alpha-Chlorotoluene	94
Bromodichloromethane	105
Bromoform	108
Bromomethane	88
2-Butanone (Methyl Ethyl Ketone)	84
Carbon Disulfide	78
Carbon Tetrachloride	103
Chlorobenzene	99
Dibromochloromethane	104
Chloroethane	88
Chloroform	92
Chloromethane	124
1,2-Dibromoethane (EDB)	97
1,2-Dichlorobenzene	105
1,3-Dichlorobenzene	106
1,4-Dichlorobenzene	106
1,1-Dichloroethane	89
Freon 12	95
1,2-Dichloroethane	104
1,1-Dichloroethene	74
cis-1,2-Dichloroethene	95
trans-1,2-Dichloroethene	79
1,2-Dichloropropane	104
cis-1,3-Dichloropropene	91
trans-1,3-Dichloropropene	91
Freon 114	92
Ethyl Benzene	95
4-Ethyltoluene	98
Hexachlorobutadiene	116
2-Hexanone	101
Methylene Chloride	96
4-Methyl-2-pentanone	103
Styrene	95
1,1,2,2-Tetrachloroethane	98
Tetrachloroethene	109
Toluene	104
1,2,4-Trichlorobenzene	103
1,1,1-Trichloroethane	92
1,1,2-Trichloroethane	98
Trichloroethene	98

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Client Sample ID: CCV

Lab ID#: 1909142-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 10:10 AM**	

Compound	%Recovery
Freon 11	96
Freon 113	93
1,2,4-Trimethylbenzene	95
1,3,5-Trimethylbenzene	99
Vinyl Acetate	83
Vinyl Chloride	96
m,p-Xylene	94
o-Xylene	94
TVOC Ref. to Hexane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	108	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: LCS

Lab ID#: 1909142-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 10:57 AM**	

Compound	%Recovery	Method Limits
Acetone	89	70-130
Benzene	102	70-130
alpha-Chlorotoluene	93	70-130
Bromodichloromethane	110	70-130
Bromoform	113	70-130
Bromomethane	91	70-130
2-Butanone (Methyl Ethyl Ketone)	85	70-130
Carbon Disulfide	74	70-130
Carbon Tetrachloride	101	70-130
Chlorobenzene	102	70-130
Dibromochloromethane	107	70-130
Chloroethane	96	70-130
Chloroform	92	70-130
Chloromethane	87	70-130
1,2-Dibromoethane (EDB)	99	70-130
1,2-Dichlorobenzene	112	70-130
1,3-Dichlorobenzene	112	70-130
1,4-Dichlorobenzene	111	70-130
1,1-Dichloroethane	92	70-130
Freon 12	98	70-130
1,2-Dichloroethane	104	70-130
1,1-Dichloroethene	80	70-130
cis-1,2-Dichloroethene	100	70-130
trans-1,2-Dichloroethene	74	70-130
1,2-Dichloropropane	107	70-130
cis-1,3-Dichloropropene	94	70-130
trans-1,3-Dichloropropene	89	70-130
Freon 114	98	70-130
Ethyl Benzene	96	70-130
4-Ethyltoluene	99	70-130
Hexachlorobutadiene	134 Q	70-130
2-Hexanone	99	70-130
Methylene Chloride	99	70-130
4-Methyl-2-pentanone	102	70-130
Styrene	95	70-130
1,1,2,2-Tetrachloroethane	103	70-130
Tetrachloroethene	114	70-130
Toluene	106	70-130
1,2,4-Trichlorobenzene	120	70-130
1,1,1-Trichloroethane	95	70-130
1,1,2-Trichloroethane	100	70-130
Trichloroethene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1909142-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 10:57 AM**	

Compound	%Recovery	Method Limits
Freon 11	102	70-130
Freon 113	94	70-130
1,2,4-Trimethylbenzene	99	70-130
1,3,5-Trimethylbenzene	105	70-130
Vinyl Acetate	71	70-130
Vinyl Chloride	92	70-130
m,p-Xylene	97	70-130
o-Xylene	97	70-130
TVOC Ref. to Hexane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	107	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	110	70-130

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Client Sample ID: LCSD

Lab ID#: 1909142-04AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 11:24 AM**	

Compound	%Recovery	Method Limits
Acetone	89	70-130
Benzene	102	70-130
alpha-Chlorotoluene	93	70-130
Bromodichloromethane	110	70-130
Bromoform	112	70-130
Bromomethane	90	70-130
2-Butanone (Methyl Ethyl Ketone)	84	70-130
Carbon Disulfide	73	70-130
Carbon Tetrachloride	101	70-130
Chlorobenzene	101	70-130
Dibromochloromethane	106	70-130
Chloroethane	93	70-130
Chloroform	93	70-130
Chloromethane	84	70-130
1,2-Dibromoethane (EDB)	99	70-130
1,2-Dichlorobenzene	111	70-130
1,3-Dichlorobenzene	111	70-130
1,4-Dichlorobenzene	110	70-130
1,1-Dichloroethane	91	70-130
Freon 12	96	70-130
1,2-Dichloroethane	101	70-130
1,1-Dichloroethene	78	70-130
cis-1,2-Dichloroethene	100	70-130
trans-1,2-Dichloroethene	75	70-130
1,2-Dichloropropane	107	70-130
cis-1,3-Dichloropropene	93	70-130
trans-1,3-Dichloropropene	90	70-130
Freon 114	99	70-130
Ethyl Benzene	96	70-130
4-Ethyltoluene	103	70-130
Hexachlorobutadiene	131 Q	70-130
2-Hexanone	98	70-130
Methylene Chloride	98	70-130
4-Methyl-2-pentanone	102	70-130
Styrene	94	70-130
1,1,2,2-Tetrachloroethane	102	70-130
Tetrachloroethene	111	70-130
Toluene	105	70-130
1,2,4-Trichlorobenzene	120	70-130
1,1,1-Trichloroethane	93	70-130
1,1,2-Trichloroethane	100	70-130
Trichloroethene	100	70-130

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Client Sample ID: LCSD

Lab ID#: 1909142-04AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p091804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/19 11:24 AM**	

Compound	%Recovery	Method Limits
Freon 11	100	70-130
Freon 113	94	70-130
1,2,4-Trimethylbenzene	98	70-130
1,3,5-Trimethylbenzene	99	70-130
Vinyl Acetate	72	70-130
Vinyl Chloride	97	70-130
m,p-Xylene	96	70-130
o-Xylene	96	70-130
TVOC Ref. to Hexane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	93	70-130
4-Bromofluorobenzene	107	70-130

CHAIN OF CUSTODY RECORD

No. 1404

EQUUS

PROJECT NUMBER: CHKSTATM:H19001	PROJECT NAME: CHK STATE M	COC 1 of 1	
SHIPPED TO: AIR TOXICS	PROJECT MANAGER: DAVID BRADY	TAT: Standard	

SAMPLER'S PRINTED NAME: TERRY FISHER

SAMPLER'S SIGNATURE:

ASOW: N/A

* TVOCs @ HEXANE $C_6 - C_{12}$

	Date	Time	Sample ID	Sample Matrix	# of Sample Containers	TO-15	TVOCs * @ HEXANE	REMARKS
01A	9-5-19	0740	20190905 MSVE	A	1	X	X	TAG/CAN # 6L1641

Custody Seal Intact?
Y N None Temp NA

TOTAL NUMBER OF CONTAINERS →	1		
RELINQUISHED BY:	DATE 9-5-19 TIME 1600	RECEIVED BY:	DATE 9/6/19 TIME 0955
RELINQUISHED BY:	DATE TIME	RECEIVED BY:	DATE TIME

METHOD OF SHIPMENT: FEDEX

AIRBILL NUMBER: 1100 7878 4529

1909142

RECEIVED IN LABORATORY BY: DATE TIME

Send PDF, EDD, and INVOICE (if applicable) to:

LABORATORY CONTACT: CATHY GARTNER 615-301-5041

LABORATORY ADDRESS: 180 BLUE RAVINE RD. STE B FOLSOM, CA 95630

POINT OF ORIGIN:

Login Sample Receipt Checklist

Client: Chesapeake Energy Corporation

Job Number: 180-96065-1
SDG Number: Well Pad 908106

Login Number: 96065
List Number: 1
Creator: Gartner, Cathy

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time (excluding tests with immediate HTs)		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-102436-1
Laboratory Sample Delivery Group: Property ID: 891077
Client Project/Site: State M-1
Revision: 1

For:
Chesapeake Energy Corporation
PO BOX 548806
Oklahoma City, Oklahoma 73154

Attn: Chase Acker

Cathy Gartner

Authorized for release by:
2/18/2020 6:33:05 PM

Cathy Gartner, Project Manager II
(615)301-5041
cathy.gartner@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

PA Lab ID: 02-00416

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Laboratory Job ID: 180-102436-1
SDG: Property ID: 891077

Table of Contents

Case Narrative

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-102436-1
SDG: Property ID: 891077

Job ID: 180-102436-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-102436-1

Subcontract Work
Method TO 15: This method was subcontracted to Eurofins Air Toxics. The subcontract laboratory certification is different from that of the facility issuing the final report.

Definitions/Glossary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-102436-1
SDG: Property ID: 891077

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-102436-1
SDG: Property ID: 891077

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20 *
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-102436-1
SDG: Property ID: 891077

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-102436-1	20200122 M1-SVE	Air	01/22/20 15:56	01/24/20 09:52	

Method Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-102436-1
SDG: Property ID: 891077

Method	Method Description	Protocol	Laboratory
TO-15	TO-15	EPA	Eurofins

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

Eurofins = Eurofins Air Toxics, 180 Blue Ravine Road, Suite B, Folsom, CA 95630

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2/7/2020
Ms. Cathy Gartner
Eurofins Test America
2960 Foster Creighton Dr.

Nashville TN 37204

Project Name: CHK STATE M
Project #: CHKSTATM:H19001
Workorder #: 2001613

Dear Ms. Cathy Gartner

The following report includes the data for the above referenced project for sample(s) received on 1/24/2020 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Brian Whittaker

Project Manager

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WORK ORDER #: 2001613

Work Order Summary

CLIENT:	Ms. Cathy Gartner Eurofins Test America 2960 Foster Creighton Dr. Nashville, TN 37204	**BILL TO:**	Accounts Payable Eurofins Test America 4104 Shuffel St NW North Canton, OH 44720
PHONE:	800-765-0980	**P.O. #**	CHKSTATM:H19001
FAX:	615-726-3404	**PROJECT #**	CHKSTATM:H19001 CHK STATE M
DATE RECEIVED:	01/24/2020	**CONTACT:**	Brian Whittaker
DATE COMPLETED:	02/06/2020		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	20200122.M-1-SVE	TO-15	6.0 "Hg	5 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 02/06/20

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

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LABORATORY NARRATIVE
EPA Method TO-15
Eurofins Test America
Workorder# 2001613

One 6 Liter Summa Canister sample was received on January 24, 2020. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

TVOC (Total Volatile Organic Compounds) referenced to Hexane includes area counts for peaks that elute from Hexane minus 0.08 minutes to Naphthalene plus 0.08 minutes and quantitating the area based on the response factor of Hexane.

Dilution was performed on sample 20200122.M-1-SVE due to the presence of high level non-target species.

The recovery of surrogate 1,2-Dichloroethane-d4 in sample 20200122.M-1-SVE was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:
B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.
M - Reported value may be biased due to apparent matrix interferences.
CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 20200122.M-1-SVE

Lab ID#: 2001613-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.7	3.7	5.4	12
Ethyl Benzene	1.7	33	7.3	140
4-Ethyltoluene	1.7	25	8.2	120
Toluene	1.7	3.1	6.3	12
1,2,4-Trimethylbenzene	1.7	10	8.2	51
1,3,5-Trimethylbenzene	1.7	9.1	8.2	45
m,p-Xylene	1.7	66	7.3	290
o-Xylene	1.7	15	7.3	66
TVOC Ref. to Hexane	34	14000	120	49000

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Client Sample ID: 20200122.M-1-SVE

Lab ID#: 2001613-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012930**	**Date of Collection:**	**1/22/20 15:56:00**
Dil. Factor:	**3.35**	**Date of Analysis:**	**1/30/20 08:55 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	17	Not Detected	40	Not Detected
Benzene	1.7	3.7	5.4	12
alpha-Chlorotoluene	1.7	Not Detected	8.7	Not Detected
Bromodichloromethane	1.7	Not Detected	11	Not Detected
Bromoform	1.7	Not Detected	17	Not Detected
Bromomethane	17	Not Detected	65	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.7	Not Detected	20	Not Detected
Carbon Disulfide	6.7	Not Detected	21	Not Detected
Carbon Tetrachloride	1.7	Not Detected	10	Not Detected
Chlorobenzene	1.7	Not Detected	7.7	Not Detected
Dibromochloromethane	1.7	Not Detected	14	Not Detected
Chloroethane	6.7	Not Detected	18	Not Detected
Chloroform	1.7	Not Detected	8.2	Not Detected
Chloromethane	17	Not Detected	34	Not Detected
1,2-Dibromoethane (EDB)	1.7	Not Detected	13	Not Detected
1,2-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,3-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,4-Dichlorobenzene	1.7	Not Detected	10	Not Detected
1,1-Dichloroethane	1.7	Not Detected	6.8	Not Detected
Freon 12	1.7	Not Detected	8.3	Not Detected
1,2-Dichloroethane	1.7	Not Detected	6.8	Not Detected
1,1-Dichloroethene	1.7	Not Detected	6.6	Not Detected
cis-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
trans-1,2-Dichloroethene	1.7	Not Detected	6.6	Not Detected
1,2-Dichloropropane	1.7	Not Detected	7.7	Not Detected
cis-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
trans-1,3-Dichloropropene	1.7	Not Detected	7.6	Not Detected
Freon 114	1.7	Not Detected	12	Not Detected
Ethyl Benzene	1.7	33	7.3	140
4-Ethyltoluene	1.7	25	8.2	120
Hexachlorobutadiene	6.7	Not Detected	71	Not Detected
2-Hexanone	6.7	Not Detected	27	Not Detected
Methylene Chloride	17	Not Detected	58	Not Detected
4-Methyl-2-pentanone	1.7	Not Detected	6.9	Not Detected
Styrene	1.7	Not Detected	7.1	Not Detected
1,1,2,2-Tetrachloroethane	1.7	Not Detected	11	Not Detected
Tetrachloroethene	1.7	Not Detected	11	Not Detected
Toluene	1.7	3.1	6.3	12
1,2,4-Trichlorobenzene	6.7	Not Detected	50	Not Detected
1,1,1-Trichloroethane	1.7	Not Detected	9.1	Not Detected
1,1,2-Trichloroethane	1.7	Not Detected	9.1	Not Detected
Trichloroethene	1.7	Not Detected	9.0	Not Detected

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Client Sample ID: 20200122.M-1-SVE

Lab ID#: 2001613-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012930**	**Date of Collection: 1/22/20 15:56:00**	
Dil. Factor:	**3.35**	**Date of Analysis: 1/30/20 08:55 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	1.7	Not Detected	9.4	Not Detected
Freon 113	1.7	Not Detected	13	Not Detected
1,2,4-Trimethylbenzene	1.7	10	8.2	51
1,3,5-Trimethylbenzene	1.7	9.1	8.2	45
Vinyl Acetate	6.7	Not Detected	24	Not Detected
Vinyl Chloride	1.7	Not Detected	4.3	Not Detected
m,p-Xylene	1.7	66	7.3	290
o-Xylene	1.7	15	7.3	66
TVOC Ref. to Hexane	34	14000	120	49000

Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	134 Q	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2001613-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012906**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 11:53 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	5.0	Not Detected	12	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Freon 12	0.50	Not Detected	2.5	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 2001613-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012906**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 11:53 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.50	Not Detected	2.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
TVOC Ref. to Hexane	10	Not Detected	35	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	116	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: CCV
Lab ID#: 2001613-03A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 09:51 AM**	

Compound	%Recovery
Acetone	95
Benzene	92
alpha-Chlorotoluene	98
Bromodichloromethane	110
Bromoform	100
Bromomethane	96
2-Butanone (Methyl Ethyl Ketone)	88
Carbon Disulfide	93
Carbon Tetrachloride	123
Chlorobenzene	91
Dibromochloromethane	103
Chloroethane	83
Chloroform	115
Chloromethane	73
1,2-Dibromoethane (EDB)	94
1,2-Dichlorobenzene	94
1,3-Dichlorobenzene	92
1,4-Dichlorobenzene	92
1,1-Dichloroethane	100
Freon 12	116
1,2-Dichloroethane	116
1,1-Dichloroethene	109
cis-1,2-Dichloroethene	104
trans-1,2-Dichloroethene	107
1,2-Dichloropropane	83
cis-1,3-Dichloropropene	101
trans-1,3-Dichloropropene	99
Freon 114	110
Ethyl Benzene	94
4-Ethyltoluene	94
Hexachlorobutadiene	102
2-Hexanone	72
Methylene Chloride	87
4-Methyl-2-pentanone	82
Styrene	90
1,1,2,2-Tetrachloroethane	81
Tetrachloroethene	100
Toluene	95
1,2,4-Trichlorobenzene	88
1,1,1-Trichloroethane	118
1,1,2-Trichloroethane	88
Trichloroethene	100

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Client Sample ID: CCV

Lab ID#: 2001613-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 09:51 AM**	

Compound	%Recovery
Freon 11	123
Freon 113	109
1,2,4-Trimethylbenzene	92
1,3,5-Trimethylbenzene	92
Vinyl Acetate	104
Vinyl Chloride	89
m,p-Xylene	99
o-Xylene	91
TVOC Ref. to Hexane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	122	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: LCS

Lab ID#: 2001613-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 10:18 AM**	

Compound	%Recovery	Method Limits
Acetone	72	70-130
Benzene	85	70-130
alpha-Chlorotoluene	111	70-130
Bromodichloromethane	105	70-130
Bromoform	109	70-130
Bromomethane	91	70-130
2-Butanone (Methyl Ethyl Ketone)	86	70-130
Carbon Disulfide	87	70-130
Carbon Tetrachloride	114	70-130
Chlorobenzene	93	70-130
Dibromochloromethane	105	70-130
Chloroethane	84	70-130
Chloroform	105	70-130
Chloromethane	74	70-130
1,2-Dibromoethane (EDB)	95	70-130
1,2-Dichlorobenzene	101	70-130
1,3-Dichlorobenzene	97	70-130
1,4-Dichlorobenzene	101	70-130
1,1-Dichloroethane	89	70-130
Freon 12	109	70-130
1,2-Dichloroethane	106	70-130
1,1-Dichloroethene	94	70-130
cis-1,2-Dichloroethene	87	70-130
trans-1,2-Dichloroethene	102	70-130
1,2-Dichloropropane	83	70-130
cis-1,3-Dichloropropene	102	70-130
trans-1,3-Dichloropropene	103	70-130
Freon 114	101	70-130
Ethyl Benzene	99	70-130
4-Ethyltoluene	104	70-130
Hexachlorobutadiene	102	70-130
2-Hexanone	91	70-130
Methylene Chloride	78	70-130
4-Methyl-2-pentanone	89	70-130
Styrene	103	70-130
1,1,2,2-Tetrachloroethane	88	70-130
Tetrachloroethene	100	70-130
Toluene	91	70-130
1,2,4-Trichlorobenzene	90	70-130
1,1,1-Trichloroethane	112	70-130
1,1,2-Trichloroethane	88	70-130
Trichloroethene	96	70-130

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Client Sample ID: LCS

Lab ID#: 2001613-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 10:18 AM**	

Compound	%Recovery	Method Limits
Freon 11	112	70-130
Freon 113	100	70-130
1,2,4-Trimethylbenzene	102	70-130
1,3,5-Trimethylbenzene	102	70-130
Vinyl Acetate	88	70-130
Vinyl Chloride	82	70-130
m,p-Xylene	101	70-130
o-Xylene	97	70-130
TVOC Ref. to Hexane	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	121	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: LCSD

Lab ID#: 2001613-04AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 10:45 AM**	

Compound	%Recovery	Method Limits
Acetone	72	70-130
Benzene	88	70-130
alpha-Chlorotoluene	112	70-130
Bromodichloromethane	106	70-130
Bromoform	108	70-130
Bromomethane	94	70-130
2-Butanone (Methyl Ethyl Ketone)	90	70-130
Carbon Disulfide	90	70-130
Carbon Tetrachloride	118	70-130
Chlorobenzene	98	70-130
Dibromochloromethane	108	70-130
Chloroethane	82	70-130
Chloroform	106	70-130
Chloromethane	73	70-130
1,2-Dibromoethane (EDB)	96	70-130
1,2-Dichlorobenzene	103	70-130
1,3-Dichlorobenzene	100	70-130
1,4-Dichlorobenzene	102	70-130
1,1-Dichloroethane	92	70-130
Freon 12	112	70-130
1,2-Dichloroethane	106	70-130
1,1-Dichloroethene	98	70-130
cis-1,2-Dichloroethene	91	70-130
trans-1,2-Dichloroethene	106	70-130
1,2-Dichloropropane	80	70-130
cis-1,3-Dichloropropene	104	70-130
trans-1,3-Dichloropropene	102	70-130
Freon 114	101	70-130
Ethyl Benzene	100	70-130
4-Ethyltoluene	107	70-130
Hexachlorobutadiene	107	70-130
2-Hexanone	95	70-130
Methylene Chloride	81	70-130
4-Methyl-2-pentanone	93	70-130
Styrene	105	70-130
1,1,2,2-Tetrachloroethane	90	70-130
Tetrachloroethene	101	70-130
Toluene	92	70-130
1,2,4-Trichlorobenzene	95	70-130
1,1,1-Trichloroethane	113	70-130
1,1,2-Trichloroethane	91	70-130
Trichloroethene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 2001613-04AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17012904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/29/20 10:45 AM**	

Compound	%Recovery	Method Limits
Freon 11	114	70-130
Freon 113	104	70-130
1,2,4-Trimethylbenzene	102	70-130
1,3,5-Trimethylbenzene	103	70-130
Vinyl Acetate	97	70-130
Vinyl Chloride	85	70-130
m,p-Xylene	104	70-130
o-Xylene	101	70-130
TVOC Ref. to Hexane	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	116	70-130
4-Bromofluorobenzene	104	70-130

2001613

CHAIN OF CUSTODY RECORD

No. 1445

EQUUS

PROJECT NUMBER: CHK STATM: H19001	PROJECT NAME: CHK STATE M	COC 1 of 1	
SHIPPED TO: AIR TOXICS	PROJECT MANAGER: DAVID BRADY	TAT: STANDARD	

SAMPLER'S PRINTED NAME: [illegible]

SAMPLER'S SIGNATURE: [signature]

ASOW: N/A

* TVOC as HEXANE C6-C12

	Date	Time	Sample ID	Sample Matrix	# of Sample Containers	TO-15	* TOTAL VOC as HEXANE	REMARKS
01A	1.22.20	1556	20200122 M1-SVR	AIR	1	XXX		# 660902

Custody Seal Intact?

Y N None Temp NA

~~+ 1.0°C~~

TOTAL NUMBER OF CONTAINERS: 1

RELINQUISHED BY: [signature]	DATE 1.22.20	RECEIVED BY: [signature] TML	DATE 01/24/20
	TIME 1630		TIME 0952
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
	TIME		TIME

METHOD OF SHIPMENT: FEDEX

AIRBILL NUMBER: 1100 7882 3026

RECEIVED IN LABORATORY BY: DATE / TIME

Send PDF, EDD, and INVOICE (if applicable) to: JULIE.CZECH@EQUUSENV.COM

LABORATORY CONTACT: CATHY GARTNER 615-301-5041

LABORATORY ADDRESS: 180 BLUE RAVINE RD. STE B FOLSOM, CA 95630

POINT OF ORIGIN:

Login Sample Receipt Checklist

Client: Chesapeake Energy Corporation

Job Number: 180-102436-1
SDG Number: Property ID: 891077

Login Number: 102436
List Number: 1
Creator: Gartner, Cathy

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time (excluding tests with immediate HTs)		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-103356-1
Laboratory Sample Delivery Group: Property ID: 891077
Client Project/Site: State M-1

For:
Chesapeake Energy Corporation
PO BOX 548806
Oklahoma City, Oklahoma 73154

Attn: Chase Acker

CathyGartner

Authorized for release by:
3/24/2020 7:56:51 AM

Cathy Gartner, Project Manager II
(615)301-5041
cathy.gartner@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

PA Lab ID: 02-00416

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Laboratory Job ID: 180-103356-1
SDG: Property ID: 891077

Table of Contents

Case Narrative

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-103356-1
SDG: Property ID: 891077

Job ID: 180-103356-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-103356-1

Subcontract Work
Method TO 15: This method was subcontracted to Eurofins Air Toxics. The subcontract laboratory certification is different from that of the facility issuing the final report.

Definitions/Glossary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-103356-1
SDG: Property ID: 891077

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-103356-1
SDG: Property ID: 891077

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-103356-1
SDG: Property ID: 891077

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-103356-1	20200305 M SVE	Air	03/05/20 13:05	03/10/20 12:26	

Method Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 180-103356-1
SDG: Property ID: 891077

Method	Method Description	Protocol	Laboratory
TO-15	TO-15	EPA	Eurofins

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

Eurofins = Eurofins Air Toxics, 180 Blue Ravine Road, Suite B, Folsom, CA 95630

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3/20/2020
Ms. Cathy Gartner
Eurofins Test America
2960 Foster Creighton Dr.

Nashville TN 37204

Project Name: CHK STATE M
Project #:
Workorder #: 2003225

Dear Ms. Cathy Gartner

The following report includes the data for the above referenced project for sample(s) received on 3/9/2020 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Brian Whittaker at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Brian Whittaker

Project Manager

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WORK ORDER #: 2003225

Work Order Summary

CLIENT:	Ms. Cathy Gartner Eurofins Test America 2960 Foster Creighton Dr. Nashville, TN 37204	**BILL TO:**	Accounts Payable Eurofins Test America 4104 Shuffel St NW North Canton, OH 44720
PHONE:	800-765-0980	**P.O. #**	23738
FAX:	615-726-3404	**PROJECT #**	CHK STATE M
DATE RECEIVED:	03/09/2020	**CONTACT:**	Brian Whittaker
DATE COMPLETED:	03/20/2020		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	20200305MSVE	TO-15	4.5 "Hg	4.9 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 03/20/20

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

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LABORATORY NARRATIVE
EPA Method TO-15
Eurofins Test America
Workorder# 2003225

One 6 Liter Summa Canister sample was received on March 09, 2020. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

TVOC (Total Volatile Organic Compounds) referenced to Hexane includes area counts for peaks that elute from Hexane minus 0.08 minutes to Naphthalene plus 0.08 minutes and quantitating the area based on the response factor of Hexane.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Dilution was performed on sample 20200305MSVE due to the presence of high level target species.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:
B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.
M - Reported value may be biased due to apparent matrix interferences.
CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 20200305MSVE

Lab ID#: 2003225-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	7.8	42	25	130
Ethyl Benzene	7.8	120	34	510
4-Ethyltoluene	7.8	100	38	510
Trichloroethene	7.8	20	42	110
1,2,4-Trimethylbenzene	7.8	59	38	290
1,3,5-Trimethylbenzene	7.8	43	38	210
m,p-Xylene	7.8	210	34	900
o-Xylene	7.8	50	34	220
TVOC Ref. to Hexane	160	26000	550	92000

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Client Sample ID: 20200305MSVE

Lab ID#: 2003225-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031223**	**Date of Collection:**	**3/5/20 1:05:00 PM**
Dil. Factor:	**15.7**	**Date of Analysis:**	**3/12/20 10:55 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	78	Not Detected	190	Not Detected
Benzene	7.8	42	25	130
alpha-Chlorotoluene	7.8	Not Detected	41	Not Detected
Bromodichloromethane	7.8	Not Detected	52	Not Detected
Bromoform	7.8	Not Detected	81	Not Detected
Bromomethane	78	Not Detected	300	Not Detected
2-Butanone (Methyl Ethyl Ketone)	31	Not Detected	92	Not Detected
Carbon Disulfide	31	Not Detected	98	Not Detected
Carbon Tetrachloride	7.8	Not Detected	49	Not Detected
Chlorobenzene	7.8	Not Detected	36	Not Detected
Dibromochloromethane	7.8	Not Detected	67	Not Detected
Chloroethane	31	Not Detected	83	Not Detected
Chloroform	7.8	Not Detected	38	Not Detected
Chloromethane	78	Not Detected	160	Not Detected
1,2-Dibromoethane (EDB)	7.8	Not Detected	60	Not Detected
1,2-Dichlorobenzene	7.8	Not Detected	47	Not Detected
1,3-Dichlorobenzene	7.8	Not Detected	47	Not Detected
1,4-Dichlorobenzene	7.8	Not Detected	47	Not Detected
1,1-Dichloroethane	7.8	Not Detected	32	Not Detected
Freon 12	7.8	Not Detected	39	Not Detected
1,2-Dichloroethane	7.8	Not Detected	32	Not Detected
1,1-Dichloroethene	7.8	Not Detected	31	Not Detected
cis-1,2-Dichloroethene	7.8	Not Detected	31	Not Detected
trans-1,2-Dichloroethene	7.8	Not Detected	31	Not Detected
1,2-Dichloropropane	7.8	Not Detected	36	Not Detected
cis-1,3-Dichloropropene	7.8	Not Detected	36	Not Detected
trans-1,3-Dichloropropene	7.8	Not Detected	36	Not Detected
Freon 114	7.8	Not Detected	55	Not Detected
Ethyl Benzene	7.8	120	34	510
4-Ethyltoluene	7.8	100	38	510
Hexachlorobutadiene	31	Not Detected	330	Not Detected
2-Hexanone	31	Not Detected	130	Not Detected
Methylene Chloride	78	Not Detected	270	Not Detected
4-Methyl-2-pentanone	7.8	Not Detected	32	Not Detected
Styrene	7.8	Not Detected	33	Not Detected
1,1,2,2-Tetrachloroethane	7.8	Not Detected	54	Not Detected
Tetrachloroethene	7.8	Not Detected	53	Not Detected
Toluene	7.8	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	31	Not Detected	230	Not Detected
1,1,1-Trichloroethane	7.8	Not Detected	43	Not Detected
1,1,2-Trichloroethane	7.8	Not Detected	43	Not Detected
Trichloroethene	7.8	20	42	110

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Client Sample ID: 20200305MSVE

Lab ID#: 2003225-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031223**	**Date of Collection: 3/5/20 1:05:00 PM**	
Dil. Factor:	**15.7**	**Date of Analysis: 3/12/20 10:55 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	7.8	Not Detected	44	Not Detected
Freon 113	7.8	Not Detected	60	Not Detected
1,2,4-Trimethylbenzene	7.8	59	38	290
1,3,5-Trimethylbenzene	7.8	43	38	210
Vinyl Acetate	31	Not Detected	110	Not Detected
Vinyl Chloride	7.8	Not Detected	20	Not Detected
m,p-Xylene	7.8	210	34	900
o-Xylene	7.8	50	34	220
TVOC Ref. to Hexane	160	26000	550	92000

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2003225-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031208**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 02:10 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	5.0	Not Detected	12	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Freon 12	0.50	Not Detected	2.5	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 2003225-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031208**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 02:10 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.50	Not Detected	2.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
Vinyl Acetate	2.0	Not Detected	7.0	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
TVOC Ref. to Hexane	10	Not Detected	35	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: CCV
Lab ID#: 2003225-03A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 11:03 AM**	

Compound	%Recovery
Acetone	93
Benzene	84
alpha-Chlorotoluene	82
Bromodichloromethane	81
Bromoform	85
Bromomethane	98
2-Butanone (Methyl Ethyl Ketone)	87
Carbon Disulfide	92
Carbon Tetrachloride	83
Chlorobenzene	85
Dibromochloromethane	86
Chloroethane	88
Chloroform	86
Chloromethane	88
1,2-Dibromoethane (EDB)	84
1,2-Dichlorobenzene	84
1,3-Dichlorobenzene	81
1,4-Dichlorobenzene	83
1,1-Dichloroethane	88
Freon 12	92
1,2-Dichloroethane	85
1,1-Dichloroethene	92
cis-1,2-Dichloroethene	88
trans-1,2-Dichloroethene	93
1,2-Dichloropropane	80
cis-1,3-Dichloropropene	83
trans-1,3-Dichloropropene	87
Freon 114	90
Ethyl Benzene	84
4-Ethyltoluene	85
Hexachlorobutadiene	80
2-Hexanone	85
Methylene Chloride	90
4-Methyl-2-pentanone	86
Styrene	88
1,1,2,2-Tetrachloroethane	84
Tetrachloroethene	80
Toluene	81
1,2,4-Trichlorobenzene	80
1,1,1-Trichloroethane	86
1,1,2-Trichloroethane	84
Trichloroethene	83

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Client Sample ID: CCV
Lab ID#: 2003225-03A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 11:03 AM**	

Compound	%Recovery
Freon 11	92
Freon 113	87
1,2,4-Trimethylbenzene	85
1,3,5-Trimethylbenzene	85
Vinyl Acetate	92
Vinyl Chloride	92
m,p-Xylene	84
o-Xylene	84
TVOC Ref. to Hexane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: LCS

Lab ID#: 2003225-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 11:29 AM**	

Compound	%Recovery	Method Limits
Acetone	103	70-130
Benzene	110	70-130
alpha-Chlorotoluene	110	70-130
Bromodichloromethane	108	70-130
Bromoform	109	70-130
Bromomethane	109	70-130
2-Butanone (Methyl Ethyl Ketone)	114	70-130
Carbon Disulfide	120	70-130
Carbon Tetrachloride	106	70-130
Chlorobenzene	106	70-130
Dibromochloromethane	109	70-130
Chloroethane	115	70-130
Chloroform	114	70-130
Chloromethane	111	70-130
1,2-Dibromoethane (EDB)	106	70-130
1,2-Dichlorobenzene	105	70-130
1,3-Dichlorobenzene	101	70-130
1,4-Dichlorobenzene	104	70-130
1,1-Dichloroethane	113	70-130
Freon 12	123	70-130
1,2-Dichloroethane	111	70-130
1,1-Dichloroethene	117	70-130
cis-1,2-Dichloroethene	106	70-130
trans-1,2-Dichloroethene	132 Q	70-130
1,2-Dichloropropane	103	70-130
cis-1,3-Dichloropropene	111	70-130
trans-1,3-Dichloropropene	114	70-130
Freon 114	118	70-130
Ethyl Benzene	105	70-130
4-Ethyltoluene	107	70-130
Hexachlorobutadiene	104	70-130
2-Hexanone	111	70-130
Methylene Chloride	116	70-130
4-Methyl-2-pentanone	109	70-130
Styrene	110	70-130
1,1,2,2-Tetrachloroethane	92	70-130
Tetrachloroethene	101	70-130
Toluene	102	70-130
1,2,4-Trichlorobenzene	107	70-130
1,1,1-Trichloroethane	110	70-130
1,1,2-Trichloroethane	108	70-130
Trichloroethene	122	70-130

eurofins | Air Toxics

Client Sample ID: LCS
Lab ID#: 2003225-04A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 11:29 AM**	

Compound	%Recovery	Method Limits
Freon 11	118	70-130
Freon 113	110	70-130
1,2,4-Trimethylbenzene	107	70-130
1,3,5-Trimethylbenzene	106	70-130
Vinyl Acetate	113	70-130
Vinyl Chloride	122	70-130
m,p-Xylene	108	70-130
o-Xylene	106	70-130
TVOC Ref. to Hexane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: LCSD

Lab ID#: 2003225-04AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 11:56 AM**	

Compound	%Recovery	Method Limits
Acetone	104	70-130
Benzene	114	70-130
alpha-Chlorotoluene	115	70-130
Bromodichloromethane	109	70-130
Bromoform	110	70-130
Bromomethane	114	70-130
2-Butanone (Methyl Ethyl Ketone)	113	70-130
Carbon Disulfide	120	70-130
Carbon Tetrachloride	106	70-130
Chlorobenzene	108	70-130
Dibromochloromethane	111	70-130
Chloroethane	111	70-130
Chloroform	112	70-130
Chloromethane	107	70-130
1,2-Dibromoethane (EDB)	110	70-130
1,2-Dichlorobenzene	105	70-130
1,3-Dichlorobenzene	104	70-130
1,4-Dichlorobenzene	105	70-130
1,1-Dichloroethane	112	70-130
Freon 12	119	70-130
1,2-Dichloroethane	113	70-130
1,1-Dichloroethene	114	70-130
cis-1,2-Dichloroethene	105	70-130
trans-1,2-Dichloroethene	128	70-130
1,2-Dichloropropane	106	70-130
cis-1,3-Dichloropropene	114	70-130
trans-1,3-Dichloropropene	121	70-130
Freon 114	116	70-130
Ethyl Benzene	110	70-130
4-Ethyltoluene	109	70-130
Hexachlorobutadiene	108	70-130
2-Hexanone	119	70-130
Methylene Chloride	114	70-130
4-Methyl-2-pentanone	109	70-130
Styrene	112	70-130
1,1,2,2-Tetrachloroethane	94	70-130
Tetrachloroethene	104	70-130
Toluene	103	70-130
1,2,4-Trichlorobenzene	111	70-130
1,1,1-Trichloroethane	112	70-130
1,1,2-Trichloroethane	112	70-130
Trichloroethene	124	70-130

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Client Sample ID: LCSD

Lab ID#: 2003225-04AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**a031204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/12/20 11:56 AM**	

Compound	%Recovery	Method Limits
Freon 11	118	70-130
Freon 113	107	70-130
1,2,4-Trimethylbenzene	108	70-130
1,3,5-Trimethylbenzene	106	70-130
Vinyl Acetate	106	70-130
Vinyl Chloride	119	70-130
m,p-Xylene	109	70-130
o-Xylene	108	70-130
TVOC Ref. to Hexane	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	100	70-130

CHAIN OF CUSTODY RECORD 2003225 No. 1466

EQUUS

PROJECT NUMBER:		PROJECT NAME: CHK STATE M	COC 1 of 1
SHIPPED TO: AIR TOXICS		PROJECT MANAGER: DAVID BRADY	TAT: STANDARD
SAMPLER'S PRINTED NAME: TERRY Fisher			ASOW: N/A
SAMPLER'S SIGNATURE:			* TVOC as HEXANE C6 - C12

Date	Time	Sample ID	Sample Matrix	# of Sample Containers	TO-15	TOTAL VOC as HEXANE *	REMARKS
OK 3/5/20	1305	20200305 M SVE	Air	1	X	X	TAG #

Custody Seal Intact?
Y N (None) Temp NA
FedEx
Ground

TOTAL NUMBER OF CONTAINERS →			
RELINQUISHED BY: Terry Fisher	DATE 3-5-20 TIME 1600	RECEIVED BY: David Brady EATC	DATE 3/9/20 TIME 1010
RELINQUISHED BY:	DATE TIME	RECEIVED BY:	DATE TIME
METHOD OF SHIPMENT: FEDEX		AIRBILL NUMBER: 1361 5179 1290	
RECEIVED IN LABORATORY BY:	DATE TIME	Send PDF, EDD, and INVOICE (if applicable) to: JULIE.CZECH@EQUUSENV.COM	
LABORATORY CONTACT: CATHY GARTNER 615-301-5041		LABORATORY ADDRESS: 180 BLUE RAVINE RD. STE B FOLSOM, CA 95630	

POINT OF ORIGIN:

Login Sample Receipt Checklist

Client: Chesapeake Energy Corporation

Job Number: 180-103356-1
SDG Number: Property ID: 891077

Login Number: 103356
List Number: 1
Creator: Gartner, Cathy

List Source: Eurofins TestAmerica, Pittsburgh

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time (excluding tests with immediate HTs)		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Nashville
2960 Foster Creighton Drive
Nashville, TN 37204
Tel: (615)726-0177

Laboratory Job ID: 490-175390-1
Laboratory Sample Delivery Group: Property ID: 891077
Client Project/Site: State M-1
Sampling Event: State M
Revision: 1

For:
Chesapeake Energy Corporation
PO BOX 548806
Oklahoma City, Oklahoma 73154

Attn: Chase Acker

Cathy Gartner

Authorized for release by:
6/19/2019 12:46:24 PM

Cathy Gartner, Project Manager II
(615)301-5041
cathy.gartner@testamericainc.com

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Laboratory Job ID: 490-175390-1
SDG: Property ID: 891077

Table of Contents

Sample Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
490-175390-1	MW-4	Water	06/04/19 12:10	06/06/19 09:20	
490-175390-2	MW-8	Water	06/04/19 14:05	06/06/19 09:20	
490-175390-3	EQ Blank	Water	06/04/19 00:01	06/06/19 09:20	
490-175390-4	Dup	Water	06/04/19 00:01	06/06/19 09:20	

Case Narrative

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Job ID: 490-175390-1

Laboratory: Eurofins TestAmerica, Nashville

Narrative

Job Narrative
490-175390-1

Revised report
Dup (490-175390-4) was reanalyzed per client request.
Reanalysis result is reported.
This replaces the final report generated on 6/14/19.

Receipt
The samples were received on 6/6/2019 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4º C.

HPLC/IC
Method(s) 300.0: Due to the high concentration of Chloride, the matrix spike (MS) for analytical batch 490-600727 could not be evaluated for accuracy and precision. The associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) met acceptance criteria.

Method(s) 300.0: Due to the nature of the sample matrix, a matrix spike / matrix spike duplicate (MS/MSD) was not analyzed with 490-601096.However, the laboratory control sample / laboratory control sample duplicate (LCS/LCSD) recoveries were within the acceptance limits. (LCS 490-601096/4) and (LCSD 490-601096/5)

Method(s) 300.0: The following samples were diluted due to the nature of the sample matrix: MW-4 (490-175390-1), MW-8 (490-175390-2) and Dup (490-175390-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Client Sample ID: MW-4

Date Collected: 06/04/19 12:10
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-1

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	392		10.0		mg/L			06/12/19 18:28	10

Client Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Client Sample ID: MW-8

Date Collected: 06/04/19 14:05
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-2

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	283		10.0		mg/L			06/12/19 18:51	10

Client Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Client Sample ID: EQ Blank

Date Collected: 06/04/19 00:01
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-3

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			06/11/19 19:51	1

Client Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Client Sample ID: Dup

Date Collected: 06/04/19 00:01
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-4

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	382		20.0		mg/L			06/18/19 11:04	20

QC Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 490-600727/3
Matrix: Water
Analysis Batch: 600727

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			06/11/19 16:46	1

Lab Sample ID: LCS 490-600727/4
Matrix: Water
Analysis Batch: 600727

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.938		mg/L		99	90 - 110

Lab Sample ID: LCSD 490-600727/5
Matrix: Water
Analysis Batch: 600727

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.932		mg/L		99	90 - 110	0	20

Lab Sample ID: 490-175390-1 MS
Matrix: Water
Analysis Batch: 600727

Client Sample ID: MW-4
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	169	E	10.0	166.8	E 4	mg/L		-20	80 - 120

Lab Sample ID: 490-175390-3 MS
Matrix: Water
Analysis Batch: 600727

Client Sample ID: EQ Blank
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	ND		10.0	11.80		mg/L		118	80 - 120

Lab Sample ID: MB 490-601096/3
Matrix: Water
Analysis Batch: 601096

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			06/12/19 17:07	1

Lab Sample ID: LCS 490-601096/4
Matrix: Water
Analysis Batch: 601096

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.901		mg/L		99	90 - 110

Lab Sample ID: LCSD 490-601096/5
Matrix: Water
Analysis Batch: 601096

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.890		mg/L		99	90 - 110	0	20

QC Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 490-602063/3
Matrix: Water
Analysis Batch: 602063

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			06/18/19 09:29	1

Lab Sample ID: LCS 490-602063/5
Matrix: Water
Analysis Batch: 602063

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	9.372		mg/L		94	90 - 110

Lab Sample ID: LCSD 490-602063/6
Matrix: Water
Analysis Batch: 602063

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	10.0	9.373		mg/L		94	90 - 110	0	20

Lab Sample ID: 490-175846-C-2 MS
Matrix: Water
Analysis Batch: 602063

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	245	E	10.0	264.5	E 4	mg/L		192	80 - 120

Lab Sample ID: 490-175846-C-2 MSD
Matrix: Water
Analysis Batch: 602063

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	245	E	10.0	254.2	E 4	mg/L		90	80 - 120	4	20

QC Association Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

HPLC/IC

Analysis Batch: 600727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-175390-3	EQ Blank	Total/NA	Water	300.0	
MB 490-600727/3	Method Blank	Total/NA	Water	300.0	
LCS 490-600727/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 490-600727/5	Lab Control Sample Dup	Total/NA	Water	300.0	
490-175390-1 MS	MW-4	Total/NA	Water	300.0	
490-175390-3 MS	EQ Blank	Total/NA	Water	300.0	

Analysis Batch: 601096

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-175390-1	MW-4	Total/NA	Water	300.0	
490-175390-2	MW-8	Total/NA	Water	300.0	
MB 490-601096/3	Method Blank	Total/NA	Water	300.0	
LCS 490-601096/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 490-601096/5	Lab Control Sample Dup	Total/NA	Water	300.0	

Analysis Batch: 602063

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
490-175390-4	Dup	Total/NA	Water	300.0	
MB 490-602063/3	Method Blank	Total/NA	Water	300.0	
LCS 490-602063/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 490-602063/6	Lab Control Sample Dup	Total/NA	Water	300.0	
490-175846-C-2 MS	Matrix Spike	Total/NA	Water	300.0	
490-175846-C-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Lab Chronicle

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Client Sample ID: MW-4
Date Collected: 06/04/19 12:10
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10			601096	06/12/19 18:28	SW1	TAL NSH

Client Sample ID: MW-8
Date Collected: 06/04/19 14:05
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10			601096	06/12/19 18:51	SW1	TAL NSH

Client Sample ID: EQ Blank
Date Collected: 06/04/19 00:01
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1			600727	06/11/19 19:51	SW1	TAL NSH

Client Sample ID: Dup
Date Collected: 06/04/19 00:01
Date Received: 06/06/19 09:20

Lab Sample ID: 490-175390-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20			602063	06/18/19 11:04	SW1	TAL NSH

Laboratory References:

TAL NSH = Eurofins TestAmerica, Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Method Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL NSH

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL NSH = Eurofins TestAmerica, Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

Accreditation/Certification Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 490-175390-1
SDG: Property ID: 891077

Laboratory: Eurofins TestAmerica, Nashville

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oklahoma	State Program	6	9412	08-31-19

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Nashville, TN

490-175390 Chain of Custody

COOLER RECEIPT FORM

Cooler Received/Opened On 6/6/2019 @ 9:20

Time Samples Removed From Cooler 17:00 Time Samples Placed In Storage 17:30 (2 Hour Window)

1. Tracking # 6114 (last 4 digits, FedEx) Courier: FedEx

IR Gun ID 17960358 pH Strip Lot N/A Chlorine Strip Lot N/A

2. Temperature of rep. sample or temp blank when opened: 1.4 *Degrees Celsius*

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO NA

4. Were custody seals on outside of cooler? YES...NO...NA

If yes, how many and where: 1 front

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (intial) _____

7. Were custody seals on containers: YES NO and Intact YES...NO...NA

Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES...NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA

Larger than this.

14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence #_____

I certify that I unloaded the cooler and answered questions 7-14 (intial) MSM

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial) MSM

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (intial) MSM

I certify that I attached a label with the unique LIMS number to each container (intial) MSM

21. Were there Non-Conformance issues at login? YES...NO Was a NCM generated? YES...NO...#_____

BIS = Broken in shipment
Cooler Receipt Form.doc

LF-1
End of Form

Revised 8/23/17

6/19/2019 (Rev. 1)

CHAIN OF CUSTODY RECORD

No. 1073

EQUUS environmental solutions

PROJECT NUMBER: CHKSTATM:H19001	PROJECT NAME: CHK STATE M	COC 1 of 1	
SHIPPED TO: TA-NASHVILLE	PROJECT MANAGER: DAVID BRADY	TAT: STANDARD	

SAMPLER'S PRINTED NAME: TERRY Fisher

SAMPLER'S SIGNATURE:

ASOW: N/A

Loc: 490 175390

Date	Time	Sample ID	Sample Matrix	# of Sample Containers	CHLORIDE	REMARKS
6-4-19	1210	MW-4	W	1	X	-1
6-4-19	1405	MW-8	W	1	X	2
6-4-19	1220	EQ Blank	W	1	X	3
6-4-19	—	Dup	W	1	X	4

TOTAL NUMBER OF CONTAINERS → 4

RELINQUISHED BY:	DATE 6-5-19	RECEIVED BY: TANAS 1.4c	DATE 6.6.19
	TIME 1600		TIME 0920
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
	TIME		TIME

METHOD OF SHIPMENT: FEDEX

AIRBILL NUMBER: 4564 1085 6114

RECEIVED IN LABORATORY BY: DATE / TIME

Send PDF, EDD, and INVOICE (if applicable) to: QAQC@EQUUSENV.COM ; JULIE.CZECH@EQUUSENV.COM

LABORATORY CONTACT: CATHY GARTNER 615-301-5041

LABORATORY ADDRESS: 2960 FOSTER CREIGHTON DRIVE NASHVILLE, TN 37204

POINT OF ORIGIN:

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Edison
777 New Durham Road
Edison, NJ 08817
Tel: (732)549-3900

Laboratory Job ID: 460-190781-1
Laboratory Sample Delivery Group: Property ID: 891077
Client Project/Site: CHK STATE M

For:
Chesapeake Energy Corporation
PO BOX 548806
Oklahoma City, Oklahoma 73154

Attn: Chase Acker

Cathy Gartner

Authorized for release by:
9/20/2019 5:07:00 PM

Cathy Gartner, Project Manager II
(615)301-5041
cathy.gartner@testamericainc.com

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Laboratory Job ID: 460-190781-1
SDG: Property ID: 891077

Table of Contents

Definitions/Glossary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Job ID: 460-190781-1

Laboratory: Eurofins TestAmerica, Edison

Narrative

Job Narrative
460-190781-1

Comments
No additional comments.

Receipt
The samples were received on 9/6/2019 10:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0º C.

GC Semi VOA
Method(s) 300.0: The following samples were diluted to bring the concentration of Chloride within the calibration range: MW-4 (460-190781-1), MW-8 (460-190781-3) and Dup (460-190781-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Client Sample ID: MW-4 — Lab Sample ID: 460-190781-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	404		150		mg/L	150		300.0	Total/NA

Client Sample ID: EQ Blank — Lab Sample ID: 460-190781-2

No Detections.

Client Sample ID: MW-8 — Lab Sample ID: 460-190781-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	223		80.0		mg/L	80		300.0	Total/NA

Client Sample ID: Dup — Lab Sample ID: 460-190781-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	217		80.0		mg/L	80		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Client Sample ID: MW-4
Lab Sample ID: 460-190781-1
Date Collected: 09/04/19 12:05
Matrix: Water
Date Received: 09/06/19 10:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**404**		150		mg/L			09/16/19 00:21	150

Client Sample ID: EQ Blank
Lab Sample ID: 460-190781-2
Date Collected: 09/04/19 12:15
Matrix: Water
Date Received: 09/06/19 10:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			09/15/19 12:22	1

Client Sample ID: MW-8
Lab Sample ID: 460-190781-3
Date Collected: 09/04/19 14:30
Matrix: Water
Date Received: 09/06/19 10:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**223**		80.0		mg/L			09/16/19 00:36	80

Client Sample ID: Dup
Lab Sample ID: 460-190781-4
Date Collected: 09/04/19 00:00
Matrix: Water
Date Received: 09/06/19 10:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**217**		80.0		mg/L			09/16/19 00:50	80

QC Sample Results

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 460-639415/8
Matrix: Water
Analysis Batch: 639415

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			09/15/19 11:37	1

Lab Sample ID: LCS 460-639415/5
Matrix: Water
Analysis Batch: 639415

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			1.50	1.583		mg/L		106	90 - 110		

Lab Sample ID: LCSD 460-639415/6
Matrix: Water
Analysis Batch: 639415

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			1.50	1.604		mg/L		107	90 - 110	1	15

Lab Sample ID: MB 460-639589/37
Matrix: Water
Analysis Batch: 639589

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			09/16/19 08:38	1

Lab Sample ID: LCS 460-639589/5
Matrix: Water
Analysis Batch: 639589

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			1.50	1.587		mg/L		106	90 - 110		

Lab Sample ID: LCSD 460-639589/6
Matrix: Water
Analysis Batch: 639589

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			1.50	1.593		mg/L		106	90 - 110	0	15

QC Association Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

HPLC/IC

Analysis Batch: 639415

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-190781-2	EQ Blank	Total/NA	Water	300.0	
MB 460-639415/8	Method Blank	Total/NA	Water	300.0	
LCS 460-639415/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 460-639415/6	Lab Control Sample Dup	Total/NA	Water	300.0	

Analysis Batch: 639589

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-190781-1	MW-4	Total/NA	Water	300.0	
460-190781-3	MW-8	Total/NA	Water	300.0	
460-190781-4	Dup	Total/NA	Water	300.0	
MB 460-639589/37	Method Blank	Total/NA	Water	300.0	
LCS 460-639589/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 460-639589/6	Lab Control Sample Dup	Total/NA	Water	300.0	

Lab Chronicle

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Client Sample ID: MW-4
Date Collected: 09/04/19 12:05
Date Received: 09/06/19 10:30

Lab Sample ID: 460-190781-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		150	639589	09/16/19 00:21	VMI	TAL EDI

Client Sample ID: EQ Blank
Date Collected: 09/04/19 12:15
Date Received: 09/06/19 10:30

Lab Sample ID: 460-190781-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	639415	09/15/19 12:22	VMI	TAL EDI

Client Sample ID: MW-8
Date Collected: 09/04/19 14:30
Date Received: 09/06/19 10:30

Lab Sample ID: 460-190781-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		80	639589	09/16/19 00:36	VMI	TAL EDI

Client Sample ID: Dup
Date Collected: 09/04/19 00:00
Date Received: 09/06/19 10:30

Lab Sample ID: 460-190781-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		80	639589	09/16/19 00:50	VMI	TAL EDI

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
Connecticut	State Program	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
DE Haz. Subst. Cleanup Act (HSCA)	State Program	N/A	12-31-19
New Jersey	NELAP	12028	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-20
Pennsylvania	NELAP	68-00522	02-28-20
Rhode Island	State	LAO00132	12-30-19
Rhode Island	State Program	LAO00132	12-30-19
USDA	Federal	NJCA-003-08	05-03-21
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Nashville

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oklahoma	State Program	9412	08-31-20

Method Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL EDI

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Sample Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-190781-1
SDG: Property ID: 891077

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
460-190781-1	MW-4	Water	09/04/19 12:05	09/06/19 10:30	
460-190781-2	EQ Blank	Water	09/04/19 12:15	09/06/19 10:30	
460-190781-3	MW-8	Water	09/04/19 14:30	09/06/19 10:30	
460-190781-4	Dup	Water	09/04/19 00:00	09/06/19 10:30	

CHAIN OF CUSTODY RECORD

No. 1341

PROJECT NUMBER: CHKSTATM:H19ØØ1	PROJECT NAME: CHK STATE M	COC 1 of 1
SHIPPED TO: TA-EDISON	PROJECT MANAGER: DAVID BRADY	TAT: STANDARD

SAMPLER'S PRINTED NAME: TERRY FISHER

SAMPLER'S SIGNATURE:

ASOW: N/A

190781

Date	Time	Sample ID	Sample Matrix	# of Sample Containers	CHLORIDE	REMARKS
9-4-19	1205	MW-4	W	1	X	-1
9-4-19	1215	EQ BLANK	W	1	X	-2
9-4-19	1430	MW-8	W	1	X	-3
9-4-19	—	Dup	W	1	X	-4

460-190781 Chain of Custody

TOTAL NUMBER OF CONTAINERS → 4

RELINQUISHED BY:	DATE 9-5-19	RECEIVED BY: Naomi P	DATE 9/6/19
	TIME 1600		TIME 10:30
RELINQUISHED BY:	DATE	RECEIVED BY:	DATE
	TIME		TIME

METHOD OF SHIPMENT: FEDEX

AIRBILL NUMBER: 4564 1087 5635

RECEIVED IN LABORATORY BY: DATE / TIME

Send PDF, EDD, and INVOICE (if applicable) to: @AGC@EQUUSENV.COM, JULIE.CZECH@EQUUSENV.COM

LABORATORY CONTACT: CATHY GARTNER: 615-301-5041

LABORATORY ADDRESS: 777 NEW DURHAM ROAD EDISON, NJ 08817

POINT OF ORIGIN:

IR#9 1084175 1.0ac Via Fedex

TestAmerica Edison
Receipt Temperature and pH Log

Job Number: 190781

Number of Coolers: 1 IR Gun # 9

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	1.0 °C	1.0 °C	Cooler #4:	°C	°C	Cooler #7:	°C	°C
Cooler #2:	°C	°C	Cooler #5:	°C	°C	Cooler #8:	°C	°C
Cooler #3:	°C	°C	Cooler #6:	°C	°C	Cooler #9:	°C	°C

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals* (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other

If pH adjustments are required record the information below:

Sample No(s). adjusted: _____

Preservative Name/Conc.: _____ Volume of Preservative used (ml): _____

Lot # of Preservative(s): _____ Expiration Date: _____

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

* *Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.*

Initials: NP **Date:** 09/06/19

Login Sample Receipt Checklist

Client: Chesapeake Energy Corporation

Job Number: 460-190781-1
SDG Number: Property ID: 891077

Login Number: 190781
List Number: 1
Creator: Lysy, Susan

List Source: Eurofins TestAmerica, Edison

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	1084175
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Edison
777 New Durham Road
Edison, NJ 08817
Tel: (732)549-3900

Laboratory Job ID: 460-199185-1
Laboratory Sample Delivery Group: Property ID: 891077
Client Project/Site: CHK STATE M

For:
Chesapeake Energy Corporation
PO BOX 548806
Oklahoma City, Oklahoma 73154

Attn: Chase Acker

Cathy Gartner

Authorized for release by:
12/24/2019 12:05:47 PM

Cathy Gartner, Project Manager II
(615)301-5041
cathy.gartner@testamericainc.com

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Laboratory Job ID: 460-199185-1
SDG: Property ID: 891077

Table of Contents

Definitions/Glossary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Job ID: 460-199185-1

Laboratory: Eurofins TestAmerica, Edison

Narrative

Job Narrative
460-199185-1

Comments
No additional comments.

Receipt
The samples were received on 12/18/2019 3:21 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.6º C.

GC Semi VOA
Method 300.0: The following sample was diluted to bring the concentration of Chloride within the calibration range: MW-8 (460-199185-3). Elevated reporting limits (RLs) are provided.

Method 300.0: The following sample was diluted to bring the concentration of Chloride within the calibration range: MW-4 (460-199185-1). Elevated reporting limits (RLs) are provided.

Method 300.0: The following sample was diluted to bring the concentration of Chloride within the calibration range: Dup (460-199185-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Client Sample ID: MW-4 — Lab Sample ID: 460-199185-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	421		250		mg/L	250		300.0	Total/NA

Client Sample ID: EQ Blank — Lab Sample ID: 460-199185-2

No Detections.

Client Sample ID: MW-8 — Lab Sample ID: 460-199185-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	198		50.0		mg/L	50		300.0	Total/NA

Client Sample ID: Dup — Lab Sample ID: 460-199185-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	415		250		mg/L	250		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Client Sample ID: MW-4
Lab Sample ID: 460-199185-1
Date Collected: 12/06/19 12:20
Matrix: Water
Date Received: 12/18/19 15:21

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	421		250		mg/L			12/20/19 07:40	250

Client Sample ID: EQ Blank
Lab Sample ID: 460-199185-2
Date Collected: 12/06/19 12:25
Matrix: Water
Date Received: 12/18/19 15:21

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			12/19/19 03:08	1

Client Sample ID: MW-8
Lab Sample ID: 460-199185-3
Date Collected: 12/06/19 13:40
Matrix: Water
Date Received: 12/18/19 15:21

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	198		50.0		mg/L			12/19/19 03:23	50

Client Sample ID: Dup
Lab Sample ID: 460-199185-4
Date Collected: 12/06/19 00:00
Matrix: Water
Date Received: 12/18/19 15:21

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	415		250		mg/L			12/20/19 23:54	250

QC Sample Results

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 460-663679/3
Matrix: Water
Analysis Batch: 663679

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			12/18/19 22:42	1

Lab Sample ID: LCS 460-663679/5
Matrix: Water
Analysis Batch: 663679

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1.50	1.529		mg/L		102	90 - 110

Lab Sample ID: LCSD 460-663679/6
Matrix: Water
Analysis Batch: 663679

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1.50	1.583		mg/L		106	90 - 110	3	15

Lab Sample ID: MB 460-663765/3
Matrix: Water
Analysis Batch: 663765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			12/20/19 01:30	1

Lab Sample ID: LCS 460-663765/5
Matrix: Water
Analysis Batch: 663765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1.50	1.548		mg/L		103	90 - 110

Lab Sample ID: LCSD 460-663765/6
Matrix: Water
Analysis Batch: 663765

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1.50	1.562		mg/L		104	90 - 110	1	15

Lab Sample ID: MB 460-664036/3
Matrix: Water
Analysis Batch: 664036

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			12/20/19 15:12	1

Lab Sample ID: LCS 460-664036/5
Matrix: Water
Analysis Batch: 664036

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1.50	1.492		mg/L		99	90 - 110

QC Sample Results

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: LCSD 460-664036/6
Matrix: Water
Analysis Batch: 664036

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			1.50	1.456		mg/L		97	90 - 110	2	15

QC Association Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

HPLC/IC

Analysis Batch: 663679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-199185-2	EQ Blank	Total/NA	Water	300.0	
460-199185-3	MW-8	Total/NA	Water	300.0	
MB 460-663679/3	Method Blank	Total/NA	Water	300.0	
LCS 460-663679/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 460-663679/6	Lab Control Sample Dup	Total/NA	Water	300.0	

Analysis Batch: 663765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-199185-1	MW-4	Total/NA	Water	300.0	
MB 460-663765/3	Method Blank	Total/NA	Water	300.0	
LCS 460-663765/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 460-663765/6	Lab Control Sample Dup	Total/NA	Water	300.0	

Analysis Batch: 664036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-199185-4	Dup	Total/NA	Water	300.0	
MB 460-664036/3	Method Blank	Total/NA	Water	300.0	
LCS 460-664036/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 460-664036/6	Lab Control Sample Dup	Total/NA	Water	300.0	

Lab Chronicle

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Client Sample ID: MW-4
Date Collected: 12/06/19 12:20
Date Received: 12/18/19 15:21

Lab Sample ID: 460-199185-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		250	663765	12/20/19 07:40	VMI	TAL EDI

Client Sample ID: EQ Blank
Date Collected: 12/06/19 12:25
Date Received: 12/18/19 15:21

Lab Sample ID: 460-199185-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	663679	12/19/19 03:08	VMI	TAL EDI

Client Sample ID: MW-8
Date Collected: 12/06/19 13:40
Date Received: 12/18/19 15:21

Lab Sample ID: 460-199185-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		50	663679	12/19/19 03:23	VMI	TAL EDI

Client Sample ID: Dup
Date Collected: 12/06/19 00:00
Date Received: 12/18/19 15:21

Lab Sample ID: 460-199185-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		250	664036	12/20/19 23:54	VMI	TAL EDI

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
Massachusetts	State Program	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-20
Rhode Island	State	LAO00132	12-30-19
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Nashville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State Program	AZ0473	05-05-14 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL EDI

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Sample Summary

Client: Chesapeake Energy Corporation
Project/Site: CHK STATE M

Job ID: 460-199185-1
SDG: Property ID: 891077

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
460-199185-1	MW-4	Water	12/06/19 12:20	12/18/19 15:21	
460-199185-2	EQ Blank	Water	12/06/19 12:25	12/18/19 15:21	
460-199185-3	MW-8	Water	12/06/19 13:40	12/18/19 15:21	
460-199185-4	Dup	Water	12/06/19 00:00	12/18/19 15:21	

460-199185 Chain of Custody

199185

CHAIN OF CUSTODY RECORD

No. 1444

PROJECT NUMBER: CHKSTATM:H19001	PROJECT NAME: CHK STATE M		COC 1 of 1
SHIPPED TO: TA-EDISON	PROJECT MANAGER: DAVID BRADY		TAT: STANDARD

SAMPLER'S PRINTED NAME: TERRY FISHER

SAMPLER'S SIGNATURE:

Date	Time	Sample ID	Sample Matrix	# of Sample Containers	CHLORIDE	ASOW: N/A. REMARKS
12-6-19	1220	MW-4	W	1	X	1
12-6-19	1225	EQ BLANK	W	1	X	2
12-6-19	1340	MW-8	W	1	X	3
12-6-19	—	Dup	W	1	X	4

TOTAL NUMBER OF CONTAINERS →

RELINQUISHED BY:	DATE 12/9/19 TIME 1500	RECEIVED BY:	DATE TIME
RELINQUISHED BY:	DATE TIME	RECEIVED BY: 12/10/19 1000	DATE TIME
METHOD OF SHIPMENT: FEDEX		AIRBILL NUMBER: 1361 5172 1200	3.3/3.6 #11
RECEIVED IN LABORATORY BY:	DATE TIME	Send PDF, EDD, and INVOICE (if applicable) to: JULIE.CZECH@EQUUSENV.COM	
LABORATORY CONTACT: CATHY GARTNER 615-301-5041		LABORATORY ADDRESS: 777 NEW DURHAM RD. EDISON, NJ 08817	

POINT OF ORIGIN:

Eurofins TestAmerica Edison
Receipt Temperature and pH Log

Job Number: 199185

Number of Coolers: 1 IR Gun # 11

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	3.3℃	3.6℃	Cooler #4:	℃	℃	Cooler #7:	℃	℃
Cooler #2:	℃	℃	Cooler #5:	℃	℃	Cooler #8:	℃	℃
Cooler #3:	℃	℃	Cooler #6:	℃	℃	Cooler #9:	℃	℃

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals* (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other

If pH adjustments are required record the information below:

Sample No(s). adjusted: _____

Preservative Name/Conc.: _____ Volume of Preservative used (ml): _____

Lot # of Preservative(s): _____ Expiration Date: _____

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

** Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.*

Initials: IQL Date: 12/10/19

Login Sample Receipt Checklist

Client: Chesapeake Energy Corporation

Job Number: 460-199185-1
SDG Number: Property ID: 891077

Login Number: 199185
List Number: 1
Creator: Rivera, Kenneth

List Source: Eurofins TestAmerica, Edison

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Edison
777 New Durham Road
Edison, NJ 08817
Tel: (732)549-3900

Laboratory Job ID: 460-204623-1
Laboratory Sample Delivery Group: Property ID: 891077
Client Project/Site: State M-1

For:
Chesapeake Energy Corporation
PO BOX 548806
Oklahoma City, Oklahoma 73154

Attn: Chase Acker

Cathy Gartner

Authorized for release by:
3/18/2020 12:29:29 PM

Cathy Gartner, Project Manager II
(615)301-5041
cathy.gartner@testamericainc.com

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Laboratory Job ID: 460-204623-1
SDG: Property ID: 891077

Table of Contents

Definitions/Glossary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Job ID: 460-204623-1

Laboratory: Eurofins TestAmerica, Edison

Narrative

Job Narrative
460-204623-1

Comments
No additional comments.

Receipt
The samples were received on 3/9/2020 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.1º C.

GC Semi VOA
Method 300.0: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW-4 (460-204623-1), MW-8 (460-204623-2), Dup (460-204623-4), (460-204966-D-1), (460-204966-D-1 DU), (460-204966-D-1 MS) and (460-204966-D-1 MSD). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Client Sample ID: MW-4 — Lab Sample ID: 460-204623-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride - DL	443		100		mg/L	100		300.0	Total/NA

Client Sample ID: MW-8 — Lab Sample ID: 460-204623-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride - DL2	118		100		mg/L	100		300.0	Total/NA

Client Sample ID: EQ Blank — Lab Sample ID: 460-204623-3

No Detections.

Client Sample ID: Dup — Lab Sample ID: 460-204623-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride - DL	442		100		mg/L	100		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Client Sample ID: MW-4
Lab Sample ID: 460-204623-1
Date Collected: 03/05/20 11:05
Matrix: Water
Date Received: 03/09/20 11:00

Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	443		100		mg/L			03/14/20 19:28	100

Client Sample ID: MW-8
Lab Sample ID: 460-204623-2
Date Collected: 03/05/20 12:15
Matrix: Water
Date Received: 03/09/20 11:00

Method: 300.0 - Anions, Ion Chromatography - DL2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	118		100		mg/L			03/14/20 19:57	100

Client Sample ID: EQ Blank
Lab Sample ID: 460-204623-3
Date Collected: 03/05/20 09:00
Matrix: Water
Date Received: 03/09/20 11:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			03/14/20 14:47	1

Client Sample ID: Dup
Lab Sample ID: 460-204623-4
Date Collected: 03/05/20 00:00
Matrix: Water
Date Received: 03/09/20 11:00

Method: 300.0 - Anions, Ion Chromatography - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	442		100		mg/L			03/14/20 20:12	100

QC Sample Results

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 460-681065/45
Matrix: Water
Analysis Batch: 681065

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00		mg/L			03/14/20 20:27	1

Lab Sample ID: LCS 460-681065/47
Matrix: Water
Analysis Batch: 681065

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			1.50	1.476		mg/L		98	90 - 110		

Lab Sample ID: LCSD 460-681065/48
Matrix: Water
Analysis Batch: 681065

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			1.50	1.462		mg/L		97	90 - 110	1	15

QC Association Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

HPLC/IC

Analysis Batch: 681065

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-204623-1 - DL	MW-4	Total/NA	Water	300.0	
460-204623-2 - DL2	MW-8	Total/NA	Water	300.0	
460-204623-3	EQ Blank	Total/NA	Water	300.0	
460-204623-4 - DL	Dup	Total/NA	Water	300.0	
MB 460-681065/45	Method Blank	Total/NA	Water	300.0	
LCS 460-681065/47	Lab Control Sample	Total/NA	Water	300.0	
LCSD 460-681065/48	Lab Control Sample Dup	Total/NA	Water	300.0	

Lab Chronicle

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Client Sample ID: MW-4
Date Collected: 03/05/20 11:05
Date Received: 03/09/20 11:00

Lab Sample ID: 460-204623-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0	DL	100	681065	03/14/20 19:28	VMI	TAL EDI

Client Sample ID: MW-8
Date Collected: 03/05/20 12:15
Date Received: 03/09/20 11:00

Lab Sample ID: 460-204623-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0	DL2	100	681065	03/14/20 19:57	VMI	TAL EDI

Client Sample ID: EQ Blank
Date Collected: 03/05/20 09:00
Date Received: 03/09/20 11:00

Lab Sample ID: 460-204623-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	681065	03/14/20 14:47	VMI	TAL EDI

Client Sample ID: Dup
Date Collected: 03/05/20 00:00
Date Received: 03/09/20 11:00

Lab Sample ID: 460-204623-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0	DL	100	681065	03/14/20 20:12	VMI	TAL EDI

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
Massachusetts	State	M-NJ312	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-21
Rhode Island	State	LAO00132	12-31-20
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Nashville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State Program	AZ0473	05-05-14 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL EDI

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Sample Summary

Client: Chesapeake Energy Corporation
Project/Site: State M-1

Job ID: 460-204623-1
SDG: Property ID: 891077

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
460-204623-1	MW-4	Water	03/05/20 11:05	03/09/20 11:00	
460-204623-2	MW-8	Water	03/05/20 12:15	03/09/20 11:00	
460-204623-3	EQ Blank	Water	03/05/20 09:00	03/09/20 11:00	
460-204623-4	Dup	Water	03/05/20 00:00	03/09/20 11:00	

CHAIN OF CUSTODY RECORD

No. 1467

PROJECT NUMBER:	PROJECT NAME: CHK STATE M	COC 1 of 1
SHIPPED TO: TA-EDISON	PROJECT MANAGER: DAVID BRADY	TAT: STANDARD

SAMPLER'S PRINTED NAME: Terry Fish

SAMPLER'S SIGNATURE:

ASOW: N/A

460-204623

Date	Time	Sample ID	Sample Matrix	# of Sample Containers	CHLORIDE	REMARKS
3/5/20	1105	mw-4	W	1	X	1
3/5/20	1215	mw-8	W	1	X	2
3/5/20	900	Ed Blank	W	1	X	3
3/5/20	—	Dup	W	1	X	4
TOTAL NUMBER OF CONTAINERS →				4		

460-204623 Chain of Custody

RELINQUISHED BY:	DATE 3/5/20 TIME 1600	RECEIVED BY:	DATE TIME
RELINQUISHED BY:	DATE TIME	RECEIVED BY:	DATE TIME
METHOD OF SHIPMENT: FEDEX		AIRBILL NUMBER: 1361 5174 1290	
RECEIVED IN LABORATORY BY: JHEdi	DATE 3/6/20 TIME 11:00	Send PDF, EDD, and INVOICE (if applicable) to: JULIE.CZECH@EQUUSENV.COM	
LABORATORY CONTACT: CATHY GARTNER 615-301-5041		LABORATORY ADDRESS: 777 NEW DURHAM RD. EDISON, NJ 08817	

POINT OF ORIGIN:

4.1°C IR11 Via FedEx CS= 1098012

Eurofins TestAmerica Edison
Receipt Temperature and pH Log

Job Number: 460-204623

Number of Coolers: 1 IR Gun # 11

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	4.1 ℃	4.1 ℃	Cooler #4:	℃	℃	Cooler #7:	℃	℃
Cooler #2:	℃	℃	Cooler #5:	℃	℃	Cooler #8:	℃	℃
Cooler #3:	℃	℃	Cooler #6:	℃	℃	Cooler #9:	℃	℃

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals* (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other

If pH adjustments are required record the information below:

Sample No(s). adjusted: _____

Preservative Name/Conc.: _____ Volume of Preservative used (ml): _____

Lot # of Preservative(s): _____ Expiration Date: _____

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

** Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.*

Initials: JB Date: 3/6/20

EDS-WI-038, Rev 4.1
10/22/2019

Login Sample Receipt Checklist

Client: Chesapeake Energy Corporation

Job Number: 460-204623-1
SDG Number: Property ID: 891077

Login Number: 204623
List Number: 1
Creator: Breton, Jayson J

List Source: Eurofins TestAmerica, Edison

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 337541

CONDITIONS

Operator: CHESAPEAKE OPERATING, INC. 6100 NORTH WESTERN AVE OKC, OK 73118	OGRID: 147179
	Action Number: 337541
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
michael.buchanan	Sixth Annual Groundwater Monitoring Report State M Lease (AP-72) has been accepted for the record.	6/4/2024