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FEEZOR ENGINEERING, INC.

LANDFILL GAS CORRECTIVE ACTION UPDATE

BRIDGETON LANDFILL

BRIDGETON, ST. LOUIS COUNTY, MISSOURI

Submitted Pursuant to Section 23 of Agreed Order
Case No. 13SL-CC01088, Effective May 13, 2013

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October, 15 2019

Project No.: BT-133

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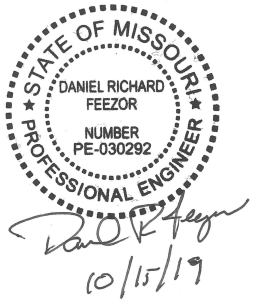

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1.0 INTRODUCTION

On May 13, 2013, Bridgeton Landfill (BL), LLC entered into an Agreed Order with the State of Missouri which required actions to address a subsurface reaction (SSR) occurring in the South Quarry area of the Bridgeton Landfill (BL). Section 23 of the Agreed Order required the preparation of an updated "Landfill Gas Corrective Action Plan" (CAP) and requested that the update consider SSR control measures. Bridgeton Landfill, LLC subsequently submitted an updated CAP on July 26, 2013. On June 29, 2018, Bridgeton Landfill LLC entered into the Final Consent Judgment (Case No. 13SL-CC01088-01) between Bridgeton Landfill, LLC and the State of Missouri). Paragraph 39 of the Final Consent Judgement requires the continuation of the quarterly CAP updates.

Section 5.0 of the July 2013 CAP proposed that weekly monitoring data would be summarized and reviewed in a quarterly report to be submitted on the 15th day of the month following each quarter. The Missouri Department of Natural Resources (MDNR) accepted this proposal in a letter dated October 18, 2013. Bridgeton Landfill, LLC has subsequently submitted updated Quarterly Corrective Action Plan Updates each quarter. The purpose of this document is to provide monitoring data for the third quarter of 2019 (July 01, 2019 – September 30, 2019) and to review the current status of gas migration control measures.

The text of the July 2013 CAP is presented in **Appendix A** for reference.

2.0 REVIEW OF CURRENT GAS MIGRATION CONTROL STATUS

The BL continues an aggressive monitoring program and significant infrastructure investment with respect to landfill gas migration control at the facility.

Detailed graphs showing approximately one year of methane concentrations as measured in the probes September 30, 2018 to September 30, 2019 are included in this document as **Appendix B**.

Table 1 lists the gas monitoring probes and their corresponding abbreviations, as presented in the July 2013 CAP, to clarify the historical graphs and the tabulated data for July 1, 2019 through September 30, 2019.

Tables 2 through **5** present tabulated gas monitoring probe data for the monitoring period. Weekly water level readings were proposed by the July 2013 CAP and approved by the October 18, 2013 MDNR letter. These readings are presented as depth to water (from top of well). Results of weekly water level measurements for the monitoring period are presented in **Table 6**. Please note the "Quadrant" designation on Tables 2-6 is based upon the March 2019 Operation, Maintenance, and Monitoring (OM&M) Plan. This plan was modified in August 2019. Therefore, this CAP Update includes the new quadrant designations for the probes.

The following discussion highlights observations regarding methane data observed during this monitoring period. A site plan that depicts locations of the gas monitoring probes is presented in **Appendix C**.

Newly Elevated Compliance Probes

There were no newly elevated compliance probes during this quarterly review.

Probes with Greater Than or Equal to 2.5% Methane: Quarterly Review

The following probes exhibited methane concentrations above 2.5% for at least a portion of the current monitoring quarter: GMP-05, TMP-1S, and TMP-3S.

Probes Below 2.5% Methane

The following probes exhibited methane concentrations less than 2.5% during the current quarterly monitoring period: GMP-01, GMP-02, GMP-03, GMP-4D, GMP-4S, GMP-5D, GMP-5S, GMP-6D, GMP-6S, GMP-7D, GMP-7S, GMP-06, GMP-07, GMP-08, GMP-09, GMP-10, GMP-11, GMP-12, GMP-13D, GMP-13S, GMP-14D, GMP-14S, GMP-15D, GMP-15S, GMP-16D,

GMP-16S, TMP-1D, TMP-1M, TMP-2D, TMP-2M, TMP-2S, TMP-3D, TMP-3M, PZ-204A-SS, and PZ-204-SS.

Quarterly-Read Probes

Sentry Probes currently monitored on a quarterly basis are GMP-05, GMP-06, and GMP-07. During this quarterly monitoring period, measurements at these probes were performed on July 2, 2019. GMP-05 exhibited methane concentrations above 2.5% during this quarter. GMP-06 and GMP-07 exhibited methane concentrations below 2.5%. Sentry Probe GMP-04 was decommissioned in March 2014. Although Compliance Probe GMP-08 is listed as a quarterly-read probe in the July 2013 CAP, it was monitored more frequently during this monitoring period. GMP-08 exhibited methane concentrations above 2.5% during the beginning of the previous quarterly monitoring period but has remained below 2.5% methane since April 17, 2019.

Data Review

A review of the probe readings for this quarterly monitoring period indicates that probes GMP-03, GMP-08, TMP-2S, TMP-3M exhibited methane concentrations below 2.5% during this quarter after exhibiting methane concentrations above 2.5% the previous quarter.

GMP-08 exhibited first-time measurements of greater than 2.5% methane on March 12, 2019. Subsequent to the March 12, 2019 detection, GMP-08 had previously been monitored more frequently. GMP-08 exhibited methane concentrations over 2.5% intermittently throughout the remainder of the first quarter 2019 and the beginning of second quarter 2019. However, GMP-08 methane measurements have been under the 2.5% threshold since April 17, 2019. A separate Landfill Gas Corrective Action Plan (LGCAP) for GMP-08 was submitted to the MDNR and to the St. Louis County Department of Public Health Air Pollution Control Program (SLCDPH-APCP) on March 26, 2019. The corrective action for GMP-08 is summarized in Sections 3.0 and 4.0 of this report. The March 26, 2019 GMP-08 LGCAP and associated approvals are presented in **Appendix E** of this report.

3.0 RECENT GAS MIGRATION CONTROL EFFORTS

The July 2013 CAP and subsequent quarterly updates provide an overview of several ongoing and planned measures that are expected to reduce gas migration. The following are gas migration control efforts initiated, continued or completed in the third quarter of 2019.

Leachate Conveyance System

The continued operation of multiple upgraded lift stations around the perimeter of the South Quarry.

General LFG System Modifications and Improvements:

The following improvements have been completed in the South Quarry at the Bridgeton Landfill:

- Nine (9) new landfill gas extraction wells were installed in the south quarry during the third quarter to increase landfill gas extraction capacity and liquid removal. The locations were targeted to provide source control adjacent to areas exhibiting migration. Wells GEW-232, GEW-233, GEW-234, GEW-235, GEW-236, GEW-237, GEW-238, GEW-239, and GEW-240 were installed in August 2019. These 9 landfill gas extraction wells have been connected to the gas collections and control system (**Appendix D**).

- As part of the GMP-08 LGCAP described in Section 2.0, a surface gas collector was installed beneath the EVOH cap on March 27, 2019. This surface collector was installed in accordance with the configuration depicted on Drawing 1 “Option 1 – Surface Collector” in **Appendix E** of this report. An underlying perforated rectangular collector combined with a 4-inch HDPE perforated pipe provides a pathway for increased gas collection. This collector continued to be operated during the third quarter.

- Continued operation and monitoring of the “Pure-Air” system adjacent to Metropolitan Sewer District lift station just southwest of the South Quarry. Any vapors extracted from this gravel sump are directed to a “Pure-Air” system of activated carbon to allow for direct atmospheric discharge, removing a major air source from the landfill’s gas collection and control system (GCCS).

- Augmented gas well dewatering through use of additional downwell pneumatic pumps and liquid level monitoring. An ongoing systematic approach occurred this quarter to investigate all gas extraction wells in the southwest and southeast

quadrants of the South Quarry, with the goal of increasing pumping and lowering water levels.

- Based on review of 2018 gas data, methane concentrations in GMP-09 appeared to be affected by maintenance performed of the southwest portion of the interceptor trench, between access sumps TS-1, TS-2, and TS-3. Therefore, BL scheduled a vendor to remove sediment accumulation in these three sumps and to jet clean the horizontal pipes between them. This cleaning was performed the first quarter 2019 and on June 27, 2019 through June 29, 2019 and again on September 18, 2019 though the September 19, 2019. The methane concentration data in GMP-09 began trending downward on January 24, 2019, until a 0% methane concentration was achieved on February 19, 2019, as can be seen on the Public Safety Probe Graph in **Appendix B.** GMP-09 remained at 0% methane through the third quarter 2019.

  The following data was collected at TS-1, TS-2, and TS-3 during the third quarter 2019:
  - Liquid Levels at the sumps;
  - System Vacuum;
  - Vacuum at sumps;
  - Gas Flow at sumps, and
  - Methane concentrations at the sump.

- BL installed a surface collector in the vicinity of GMP-03 (Southeast Surface Collector 2) in June 2019. This surface collector was installed and is continued to be operated to influence the methane concentrations in GMP-03.

Leachate Pretreatment Facility:

The leachate pretreatment facility continued operation during the third quarter of 2019.

4.0 PROPOSED AND ONGOING GAS MIGRATION CONTROL EFFORTS

Ongoing efforts have been successful in some areas, as suggested by the recent data in the GMP-09 area at the extreme southwest corner of the South Quarry, in the GMP-14D area in the northeast corner of the South Quarry and in the GMP-08 area in the northeast corner in the North Quarry. Accordingly, the gas collection efforts within the South and North Quarry will continue. This includes the continuation of a program to maintain liquid levels in gas wells, including daily inspection and ongoing maintenance of gas extraction well pumps.

In order to better assess pump performance, BL collected monthly liquid levels in gas extraction wells with pumps beginning in February 2019. In addition, BL collected quarterly liquid levels on all gas extraction wells to review subsurface conditions over time, so that optimal pump operation and installation could be achieved. These efforts continued during the third quarter 2019 and will continue through the fourth quarter 2019.

In addition, BL will continue to schedule a vendor to remove sediment accumulation at sumps TS-1, TS-2, and TS-3 and to jet clean the horizontal pipes between them on a quarterly basis, since the January 2019 effort (and corresponding June 2019 and September 2019 efforts) is suspected of being influential on GMP-9's decrease in methane concentrations.

Due to past remedial efforts this last year by BL, probes GMP-03, GMP-08, GMP-09, GMP-14D, and TMP-2S have all exhibited compliant methane levels. While efforts have been made to affect the southwest corner of the South Quarry (for TMP-1S and TMP-3S), and northeast corner of the South Quarry (for GMP-05), these two areas remain problematic, and additional efforts are warranted.

Southwest Corner of the South Quarry

During the third quarter, additional gas wells were installed specifically to affect the temporary monitoring probes. The following wells were installed:

- GEW-233 to investigate the effect on TMP-1S; and
- GEW 234 to investigate the effect on TMP-3S and TMP – 3M.

These newly installed wells will be monitored during the fourth quarter to see if they affect the probes with levels over 2.5% methane.

In addition, it is proposed to install a series of temporary monitoring points in the area, to determine the direction of combustible gas movement in the strata to determine if gas may be moving towards TMP -1S, TMP-3S and TMP-3M. The location of the points would be proposed based upon the current understanding of site geology, infrastructure and potential natural and man-made gas transmission pathways that may exist. The points would be installed utilizing a Hydraulic Soil Probe (HSP) down to the bedrock interface and completed using small-diameter PVC piping or perforated tubing. Perforation elevations would be defined by the results of the HSP borings, targeting any strata that either indicates the presence of combustible gas during the

advancement of the boring or represents a higher-permeability strata such as sands, gravels and weathered formations that may be conducive to gas transmission.

Once installed, the points would be monitored to detect relative gradients in sub-surface pressure and combustible gas concentrations. This information could then be utilized to more effectively address combustible gas levels detected in the TMPs.

It is expected that an investigation work plan will be submitted to the MDNR during the fourth quarter 2019.

Northeast Corner of the South Quarry

While GMP-14D returned to methane levels below 2.5% during the second quarter, methane concentrations in GMP-05 remains over 2.5% methane. The following were installed during the third quarter:

- GEW-237 to investigate the effect on GMP-05

This newly installed well will be monitored during the fourth quarter to see if it affects the methane levels in GMP-05. In addition, during the fourth quarter 2019, a landfill gas collection trench will be installed near GMP-05 50 feet in each direction away from the probe. This trench collector will be connected to the gas system, and the performance of the collection trench will be monitored to see if it affects the methane levels in GMP-05.

5.0 CONTINUED MONITORING AND REPORTING

BL will continue the gas probe monitoring and reporting as specified in Section 5.0 of the July 2013 CAP and Section XI.39 of the June 29, 2018 Final Consent Judgment.

TABLE 1

LIST OF LANDFILL GAS MONITORING PROBES

Bridgeton Landfill
Landfill Gas Monitoring Probes
July 2013

ID	CSV ID	POINT NAME	Ref Boring/installation Record	Type	Current Monitoring Frequency
GMP-01	BRIGMP01	MP01	GMP-01	Compliance probe	weekly
GMP-02	BRIGMP02	MP02	GMP-02	Compliance probe	weekly
GMP-03	BRIGMP03	MP03	GMP-03	Compliance probe	weekly
GMP-04*	BRIGMP04	MP04	GMP-04	Sentry probe	quarterly
GMP-05	BRIGMP05	MP05	GMP-05	Sentry probe	quarterly
GMP-06	BRIGMP06	MP06	PZ-201-SS	Sentry probe	quarterly
GMP-07	BRIGMP07	MP07	PZ-200-SS	Sentry probe	quarterly
GMP-08	BRIGMP08	MP08	GMP-08	Compliance probe	quarterly
GMP-09	BRIGMP09	MP09	GMP-09	Public Safety Probe	weekly
GMP-10	BRIGMP10	MP10	GMP-10	Public Safety Probe	weekly
GMP-11	BRIGMP11	MP11	GMP-11	Public Safety Probe	weekly
GMP-12	BRIGMP12	MP12	GMP-12	Public Safety Probe	weekly
GMP-4S	BRIGMP4S	BRIGMP4S	GMP-04	Compliance nested probe	weekly
GMP-4D	BRIGMP4D	BRIGMP4D	GMP-04	Compliance nested probe	weekly
GMP-5S	BRIGMP5S	BRIGMP5S	GMP-05	Compliance nested probe	weekly
GMP-5D	BRIGMP5D	BRIGMP5D	GMP-05	Compliance nested probe	weekly
GMP-6S	BRIGMP6S	BRIGMP6S	GMP-06	Compliance nested probe	weekly
GMP-6D	BRIGMP6D	BRIGMP6D	GMP-06	Compliance nested probe	weekly
GMP-7S	BRIGMP7S	BRIGMP7S	GMP-07	Compliance nested probe	weekly
GMP-7D	BRIGMP7D	BRIGMP7D	GMP-07	Compliance nested probe	weekly
GMP-13S	BRGMP13S	BRGMP13S	GMP-13	Compliance nested probe	weekly
GMP-13D	BRGMP13D	BRGMP13D	GMP-13	Compliance nested probe	weekly
GMP-14S	BRGMP14S	BRGMP14S	GMP-14	Compliance nested probe	weekly
GMP-14D	BRGMP14D	BRGMP14D	GMP-14	Compliance nested probe	weekly
GMP-15S	BRGMP15S	BRGMP15S	GMP-15	Compliance nested probe	weekly
GMP-15D	BRGMP15D	BRGMP15D	GMP-15	Compliance nested probe	weekly
GMP-16S	BRGMP16S	BRGMP16S	GMP-16	Compliance nested probe	weekly
GMP-16D	BRGMP16D	BRGMP16D	GMP-16	Compliance nested probe	weekly
TMP-1S	BRITMP1S	BRITMP1S	TMP-01	Investigative nested probe	weekly
TMP-1M	BRITMP1M	BRITMP1M	TMP-01	Investigative nested probe	weekly
TMP-1D	BRITMP1D	BRITMP1D	TMP-01	Investigative nested probe	weekly
TMP-2S	BRITMP2S	BRITMP2S	TMP-02	Investigative nested probe	weekly
TMP-2M	BRITMP2M	BRITMP2M	TMP-02	Investigative nested probe	weekly
TMP-2D	BRITMP2D	BRITMP2D	TMP-02	Investigative nested probe	weekly
TMP-3S	BRITMP3S	BRITMP3S	TMP-03	Investigative nested probe	weekly
TMP-3M	BRITMP3M	BRITMP3M	TMP-03	Investigative nested probe	weekly
TMP-3D	BRITMP3D	BRITMP3D	TMP-03	Investigative nested probe	weekly
PZ-204-SS	PZ2040SS	4OSS	PZ-204-SS	Public Safety Probe	weekly
PZ-204A-SS	PZ204ASS	4ASS	PZ-204-ASS	Public Safety Probe	weekly

* Well has been decommissioned

TABLE 2

COMPLIANCE GAS MONITORING PROBE DATA

JULY 01, 2019 – SEPTEMBER 30, 2019

Point ID	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Baraometric Pressure	Relative Pressure
GMP-01	Weekly	2	7/2/2019	0.0	0.3	20.3	79.4	30	-0.05
GMP-01	Weekly	2	7/9/2019	0.0	0.3	20.5	79.2	30	0.03
GMP-01	Weekly	2	7/16/2019	0.0	0.3	20.2	79.5	30	0.02
GMP-01	Weekly	2	7/23/2019	0.0	0.3	20.0	79.7	30	0.04
GMP-01	Weekly	2	7/30/2019	0.0	0.2	20.5	79.3	30	0.05
GMP-01	Weekly	2	8/7/2019	0.0	0.2	20.6	79.2	30	0.04
GMP-01	Weekly	2	8/13/2019	0.0	0.2	20.7	79.1	30	0.04
GMP-01	Weekly	2	8/20/2019	0.0	0.1	20.8	79.1	30	0.03
GMP-01	Weekly	2	8/29/2019	0.0	0.2	20.4	79.4	30	0.03
GMP-01	Weekly	2	9/5/2019	0.0	0.2	20.8	79.0	30	0.03
GMP-01	Weekly	2	9/10/2019	0.0	0.3	20.4	79.3	30	0.01
GMP-01	Weekly	2	9/17/2019	0.0	0.2	20.7	79.1	30	0.02
GMP-01	Weekly	2	9/25/2019	0.0	0.3	20.4	79.3	30	0.02
GMP-02	Weekly	2	7/2/2019	0.0	1.2	19.2	79.6	30	0.05
GMP-02	Weekly	2	7/9/2019	0.0	0.9	19.1	80.0	30	0.04
GMP-02	Weekly	2	7/16/2019	0.0	1.1	18.9	80.0	30	0.07
GMP-02	Weekly	2	7/23/2019	0.0	1.2	18.1	80.7	30	1.35
GMP-02	Weekly	2	7/30/2019	0.0	0.9	18.5	80.6	30	0.01
GMP-02	Weekly	2	8/7/2019	0.0	0.3	19.4	80.3	30	0.01
GMP-02	Weekly	2	8/13/2019	0.0	0.8	19.2	80.0	30	-0.01
GMP-02	Weekly	2	8/20/2019	0.0	0.7	20.1	79.2	30	0.02
GMP-02	Weekly	2	8/29/2019	0.0	1.4	18.4	80.2	30	0.03
GMP-02	Weekly	2	9/5/2019	0.0	1.5	19.0	79.5	30	-0.02
GMP-02	Weekly	2	9/10/2019	0.0	1.5	17.9	80.6	30	0.02
GMP-02	Weekly	2	9/17/2019	0.0	0.9	18.8	80.3	30	0.01
GMP-02	Weekly	2	9/25/2019	0.0	1.0	19.3	79.7	30	-0.01
GMP-03	Weekly	4	7/2/2019	1.6	19.9	0.1	78.4	30	0.00
GMP-03	Weekly	4	7/9/2019	0.5	21.0	0.1	78.4	30	0.00
GMP-03	Weekly	4	7/16/2019	0.1	21.2	0.1	78.6	30	-0.01
GMP-03	Weekly	4	7/23/2019	0.0	22.3	0.0	77.7	30	0.00
GMP-03	Weekly	4	7/30/2019	0.0	22.8	0.1	77.1	30	0.01
GMP-03	Weekly	4	8/7/2019	0.0	23.6	0.0	76.4	30	0.00
GMP-03	Weekly	4	8/13/2019	0.0	22.9	0.1	77.0	30	0.00
GMP-03	Weekly	4	8/20/2019	0.4	24.3	0.0	75.3	30	-0.02
GMP-03	Weekly	4	8/29/2019	0.0	24.2	0.0	75.8	30	0.00
GMP-03	Weekly	4	9/5/2019	0.0	23.5	0.0	76.5	30	0.00
GMP-03	Weekly	4	9/10/2019	0.0	23.6	0.0	76.4	30	-0.01
GMP-03	Weekly	4	9/17/2019	0.0	23.9	0.0	76.1	30	0.00
GMP-03	Weekly	4	9/25/2019	0.9	24.0	0.0	75.1	30	-0.01
GMP-08	Weekly	1	7/1/2019	0.0	6.7	14.3	79.0	30	-0.02

Point ID	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Baraometric Pressure	Relative Pressure
GMP-08	Weekly	1	7/2/2019	0.0	10.2	9.8	80.0	30	0.06
GMP-08	Weekly	1	7/3/2019	0.0	6.0	14.5	79.5	30	-0.02
GMP-08	Weekly	1	7/5/2019	0.0	5.7	13.9	80.4	30	-0.01
GMP-08	Weekly	1	7/8/2019	0.0	7.7	12.5	79.8	30	-0.01
GMP-08	Weekly	1	7/9/2019	0.0	7.3	13.2	79.5	30	-0.02
GMP-08	Weekly	1	7/10/2019	0.0	5.8	13.8	80.4	30	-0.01
GMP-08	Weekly	1	7/11/2019	0.0	8.8	11.3	79.9	30	0.00
GMP-08	Weekly	1	7/12/2019	0.0	6.2	14.5	79.3	30	-0.03
GMP-08	Weekly	1	7/15/2019	0.0	9.2	10.2	80.6	30	-0.02
GMP-08	Weekly	1	7/16/2019	0.1	15.2	3.1	81.6	30	0.03
GMP-08	Weekly	1	7/23/2019	0.0	3.8	15.0	81.2	30	0.00
GMP-08	Weekly	1	7/30/2019	0.0	4.1	14.6	81.3	30	0.02
GMP-08	Weekly	1	8/7/2019	0.0	6.3	12.8	80.9	30	-0.02
GMP-08	Weekly	1	8/13/2019	0.0	5.6	13.0	81.4	30	-0.03
GMP-08	Weekly	1	8/20/2019	0.0	2.1	17.1	80.8	30	-0.10
GMP-08	Weekly	1	8/29/2019	0.0	3.1	16.2	80.7	30	0.00
GMP-08	Weekly	1	9/5/2019	0.0	2.1	17.1	80.8	30	0.02
GMP-08	Weekly	1	9/10/2019	0.0	3.2	16.3	80.5	30	0.01
GMP-08	Weekly	1	9/17/2019	0.0	2.6	16.3	81.1	30	0.02
GMP-08	Weekly	1	9/25/2019	0.0	5.6	12.4	82.0	30	-0.08
GMP-4D	Weekly	4	7/2/2019	0.0	0.1	20.4	79.5	30	0.02
GMP-4D	Weekly	4	7/9/2019	0.0	0.1	20.0	79.9	30	0.00
GMP-4D	Weekly	4	7/16/2019	0.0	0.3	19.3	80.4	30	-0.01
GMP-4D	Weekly	4	7/23/2019	0.0	0.4	19.6	80.0	30	0.00
GMP-4D	Weekly	4	7/30/2019	0.0	0.4	19.8	79.8	30	0.00
GMP-4D	Weekly	4	8/7/2019	0.0	0.3	19.6	80.1	30	0.00
GMP-4D	Weekly	4	8/13/2019	0.0	0.5	19.7	79.8	30	0.00
GMP-4D	Weekly	4	8/20/2019	0.0	0.3	20.0	79.7	30	0.01
GMP-4D	Weekly	4	8/29/2019	0.0	0.3	20.2	79.5	30	0.00
GMP-4D	Weekly	4	9/5/2019	0.0	0.3	19.9	79.8	30	0.00
GMP-4D	Weekly	4	9/10/2019	0.0	0.2	20.3	79.5	30	0.00
GMP-4D	Weekly	4	9/17/2019	0.0	0.2	19.8	80.0	30	0.02
GMP-4D	Weekly	4	9/25/2019	0.0	0.2	20.5	79.3	30	0.05
GMP-4S	Weekly	4	7/2/2019	0.0	0.1	20.3	79.6	30	0.00
GMP-4S	Weekly	4	7/9/2019	0.0	0.1	20.2	79.7	30	0.00
GMP-4S	Weekly	4	7/16/2019	0.0	0.2	19.8	80.0	30	-0.01
GMP-4S	Weekly	4	7/23/2019	0.0	0.2	20.2	79.6	30	0.00
GMP-4S	Weekly	4	7/30/2019	0.0	0.2	20.5	79.3	30	0.00
GMP-4S	Weekly	4	8/7/2019	0.0	0.2	20.2	79.6	30	-0.01
GMP-4S	Weekly	4	8/13/2019	0.0	0.2	20.4	79.4	30	0.00

Point ID	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Baraometric Pressure	Relative Pressure
GMP-4S	Weekly	4	8/20/2019	0.0	0.2	20.4	79.4	30	0.00
GMP-4S	Weekly	4	8/29/2019	0.0	0.3	20.1	79.6	30	0.00
GMP-4S	Weekly	4	9/5/2019	0.0	0.3	20.2	79.5	30	0.00
GMP-4S	Weekly	4	9/10/2019	0.0	0.2	20.4	79.4	30	0.00
GMP-4S	Weekly	4	9/17/2019	0.0	0.2	19.9	79.9	30	0.00
GMP-4S	Weekly	4	9/25/2019	0.0	0.2	20.3	79.5	30	0.01
GMP-5D	Weekly	3	7/2/2019	0.0	0.2	20.6	79.2	30	0.01
GMP-5D	Weekly	3	7/9/2019	0.0	0.1	20.6	79.3	30	0.02
GMP-5D	Weekly	3	7/16/2019	0.0	0.1	20.6	79.3	30	0.00
GMP-5D	Weekly	3	7/23/2019	0.0	0.1	20.6	79.3	30	0.02
GMP-5D	Weekly	3	7/30/2019	0.0	0.1	20.6	79.3	30	0.03
GMP-5D	Weekly	3	8/7/2019	0.0	0.1	20.4	79.5	30	-0.06
GMP-5D	Weekly	3	8/13/2019	0.0	0.0	19.7	80.3	30	0.03
GMP-5D	Weekly	3	8/20/2019	0.0	0.2	20.6	79.2	30	0.16
GMP-5D	Weekly	3	8/29/2019	0.0	0.2	20.5	79.3	30	-0.02
GMP-5D	Weekly	3	9/5/2019	0.0	0.3	20.2	79.5	30	0.01
GMP-5D	Weekly	3	9/10/2019	0.0	0.1	20.6	79.3	30	0.00
GMP-5D	Weekly	3	9/17/2019	0.0	0.1	19.9	80.0	30	0.03
GMP-5D	Weekly	3	9/25/2019	0.0	0.3	20.0	79.7	30	0.04
GMP-5S	Weekly	3	7/2/2019	0.0	0.1	20.7	79.2	30	0.02
GMP-5S	Weekly	3	7/9/2019	0.0	0.0	20.8	79.2	30	0.00
GMP-5S	Weekly	3	7/16/2019	0.0	0.0	20.8	79.2	30	0.00
GMP-5S	Weekly	3	7/23/2019	0.0	0.0	20.8	79.2	30	0.01
GMP-5S	Weekly	3	7/30/2019	0.0	0.0	20.7	79.3	30	0.00
GMP-5S	Weekly	3	8/7/2019	0.0	0.0	20.6	79.4	30	-0.04
GMP-5S	Weekly	3	8/13/2019	0.0	0.1	20.5	79.4	30	0.01
GMP-5S	Weekly	3	8/20/2019	0.0	0.1	20.9	79.0	30	0.07
GMP-5S	Weekly	3	8/29/2019	0.0	0.1	20.7	79.2	30	-0.02
GMP-5S	Weekly	3	9/5/2019	0.0	0.1	20.5	79.4	30	0.01
GMP-5S	Weekly	3	9/10/2019	0.0	0.0	20.8	79.2	30	0.00
GMP-5S	Weekly	3	9/17/2019	0.0	0.0	19.9	80.1	30	0.01
GMP-5S	Weekly	3	9/25/2019	0.0	0.0	20.5	79.5	30	0.03
GMP-6D	Weekly	1	7/2/2019	0.0	0.0	20.6	79.4	30	0.01
GMP-6D	Weekly	1	7/9/2019	0.0	0.0	20.7	79.3	30	0.02
GMP-6D	Weekly	1	7/16/2019	0.0	0.0	20.5	79.5	30	0.03
GMP-6D	Weekly	1	7/23/2019	0.0	0.0	20.7	79.3	30	0.05
GMP-6D	Weekly	1	7/30/2019	0.0	0.1	20.4	79.5	30	0.03
GMP-6D	Weekly	1	8/7/2019	0.0	0.1	20.5	79.4	30	0.04
GMP-6D	Weekly	1	8/13/2019	0.0	0.1	20.7	79.2	30	0.03
GMP-6D	Weekly	1	8/20/2019	0.0	0.1	20.8	79.1	30	0.11

Point ID	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Baraometric Pressure	Relative Pressure
GMP-6D	Weekly	1	8/29/2019	0.0	0.1	20.9	79.0	30	0.00
GMP-6D	Weekly	1	9/5/2019	0.0	0.1	20.5	79.4	30	0.01
GMP-6D	Weekly	1	9/10/2019	0.0	0.1	20.9	79.0	30	0.01
GMP-6D	Weekly	1	9/17/2019	0.0	0.1	20.3	79.6	30	0.03
GMP-6D	Weekly	1	9/25/2019	0.0	0.1	20.5	79.4	30	0.02
GMP-6S	Weekly	1	7/2/2019	0.0	0.1	20.4	79.5	30	0.02
GMP-6S	Weekly	1	7/9/2019	0.0	0.1	20.4	79.5	30	0.02
GMP-6S	Weekly	1	7/16/2019	0.0	0.1	20.1	79.8	30	0.03
GMP-6S	Weekly	1	7/23/2019	0.0	0.2	19.9	79.9	30	0.01
GMP-6S	Weekly	1	7/30/2019	0.0	0.3	19.6	80.1	30	0.00
GMP-6S	Weekly	1	8/7/2019	0.0	0.4	19.6	80.0	30	0.00
GMP-6S	Weekly	1	8/13/2019	0.0	0.5	19.6	79.9	30	0.00
GMP-6S	Weekly	1	8/20/2019	0.0	0.5	19.9	79.6	30	0.02
GMP-6S	Weekly	1	8/29/2019	0.0	0.5	19.8	79.7	30	-0.01
GMP-6S	Weekly	1	9/5/2019	0.0	0.4	19.5	80.1	30	-0.01
GMP-6S	Weekly	1	9/10/2019	0.0	0.3	20.0	79.7	30	0.00
GMP-6S	Weekly	1	9/17/2019	0.0	0.4	19.1	80.5	30	0.00
GMP-6S	Weekly	1	9/25/2019	0.0	0.5	19.5	80.0	30	0.00
GMP-7D	Weekly	1	7/2/2019	0.0	0.1	20.5	79.4	30	0.00
GMP-7D	Weekly	1	7/9/2019	0.0	0.1	20.9	79.0	30	0.00
GMP-7D	Weekly	1	7/16/2019	0.0	0.1	20.7	79.2	30	0.00
GMP-7D	Weekly	1	7/23/2019	0.0	0.1	20.8	79.1	30	-0.01
GMP-7D	Weekly	1	7/30/2019	0.0	0.1	20.6	79.3	30	0.00
GMP-7D	Weekly	1	8/7/2019	0.0	0.1	20.8	79.1	30	-0.02
GMP-7D	Weekly	1	8/13/2019	0.0	0.1	21.2	78.7	30	-0.01
GMP-7D	Weekly	1	8/20/2019	0.0	0.1	20.9	79.0	30	0.00
GMP-7D	Weekly	1	8/29/2019	0.0	0.1	20.9	79.0	30	0.00
GMP-7D	Weekly	1	9/5/2019	0.0	0.1	20.8	79.1	30	-0.01
GMP-7D	Weekly	1	9/10/2019	0.0	0.2	21.2	78.6	30	0.00
GMP-7D	Weekly	1	9/17/2019	0.0	0.2	20.8	79.0	30	-0.01
GMP-7D	Weekly	1	9/25/2019	0.0	0.3	20.7	79.0	30	0.00
GMP-7S	Weekly	1	7/2/2019	0.0	1.1	4.3	94.6	30	0.00
GMP-7S	Weekly	1	7/9/2019	0.0	1.0	3.9	95.1	30	0.00
GMP-7S	Weekly	1	7/16/2019	0.0	2.0	2.6	95.4	30	0.00
GMP-7S	Weekly	1	7/23/2019	0.0	1.2	2.6	96.2	30	0.01
GMP-7S	Weekly	1	7/30/2019	0.0	1.7	3.0	95.3	30	0.00
GMP-7S	Weekly	1	8/7/2019	0.0	2.1	3.6	94.3	30	-0.01
GMP-7S	Weekly	1	8/13/2019	0.0	2.2	1.6	96.2	30	4.87
GMP-7S	Weekly	1	8/20/2019	0.0	2.0	5.0	93.0	30	0.01
GMP-7S	Weekly	1	8/29/2019	0.0	1.4	3.2	95.4	30	0.00

Point ID	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Baraometric Pressure	Relative Pressure
GMP-7S	Weekly	1	9/5/2019	0.0	1.6	4.8	93.6	30	0.00
GMP-7S	Weekly	1	9/10/2019	0.0	2.0	4.3	93.7	30	-0.01
GMP-7S	Weekly	1	9/17/2019	0.0	2.1	5.4	92.5	30	0.00
GMP-7S	Weekly	1	9/25/2019	0.0	3.2	4.6	92.2	30	0.04
GMP-13D	Weekly	4	7/2/2019	0.0	0.2	20.8	79.0	30	0.03
GMP-13D	Weekly	4	7/9/2019	0.0	0.1	20.6	79.3	30	0.01
GMP-13D	Weekly	4	7/16/2019	0.0	0.2	20.2	79.6	30	0.03
GMP-13D	Weekly	4	7/23/2019	0.0	0.2	20.8	79.0	30	0.03
GMP-13D	Weekly	4	7/30/2019	0.0	0.3	20.8	78.9	30	0.02
GMP-13D	Weekly	4	8/7/2019	0.0	0.2	20.6	79.2	30	0.01
GMP-13D	Weekly	4	8/13/2019	0.0	0.3	20.8	78.9	30	0.02
GMP-13D	Weekly	4	8/20/2019	0.0	0.1	21.0	78.9	30	0.00
GMP-13D	Weekly	4	8/29/2019	0.0	0.3	20.7	79.0	30	0.01
GMP-13D	Weekly	4	9/5/2019	0.0	0.3	20.7	79.0	30	0.02
GMP-13D	Weekly	4	9/10/2019	0.0	0.6	20.9	78.5	30	0.00
GMP-13D	Weekly	4	9/17/2019	0.0	0.3	20.7	79.0	30	0.03
GMP-13D	Weekly	4	9/25/2019	0.0	0.1	21.1	78.8	30	-7.81
GMP-13S	Weekly	4	7/2/2019	0.0	2.1	16.7	81.2	30	0.00
GMP-13S	Weekly	4	7/9/2019	0.0	0.7	19.5	79.8	30	0.00
GMP-13S	Weekly	4	7/16/2019	0.0	3.0	15.2	81.8	30	0.00
GMP-13S	Weekly	4	7/23/2019	0.0	2.0	17.6	80.4	30	0.00
GMP-13S	Weekly	4	7/30/2019	0.0	3.6	15.3	81.1	30	0.00
GMP-13S	Weekly	4	8/7/2019	0.0	3.9	14.2	81.9	30	0.00
GMP-13S	Weekly	4	8/13/2019	0.0	4.4	14.1	81.5	30	0.00
GMP-13S	Weekly	4	8/20/2019	0.0	4.6	14.3	81.1	30	0.00
GMP-13S	Weekly	4	8/29/2019	0.0	3.8	14.1	82.1	30	0.00
GMP-13S	Weekly	4	9/5/2019	0.0	4.9	12.9	82.2	30	0.00
GMP-13S	Weekly	4	9/10/2019	0.0	5.8	12.7	81.5	30	0.00
GMP-13S	Weekly	4	9/17/2019	0.0	5.5	12.2	82.3	30	0.00
GMP-13S	Weekly	4	9/25/2019	0.0	6.1	12.5	81.4	30	0.00
GMP-14D	Weekly	3	7/2/2019	0.0	0.0	20.7	79.3	30	0.02
GMP-14D	Weekly	3	7/9/2019	0.0	0.0	20.8	79.2	30	-0.01
GMP-14D	Weekly	3	7/16/2019	0.0	0.0	20.2	79.8	30	0.00
GMP-14D	Weekly	3	7/23/2019	0.0	0.0	20.9	79.1	30	-0.02
GMP-14D	Weekly	3	7/30/2019	0.0	0.0	20.7	79.3	30	-0.02
GMP-14D	Weekly	3	8/7/2019	0.0	0.0	20.7	79.3	30	-0.03
GMP-14D	Weekly	3	8/13/2019	0.0	0.1	20.7	79.2	30	0.02
GMP-14D	Weekly	3	8/20/2019	0.0	0.0	21.0	79.0	30	0.11
GMP-14D	Weekly	3	8/29/2019	0.0	0.0	20.8	79.2	30	-0.03
GMP-14D	Weekly	3	9/5/2019	0.0	0.0	20.6	79.4	30	0.01

Point ID	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Baraometric Pressure	Relative Pressure
GMP-14D	Weekly	3	9/10/2019	0.0	0.0	20.9	79.1	30	0.01
GMP-14D	Weekly	3	9/17/2019	0.0	0.0	20.2	79.8	30	0.02
GMP-14D	Weekly	3	9/25/2019	0.0	0.0	20.7	79.3	30	0.03
GMP-14S	Weekly	3	7/2/2019	0.0	0.0	20.8	79.2	30	0.00
GMP-14S	Weekly	3	7/9/2019	0.0	0.0	20.8	79.2	30	0.00
GMP-14S	Weekly	3	7/16/2019	0.0	0.0	20.3	79.7	30	0.00
GMP-14S	Weekly	3	7/23/2019	0.0	0.1	20.9	79.0	30	0.01
GMP-14S	Weekly	3	7/30/2019	0.0	0.1	20.7	79.2	30	0.01
GMP-14S	Weekly	3	8/7/2019	0.0	0.0	20.6	79.4	30	0.00
GMP-14S	Weekly	3	8/13/2019	0.0	0.1	20.8	79.1	30	0.00
GMP-14S	Weekly	3	8/20/2019	0.0	0.1	21.0	78.9	30	0.02
GMP-14S	Weekly	3	8/29/2019	0.0	0.1	20.7	79.2	30	0.00
GMP-14S	Weekly	3	9/5/2019	0.0	0.1	20.5	79.4	30	0.00
GMP-14S	Weekly	3	9/10/2019	0.0	0.1	20.9	79.0	30	-0.01
GMP-14S	Weekly	3	9/17/2019	0.0	0.1	20.2	79.7	30	0.00
GMP-14S	Weekly	3	9/25/2019	0.0	0.0	20.7	79.3	30	0.00
GMP-15D	Weekly	1	7/2/2019	0.0	0.0	20.3	79.7	30	0.15
GMP-15D	Weekly	1	7/9/2019	0.0	0.0	20.7	79.3	30	0.03
GMP-15D	Weekly	1	7/16/2019	0.0	0.0	20.4	79.6	30	0.09
GMP-15D	Weekly	1	7/23/2019	0.0	0.1	20.4	79.5	30	0.02
GMP-15D	Weekly	1	7/30/2019	0.0	0.1	20.2	79.7	30	0.16
GMP-15D	Weekly	1	8/7/2019	0.0	0.0	20.4	79.6	30	-0.02
GMP-15D	Weekly	1	8/13/2019	0.0	0.2	20.7	79.1	30	0.10
GMP-15D	Weekly	1	8/20/2019	0.0	0.1	20.8	79.1	30	0.07
GMP-15D	Weekly	1	8/29/2019	0.0	0.2	20.8	79.0	30	0.02
GMP-15D	Weekly	1	9/5/2019	0.0	0.2	20.5	79.3	30	0.02
GMP-15D	Weekly	1	9/10/2019	0.0	0.1	21.0	78.9	30	-0.01
GMP-15D	Weekly	1	9/17/2019	0.0	0.1	20.3	79.6	30	0.08
GMP-15D	Weekly	1	9/25/2019	0.0	0.1	20.4	79.5	30	0.18
GMP-15S	Weekly	1	7/2/2019	0.0	0.0	20.4	79.6	30	0.14
GMP-15S	Weekly	1	7/9/2019	0.0	0.0	20.7	79.3	30	0.01
GMP-15S	Weekly	1	7/16/2019	0.0	0.0	20.5	79.5	30	0.05
GMP-15S	Weekly	1	7/23/2019	0.0	0.0	20.4	79.6	30	0.05
GMP-15S	Weekly	1	7/30/2019	0.0	0.0	20.4	79.6	30	0.09
GMP-15S	Weekly	1	8/7/2019	0.0	0.0	20.4	79.6	30	0.03
GMP-15S	Weekly	1	8/13/2019	0.0	0.0	20.8	79.2	30	0.06
GMP-15S	Weekly	1	8/20/2019	0.0	0.0	20.9	79.1	30	-0.07
GMP-15S	Weekly	1	8/29/2019	0.0	0.1	21.0	78.9	30	-0.02
GMP-15S	Weekly	1	9/5/2019	0.0	0.0	20.6	79.4	30	0.03
GMP-15S	Weekly	1	9/10/2019	0.0	0.0	21.1	78.9	30	-0.02

Point ID	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Baraometric Pressure	Relative Pressure
GMP-15S	Weekly	1	9/17/2019	0.0	0.0	20.4	79.6	30	0.05
GMP-15S	Weekly	1	9/25/2019	0.0	0.0	20.5	79.5	30	0.06
GMP-16D	Weekly	1	7/2/2019	0.0	0.0	20.3	79.7	30	0.17
GMP-16D	Weekly	1	7/9/2019	0.0	0.0	20.9	79.1	30	0.02
GMP-16D	Weekly	1	7/16/2019	0.0	0.0	20.4	79.6	30	1.71
GMP-16D	Weekly	1	7/23/2019	0.0	0.0	20.6	79.4	30	-0.03
GMP-16D	Weekly	1	7/30/2019	0.0	0.0	20.2	79.8	30	-0.19
GMP-16D	Weekly	1	8/7/2019	0.0	0.0	20.6	79.4	30	0.02
GMP-16D	Weekly	1	8/13/2019	0.0	0.1	20.9	79.0	30	3.86
GMP-16D	Weekly	1	8/20/2019	0.0	0.1	20.8	79.1	30	-0.10
GMP-16D	Weekly	1	8/29/2019	0.0	0.1	20.8	79.1	30	4.67
GMP-16D	Weekly	1	9/5/2019	0.0	0.1	20.4	79.5	30	0.51
GMP-16D	Weekly	1	9/10/2019	0.0	0.0	20.8	79.2	30	1.83
GMP-16D	Weekly	1	9/17/2019	0.0	0.0	21.0	79.0	30	0.10
GMP-16D	Weekly	1	9/25/2019	0.0	0.0	20.7	79.3	30	-0.39
GMP-16S	Weekly	1	7/2/2019	0.0	0.0	20.1	79.9	30	0.49
GMP-16S	Weekly	1	7/9/2019	0.0	0.0	20.4	79.6	30	0.49
GMP-16S	Weekly	1	7/16/2019	0.0	0.0	20.5	79.5	30	2.42
GMP-16S	Weekly	1	7/23/2019	0.0	0.0	20.4	79.6	30	1.40
GMP-16S	Weekly	1	7/30/2019	0.0	0.0	20.3	79.7	30	-0.01
GMP-16S	Weekly	1	8/7/2019	0.0	0.0	20.6	79.4	30	-0.19
GMP-16S	Weekly	1	8/13/2019	0.0	0.1	20.9	79.0	30	2.87
GMP-16S	Weekly	1	8/20/2019	0.0	0.0	20.9	79.1	30	0.00
GMP-16S	Weekly	1	8/29/2019	0.0	0.0	20.9	79.1	30	3.13
GMP-16S	Weekly	1	9/5/2019	0.0	0.0	20.7	79.3	30	0.00
GMP-16S	Weekly	1	9/10/2019	0.0	0.0	20.8	79.2	30	1.77
GMP-16S	Weekly	1	9/17/2019	0.0	0.0	21.1	78.9	30	0.00
GMP-16S	Weekly	1	9/25/2019	0.0	0.0	20.9	79.1	30	0.00

TABLE 3

SENTRY GAS MONITORING PROBE DATA

JULY 01, 2019 – SEPTEMBER 30, 2019

Point Name	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Barometric Pressure	Relative Pressure
GMP-05	Quarterly	3	7/2/2019	50.0	29.5	4.5	16.0	30	1.48
GMP-06	Quarterly	1	7/2/2019	0.0	0.0	20.4	79.6	30	0.00
GMP-07	Quarterly	1	7/2/2019	0.0	0.1	20.4	79.5	30	-0.02

TABLE 4

INVESTIGATIVE GAS MONITORING PROBE DATA

JULY 01, 2019 – SEPTEMBER 30, 2019

Point Name	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Barometric Pressure	Relative Pressure
TMP-1D	Weekly	2	7/2/2019	0.0	0.2	20.6	79.2	30	-3.77
TMP-1D	Weekly	2	7/9/2019	0.0	0.2	20.7	79.1	30	-1.58
TMP-1D	Weekly	2	7/16/2019	0.0	0.3	20.7	79.0	30	-3.30
TMP-1D	Weekly	2	7/23/2019	0.0	0.2	20.3	79.5	30	-4.50
TMP-1D	Weekly	2	7/30/2019	0.0	0.2	20.5	79.3	30	-3.33
TMP-1D	Weekly	2	8/7/2019	0.0	0.2	20.7	79.1	30	-3.94
TMP-1D	Weekly	2	8/13/2019	0.0	0.2	20.8	79.0	30	-3.28
TMP-1D	Weekly	2	8/20/2019	0.0	0.2	20.7	79.1	30	-0.83
TMP-1D	Weekly	2	8/29/2019	0.1	0.2	20.3	79.4	30	-2.59
TMP-1D	Weekly	2	9/5/2019	0.0	0.2	20.4	79.4	30	0.67
TMP-1D	Weekly	2	9/10/2019	0.0	0.2	20.6	79.2	30	0.02
TMP-1D	Weekly	2	9/17/2019	0.0	0.2	20.7	79.1	30	-3.58
TMP-1D	Weekly	2	9/25/2019	0.0	0.2	20.5	79.3	30	0.86
TMP-1M	Weekly	2	7/2/2019	0.1	0.5	20.4	79.0	30	-0.01
TMP-1M	Weekly	2	7/9/2019	0.1	0.5	20.6	78.8	30	-0.01
TMP-1M	Weekly	2	7/16/2019	0.2	0.8	20.5	78.5	30	0.01
TMP-1M	Weekly	2	7/23/2019	0.2	0.6	20.2	79.0	30	0.00
TMP-1M	Weekly	2	7/30/2019	0.2	0.7	20.3	78.8	30	0.02
TMP-1M	Weekly	2	8/7/2019	0.2	0.7	20.5	78.6	30	0.01
TMP-1M	Weekly	2	8/13/2019	0.3	0.6	20.6	78.5	30	0.00
TMP-1M	Weekly	2	8/20/2019	0.2	0.5	20.5	78.8	30	-0.07
TMP-1M	Weekly	2	8/29/2019	0.3	0.7	20.1	78.9	30	0.01
TMP-1M	Weekly	2	9/5/2019	0.2	0.5	20.3	79.0	30	0.00
TMP-1M	Weekly	2	9/10/2019	0.2	1.1	20.4	78.3	30	-0.05
TMP-1M	Weekly	2	9/17/2019	0.2	1.1	20.4	78.3	30	0.03
TMP-1M	Weekly	2	9/25/2019	0.2	1.0	20.4	78.4	30	-0.03
TMP-1S	Weekly	2	7/2/2019	59.5	38.5	0.5	1.5	30	-0.01
TMP-1S	Weekly	2	7/9/2019	60.2	39.3	0.4	0.1	30	0.01
TMP-1S	Weekly	2	7/16/2019	59.5	40.2	0.3	0.0	30	0.00
TMP-1S	Weekly	2	7/23/2019	64.2	33.3	0.4	2.1	30	0.01
TMP-1S	Weekly	2	7/30/2019	59.7	40.0	0.3	0.0	30	0.01
TMP-1S	Weekly	2	8/7/2019	58.6	41.2	0.2	0.0	30	0.00
TMP-1S	Weekly	2	8/13/2019	55.3	37.9	0.7	6.1	30	0.01
TMP-1S	Weekly	2	8/20/2019	54.0	41.2	0.2	4.6	30	0.00
TMP-1S	Weekly	2	8/29/2019	54.1	39.6	0.4	5.9	30	0.01
TMP-1S	Weekly	2	9/5/2019	54.3	39.8	0.3	5.6	30	0.02
TMP-1S	Weekly	2	9/10/2019	58.3	40.7	0.4	0.6	30	0.00
TMP-1S	Weekly	2	9/17/2019	58.6	38.0	0.2	3.2	30	0.01
TMP-1S	Weekly	2	9/25/2019	60.6	39.2	0.2	0.0	30	0.00
TMP-2D	Weekly	2	7/2/2019	0.0	0.2	20.7	79.1	30	0.03

Point Name	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Barometric Pressure	Relative Pressure
TMP-2D	Weekly	2	7/9/2019	0.0	0.0	20.9	79.1	30	-0.05
TMP-2D	Weekly	2	7/16/2019	0.0	0.1	20.5	79.4	30	0.13
TMP-2D	Weekly	2	7/23/2019	0.0	0.0	20.4	79.6	30	0.14
TMP-2D	Weekly	2	7/30/2019	0.0	0.0	20.7	79.3	30	0.05
TMP-2D	Weekly	2	8/7/2019	0.0	0.0	20.8	79.2	30	0.07
TMP-2D	Weekly	2	8/13/2019	0.0	0.0	20.8	79.2	30	0.05
TMP-2D	Weekly	2	8/20/2019	0.0	0.1	20.8	79.1	30	0.00
TMP-2D	Weekly	2	8/29/2019	0.0	0.2	20.4	79.4	30	0.09
TMP-2D	Weekly	2	9/5/2019	0.0	0.1	20.7	79.2	30	0.06
TMP-2D	Weekly	2	9/10/2019	0.0	0.2	20.4	79.4	30	0.05
TMP-2D	Weekly	2	9/17/2019	0.0	0.4	20.5	79.1	30	0.02
TMP-2D	Weekly	2	9/25/2019	0.0	0.7	20.4	78.9	30	0.01
TMP-2M	Weekly	2	7/2/2019	0.0	0.6	20.5	78.9	30	0.00
TMP-2M	Weekly	2	7/9/2019	0.0	0.2	20.7	79.1	30	0.01
TMP-2M	Weekly	2	7/16/2019	0.0	0.5	20.2	79.3	30	0.01
TMP-2M	Weekly	2	7/23/2019	0.0	0.2	20.1	79.7	30	0.01
TMP-2M	Weekly	2	7/30/2019	0.0	0.8	20.3	78.9	30	-0.01
TMP-2M	Weekly	2	8/7/2019	0.0	0.3	20.5	79.2	30	0.02
TMP-2M	Weekly	2	8/13/2019	0.0	0.4	20.5	79.1	30	0.00
TMP-2M	Weekly	2	8/20/2019	0.0	0.8	20.0	79.2	30	0.01
TMP-2M	Weekly	2	8/29/2019	0.0	2.3	17.7	80.0	30	0.00
TMP-2M	Weekly	2	9/5/2019	0.0	1.4	19.4	79.2	30	0.01
TMP-2M	Weekly	2	9/10/2019	0.0	1.7	19.4	78.9	30	-0.01
TMP-2M	Weekly	2	9/17/2019	0.0	3.3	16.0	80.7	30	0.01
TMP-2M	Weekly	2	9/25/2019	0.0	7.8	10.0	82.2	30	0.00
TMP-2S	Weekly	2	7/2/2019	0.0	14.9	7.5	77.6	30	-0.01
TMP-2S	Weekly	2	7/9/2019	0.0	6.3	11.4	82.3	30	0.00
TMP-2S	Weekly	2	7/16/2019	0.0	7.1	12.9	80.0	30	0.00
TMP-2S	Weekly	2	7/23/2019	0.0	3.9	13.5	82.6	30	0.00
TMP-2S	Weekly	2	7/30/2019	0.0	11.1	10.6	78.3	30	0.00
TMP-2S	Weekly	2	8/7/2019	0.0	4.5	15.9	79.6	30	0.00
TMP-2S	Weekly	2	8/13/2019	0.0	4.7	16.0	79.3	30	0.00
TMP-2S	Weekly	2	8/20/2019	0.0	5.5	14.7	79.8	30	0.00
TMP-2S	Weekly	2	8/29/2019	0.0	4.4	15.6	80.0	30	-0.01
TMP-2S	Weekly	2	9/5/2019	0.0	8.5	12.8	78.7	30	0.01
TMP-2S	Weekly	2	9/10/2019	0.0	3.5	15.8	80.7	30	0.00
TMP-2S	Weekly	2	9/17/2019	0.0	3.6	16.4	80.0	30	0.00
TMP-2S	Weekly	2	9/17/2019	0.0	8.2	12.8	79.0	30	-0.01
TMP-2S	Weekly	2	9/25/2019	0.0	10.6	12.3	77.1	30	0.00
TMP-3D	Weekly	2	7/2/2019	0.0	2.4	18.2	79.4	30	-0.18

Point Name	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Barometric Pressure	Relative Pressure
TMP-3D	Weekly	2	7/9/2019	0.0	1.9	18.6	79.5	30	0.28
TMP-3D	Weekly	2	7/16/2019	0.0	1.1	19.3	79.6	30	0.04
TMP-3D	Weekly	2	7/23/2019	0.0	1.4	18.7	79.9	30	0.30
TMP-3D	Weekly	2	7/30/2019	0.0	0.8	19.8	79.4	30	-0.11
TMP-3D	Weekly	2	8/7/2019	0.0	0.8	19.8	79.4	30	-0.03
TMP-3D	Weekly	2	8/13/2019	0.0	0.7	20.1	79.2	30	0.05
TMP-3D	Weekly	2	8/20/2019	0.0	0.7	20.1	79.2	30	0.09
TMP-3D	Weekly	2	8/29/2019	0.0	0.9	19.7	79.4	30	0.03
TMP-3D	Weekly	2	9/5/2019	0.0	0.8	20.2	79.0	30	0.14
TMP-3D	Weekly	2	9/10/2019	0.0	1.1	20.0	78.9	30	0.03
TMP-3D	Weekly	2	9/17/2019	0.0	0.5	20.2	79.3	30	0.22
TMP-3D	Weekly	2	9/25/2019	0.0	0.8	20.0	79.2	30	0.08
TMP-3M	Weekly	2	7/2/2019	1.2	2.1	19.7	77.0	30	0.06
TMP-3M	Weekly	2	7/9/2019	1.1	2.0	20.0	76.9	30	0.07
TMP-3M	Weekly	2	7/16/2019	1.2	2.2	19.7	76.9	30	0.07
TMP-3M	Weekly	2	7/23/2019	1.2	2.2	19.5	77.1	30	0.00
TMP-3M	Weekly	2	7/30/2019	1.5	3.7	19.4	75.4	30	0.01
TMP-3M	Weekly	2	8/7/2019	0.9	2.0	20.0	77.1	30	0.04
TMP-3M	Weekly	2	8/13/2019	1.3	2.1	20.1	76.5	30	-0.02
TMP-3M	Weekly	2	8/20/2019	1.8	3.4	19.7	75.1	30	0.04
TMP-3M	Weekly	2	8/29/2019	1.8	3.6	19.3	75.3	30	-0.03
TMP-3M	Weekly	2	9/5/2019	1.7	3.8	19.6	74.9	30	-0.07
TMP-3M	Weekly	2	9/10/2019	1.6	4.3	19.3	74.8	30	0.03
TMP-3M	Weekly	2	9/17/2019	1.4	3.5	19.6	75.5	30	0.04
TMP-3M	Weekly	2	9/25/2019	1.2	3.0	19.6	76.2	30	0.05
TMP-3S	Weekly	2	7/2/2019	6.4	1.4	1.3	90.9	30	0.01
TMP-3S	Weekly	2	7/9/2019	7.0	2.1	1.4	89.5	30	-0.18
TMP-3S	Weekly	2	7/16/2019	9.3	2.7	0.4	87.6	30	0.12
TMP-3S	Weekly	2	7/23/2019	38.0	5.5	0.1	56.4	30	0.44
TMP-3S	Weekly	2	7/30/2019	54.8	16.6	0.1	28.5	30	1.04
TMP-3S	Weekly	2	8/7/2019	60.9	39.0	0.1	0.0	30	1.39
TMP-3S	Weekly	2	8/13/2019	66.8	24.9	1.2	7.1	30	-0.05
TMP-3S	Weekly	2	8/20/2019	62.3	18.6	0.6	18.5	30	-0.33
TMP-3S	Weekly	2	8/29/2019	59.4	13.8	0.4	26.4	30	-0.32
TMP-3S	Weekly	2	9/5/2019	49.1	11.7	0.3	38.9	30	-0.23
TMP-3S	Weekly	2	9/10/2019	42.6	8.4	3.9	45.1	30	-0.13
TMP-3S	Weekly	2	9/17/2019	0.0	0.0	20.8	79.2	30	0.29
TMP-3S	Weekly	2	9/25/2019	62.8	9.1	0.8	27.3	30	-0.17

TABLE 5

PUBLIC SAFETY GAS MONITORING PROBE DATA

JULY 01, 2019 – SEPTEMBER 30, 2019

Point Name	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Barometric Pressure	Relative Pressure
4ASS	Weekly	2	7/2/2019	0.0	0.1	20.7	79.2	30	0.01
4ASS	Weekly	2	7/9/2019	0.0	2.2	18.3	79.5	30	0.02
4ASS	Weekly	2	7/16/2019	0.0	0.4	19.8	79.8	30	0.00
4ASS	Weekly	2	7/23/2019	0.0	1.2	18.7	80.1	30	0.98
4ASS	Weekly	2	7/30/2019	0.0	0.3	19.8	79.9	30	0.02
4ASS	Weekly	2	8/7/2019	0.0	0.2	20.0	79.8	30	0.00
4ASS	Weekly	2	8/13/2019	0.0	0.3	20.0	79.7	30	0.00
4ASS	Weekly	2	8/20/2019	0.0	0.7	20.6	78.7	30	0.01
4ASS	Weekly	2	8/29/2019	0.0	2.1	18.5	79.4	30	1.42
4ASS	Weekly	2	9/5/2019	0.0	1.6	19.4	79.0	30	-0.05
4ASS	Weekly	2	9/10/2019	0.0	3.4	18.2	78.4	30	-0.43
4ASS	Weekly	2	9/17/2019	0.0	0.6	19.7	79.7	30	0.00
4ASS	Weekly	2	9/25/2019	0.0	1.9	19.2	78.9	30	0.02
4OSS	Weekly	2	7/2/2019	0.0	0.0	20.9	79.1	30	-0.01
4OSS	Weekly	2	7/9/2019	0.0	0.0	20.9	79.1	30	-0.05
4OSS	Weekly	2	7/16/2019	0.0	0.1	20.1	79.8	30	0.84
4OSS	Weekly	2	7/23/2019	0.0	0.0	20.1	79.9	30	-2.66
4OSS	Weekly	2	7/30/2019	0.0	0.0	20.3	79.7	30	-0.29
4OSS	Weekly	2	8/7/2019	0.0	0.0	20.2	79.8	30	-0.42
4OSS	Weekly	2	8/13/2019	0.0	0.0	20.3	79.7	30	0.41
4OSS	Weekly	2	8/20/2019	0.0	0.1	21.0	78.9	30	0.02
4OSS	Weekly	2	8/29/2019	0.0	0.1	20.1	79.8	30	1.43
4OSS	Weekly	2	9/5/2019	0.0	0.1	20.5	79.4	30	-0.56
4OSS	Weekly	2	9/10/2019	0.0	0.2	20.1	79.7	30	-0.50
4OSS	Weekly	2	9/17/2019	0.0	0.1	20.3	79.6	30	-0.51
4OSS	Weekly	2	9/25/2019	0.0	0.4	20.0	79.6	30	0.45
GMP-09	Weekly	2	7/2/2019	0.0	1.8	18.3	79.9	30	0.02
GMP-09	Weekly	2	7/9/2019	0.0	0.0	20.7	79.3	30	0.02
GMP-09	Weekly	2	7/16/2019	0.0	0.7	19.1	80.2	30	-0.04
GMP-09	Weekly	2	7/23/2019	0.0	1.0	18.5	80.5	30	1.78
GMP-09	Weekly	2	7/30/2019	0.0	0.8	19.1	80.1	30	-0.02
GMP-09	Weekly	2	8/7/2019	0.0	1.0	18.9	80.1	30	0.01
GMP-09	Weekly	2	8/13/2019	0.0	0.9	19.4	79.7	30	0.00
GMP-09	Weekly	2	8/20/2019	0.0	1.4	18.6	80.0	30	-0.58
GMP-09	Weekly	2	8/29/2019	0.0	2.1	17.8	80.1	30	0.19
GMP-09	Weekly	2	9/5/2019	0.0	1.9	18.4	79.7	30	1.13
GMP-09	Weekly	2	9/10/2019	0.0	1.1	18.4	80.5	30	-2.32
GMP-09	Weekly	2	9/17/2019	0.0	1.0	18.8	80.2	30	0.02
GMP-09	Weekly	2	9/25/2019	0.0	1.2	18.8	80.0	30	-0.67
GMP-10	Weekly	2	7/2/2019	0.0	0.4	19.5	80.1	30	0.00

Point Name	Frequency	Quadrant	Record Date	CH4 (%)	CO2 (%)	O2 (%)	Balance Gas (%)	Barometric Pressure	Relative Pressure
GMP-10	Weekly	2	7/9/2019	0.0	0.1	19.8	80.1	30	-0.11
GMP-10	Weekly	2	7/16/2019	0.0	0.4	19.3	80.3	30	-0.12
GMP-10	Weekly	2	7/23/2019	0.0	0.4	19.1	80.5	30	4.95
GMP-10	Weekly	2	7/30/2019	0.0	0.4	19.1	80.5	30	-0.14
GMP-10	Weekly	2	8/7/2019	0.0	0.3	19.8	79.9	30	-0.13
GMP-10	Weekly	2	8/13/2019	0.0	0.5	19.2	80.3	30	0.16
GMP-10	Weekly	2	8/20/2019	0.0	0.6	19.0	80.4	30	-3.90
GMP-10	Weekly	2	8/29/2019	0.0	0.8	17.7	81.5	30	-0.09
GMP-10	Weekly	2	9/5/2019	0.0	0.8	17.5	81.7	30	-5.78
GMP-10	Weekly	2	9/10/2019	0.0	0.6	17.5	81.9	30	-0.26
GMP-10	Weekly	2	9/17/2019	0.0	0.3	20.1	79.6	30	0.05
GMP-10	Weekly	2	9/25/2019	0.0	0.6	19.5	79.9	30	-0.05
GMP-11	Weekly	4	7/2/2019	0.0	0.1	20.8	79.1	30	-1.51
GMP-11	Weekly	4	7/9/2019	0.0	0.0	20.0	80.0	30	0.04
GMP-11	Weekly	4	7/16/2019	0.0	0.1	20.0	79.9	30	-0.65
GMP-11	Weekly	4	7/23/2019	0.0	0.0	19.2	80.8	30	-5.37
GMP-11	Weekly	4	7/30/2019	0.0	0.0	19.5	80.5	30	-7.75
GMP-11	Weekly	4	8/7/2019	0.0	0.1	19.8	80.1	30	-9.15
GMP-11	Weekly	4	8/13/2019	0.0	0.1	19.9	80.0	30	-6.42
GMP-11	Weekly	4	8/20/2019	0.0	0.1	20.8	79.1	30	-1.74
GMP-11	Weekly	4	8/29/2019	0.0	0.2	19.8	80.0	30	0.28
GMP-11	Weekly	4	9/5/2019	0.0	0.1	20.2	79.7	30	-0.41
GMP-11	Weekly	4	9/10/2019	0.0	0.1	19.4	80.5	30	-0.34
GMP-11	Weekly	4	9/17/2019	0.0	0.0	20.4	79.6	30	-5.98
GMP-11	Weekly	4	9/25/2019	0.0	0.4	20.2	79.4	30	-0.56
GMP-12	Weekly	4	7/2/2019	0.0	0.0	19.8	80.2	30	-0.11
GMP-12	Weekly	4	7/9/2019	0.0	0.0	20.0	80.0	30	0.95
GMP-12	Weekly	4	7/16/2019	0.0	0.1	19.8	80.1	30	-0.44
GMP-12	Weekly	4	7/23/2019	0.0	0.0	19.2	80.8	30	-0.88
GMP-12	Weekly	4	7/30/2019	0.0	0.0	19.6	80.4	30	-3.90
GMP-12	Weekly	4	8/7/2019	0.0	0.0	19.6	80.4	30	-6.77
GMP-12	Weekly	4	8/13/2019	0.0	0.0	19.5	80.5	30	-6.42
GMP-12	Weekly	4	8/20/2019	0.0	0.1	20.4	79.5	30	-8.53
GMP-12	Weekly	4	8/29/2019	0.0	0.2	19.6	80.2	30	-0.47
GMP-12	Weekly	4	9/5/2019	0.0	0.6	18.1	81.3	30	-4.10
GMP-12	Weekly	4	9/10/2019	0.0	0.1	19.2	80.7	30	-5.74
GMP-12	Weekly	4	9/17/2019	0.0	0.0	19.5	80.5	30	-2.80
GMP-12	Weekly	4	9/25/2019	0.0	0.2	20.0	79.8	30	-14.03

TABLE 6

GAS MONITORING PROBE WATER LEVEL DATA

JULY 01, 2019 – SEPTEMBER 30, 2019

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
4ASS	7/2/2019	2	4.8	No Comment
4ASS	7/9/2019	2	4.5	No Comment
4ASS	7/16/2019	2	4.8	No Comment
4ASS	7/23/2019	2	4.9	No Comment
4ASS	7/30/2019	2	4.8	No Comment
4ASS	8/7/2019	2	5.0	No Comment
4ASS	8/13/2019	2	4.8	No Comment
4ASS	8/20/2019	2	4.9	No Comment
4ASS	8/29/2019	2	4.5	No Comment
4ASS	9/5/2019	2	4.6	No Comment
4ASS	9/10/2019	2	4.6	No Comment
4ASS	9/17/2019	2	4.9	No Comment
4ASS	9/25/2019	2	4.9	No Comment
4OSS	7/2/2019	2	8.3	No Comment
4OSS	7/9/2019	2	8.5	No Comment
4OSS	7/16/2019	2	8.5	No Comment
4OSS	7/23/2019	2	8.6	No Comment
4OSS	7/30/2019	2	8.6	No Comment
4OSS	8/7/2019	2	8.8	No Comment
4OSS	8/13/2019	2	8.9	No Comment
4OSS	8/20/2019	2	10.1	No Comment
4OSS	8/29/2019	2	9.1	No Comment
4OSS	9/5/2019	2	9.1	No Comment
4OSS	9/10/2019	2	9.5	No Comment
4OSS	9/17/2019	2	9.2	No Comment
4OSS	9/25/2019	2	9.4	No Comment
GMP-01	7/2/2019	2	11.8	No Comment
GMP-01	7/9/2019	2	11.8	No Comment
GMP-01	7/16/2019	2	11.8	No Comment
GMP-01	7/23/2019	2	11.8	No Comment
GMP-01	7/30/2019	2	11.8	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-01	8/7/2019	2	11.8	No Comment
GMP-01	8/13/2019	2	11.8	No Comment
GMP-01	8/20/2019	2	11.8	No Comment
GMP-01	8/29/2019	2	11.8	No Comment
GMP-01	9/5/2019	2	11.8	No Comment
GMP-01	9/10/2019	2	11.8	No Comment
GMP-01	9/17/2019	2	11.8	No Comment
GMP-01	9/25/2019	2	11.8	No Comment
GMP-02	7/2/2019	2	9.4	No Comment
GMP-02	7/9/2019	2	9.4	No Comment
GMP-02	7/16/2019	2	9.5	No Comment
GMP-02	7/23/2019	2	9.5	No Comment
GMP-02	7/30/2019	2	9.4	No Comment
GMP-02	8/7/2019	2	9.4	No Comment
GMP-02	8/13/2019	2	9.5	No Comment
GMP-02	8/20/2019	2	9.5	No Comment
GMP-02	8/29/2019	2	9.5	No Comment
GMP-02	9/5/2019	2	9.5	No Comment
GMP-02	9/10/2019	2	9.5	No Comment
GMP-02	9/17/2019	2	9.5	No Comment
GMP-02	9/25/2019	2	9.5	No Comment
GMP-03	7/2/2019	4	12.4	No Comment
GMP-03	7/9/2019	4	12.0	No Comment
GMP-03	7/16/2019	4	12.7	No Comment
GMP-03	7/23/2019	4	12.7	No Comment
GMP-03	7/30/2019	4	13.2	No Comment
GMP-03	8/7/2019	4	13.8	No Comment
GMP-03	8/13/2019	4	14.0	No Comment
GMP-03	8/20/2019	4	14.7	No Comment
GMP-03	8/29/2019	4	14.2	No Comment
GMP-03	9/5/2019	4	14.6	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-03	9/10/2019	4	14.9	No Comment
GMP-03	9/17/2019	4	15.3	No Comment
GMP-03	9/25/2019	4	17.6	No Comment
GMP-05	7/2/2019	3	8.6	No Comment
GMP-06	7/2/2019	1	8.2	No Comment
GMP-07	7/2/2019	1	21.6	No Comment
GMP-08	7/1/2019	1	33.0	No Comment
GMP-08	7/2/2019	1	33.0	No Comment
GMP-08	7/3/2019	1	33.1	No Comment
GMP-08	7/5/2019	1	33.0	No Comment
GMP-08	7/8/2019	1	32.8	No Comment
GMP-08	7/9/2019	1	32.8	No Comment
GMP-08	7/10/2019	1	32.9	No Comment
GMP-08	7/11/2019	1	33.0	No Comment
GMP-08	7/12/2019	1	32.9	No Comment
GMP-08	7/15/2019	1	33.1	No Comment
GMP-08	7/16/2019	1	32.9	No Comment
GMP-08	7/23/2019	1	32.5	No Comment
GMP-08	7/30/2019	1	32.5	No Comment
GMP-08	8/7/2019	1	33.2	No Comment
GMP-08	8/13/2019	1	33.2	No Comment
GMP-08	8/20/2019	1	33.4	No Comment
GMP-08	8/29/2019	1	33.1	No Comment
GMP-08	9/5/2019	1	33.1	No Comment
GMP-08	9/10/2019	1	33.1	No Comment
GMP-08	9/17/2019	1	33.2	No Comment
GMP-08	9/25/2019	1	33.4	No Comment
GMP-09	7/2/2019	2	8.2	No Comment
GMP-09	7/9/2019	2	7.5	No Comment
GMP-09	7/16/2019	2	7.5	No Comment
GMP-09	7/23/2019	2	8.1	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-09	7/30/2019	2	8.7	No Comment
GMP-09	8/7/2019	2	9.6	No Comment
GMP-09	8/13/2019	2	9.8	No Comment
GMP-09	8/20/2019	2	9.9	No Comment
GMP-09	8/29/2019	2	9.7	No Comment
GMP-09	9/5/2019	2	9.6	No Comment
GMP-09	9/10/2019	2	9.9	No Comment
GMP-09	9/17/2019	2	10.4	No Comment
GMP-09	9/25/2019	2	10.7	No Comment
GMP-10	7/2/2019	2	8.6	No Comment
GMP-10	7/9/2019	2	8.2	No Comment
GMP-10	7/16/2019	2	8.9	No Comment
GMP-10	7/23/2019	2	8.0	No Comment
GMP-10	7/30/2019	2	8.6	No Comment
GMP-10	8/7/2019	2	8.8	No Comment
GMP-10	8/13/2019	2	8.8	No Comment
GMP-10	8/20/2019	2	8.8	No Comment
GMP-10	8/29/2019	2	8.4	No Comment
GMP-10	9/5/2019	2	8.4	No Comment
GMP-10	9/10/2019	2	8.6	No Comment
GMP-10	9/17/2019	2	9.7	No Comment
GMP-10	9/25/2019	2	9.7	No Comment
GMP-11	7/2/2019	4	0.4	No Comment
GMP-11	7/9/2019	4	0.3	No Comment
GMP-11	7/16/2019	4	0.4	No Comment
GMP-11	7/23/2019	4	0.3	No Comment
GMP-11	7/30/2019	4	0.4	No Comment
GMP-11	8/7/2019	4	0.5	No Comment
GMP-11	8/13/2019	4	0.7	No Comment
GMP-11	8/20/2019	4	0.9	No Comment
GMP-11	8/29/2019	4	0.8	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-11	9/5/2019	4	0.7	No Comment
GMP-11	9/10/2019	4	0.7	No Comment
GMP-11	9/17/2019	4	0.9	No Comment
GMP-11	9/25/2019	4	0.9	No Comment
GMP-12	7/2/2019	4	0.2	No Comment
GMP-12	7/9/2019	4	0.1	No Comment
GMP-12	7/16/2019	4	0.2	No Comment
GMP-12	7/23/2019	4	0.1	No Comment
GMP-12	7/30/2019	4	0.2	No Comment
GMP-12	8/7/2019	4	0.3	No Comment
GMP-12	8/13/2019	4	0.4	No Comment
GMP-12	8/20/2019	4	0.6	No Comment
GMP-12	8/29/2019	4	0.6	No Comment
GMP-12	9/5/2019	4	0.4	No Comment
GMP-12	9/10/2019	4	0.5	No Comment
GMP-12	9/17/2019	4	0.9	No Comment
GMP-12	9/25/2019	4	0.7	No Comment
GMP-13D	7/2/2019	4	8.3	No Comment
GMP-13D	7/9/2019	4	8.5	No Comment
GMP-13D	7/16/2019	4	8.5	No Comment
GMP-13D	7/23/2019	4	8.7	No Comment
GMP-13D	7/30/2019	4	8.9	No Comment
GMP-13D	8/7/2019	4	9.2	No Comment
GMP-13D	8/13/2019	4	9.4	No Comment
GMP-13D	8/20/2019	4	9.8	No Comment
GMP-13D	8/29/2019	4	10.3	No Comment
GMP-13D	9/5/2019	4	10.5	No Comment
GMP-13D	9/10/2019	4	10.7	No Comment
GMP-13D	9/17/2019	4	11.4	No Comment
GMP-13D	9/25/2019	4	11.4	No Comment
GMP-13S	7/2/2019	4	8.6	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-13S	7/9/2019	4	7.5	No Comment
GMP-13S	7/16/2019	4	9.2	No Comment
GMP-13S	7/23/2019	4	7.5	No Comment
GMP-13S	7/30/2019	4	9.7	No Comment
GMP-13S	8/7/2019	4	10.7	No Comment
GMP-13S	8/13/2019	4	10.7	No Comment
GMP-13S	8/20/2019	4	11.9	No Comment
GMP-13S	8/29/2019	4	11.0	No Comment
GMP-13S	9/5/2019	4	11.9	No Comment
GMP-13S	9/10/2019	4	12.8	No Comment
GMP-13S	9/17/2019	4	13.0	No Comment
GMP-13S	9/25/2019	4	13.5	No Comment
GMP-14D	7/2/2019	3	6.5	No Comment
GMP-14D	7/9/2019	3	5.8	No Comment
GMP-14D	7/16/2019	3	6.9	No Comment
GMP-14D	7/23/2019	3	5.7	No Comment
GMP-14D	7/30/2019	3	7.1	No Comment
GMP-14D	8/7/2019	3	7.8	No Comment
GMP-14D	8/13/2019	3	7.6	No Comment
GMP-14D	8/20/2019	3	8.7	No Comment
GMP-14D	8/29/2019	3	7.9	No Comment
GMP-14D	9/5/2019	3	8.3	No Comment
GMP-14D	9/10/2019	3	8.6	No Comment
GMP-14D	9/17/2019	3	10.9	No Comment
GMP-14D	9/25/2019	3	10.1	No Comment
GMP-14S	7/2/2019	3	8.4	No Comment
GMP-14S	7/9/2019	3	7.8	No Comment
GMP-14S	7/16/2019	3	8.7	No Comment
GMP-14S	7/23/2019	3	8.6	No Comment
GMP-14S	7/30/2019	3	9.1	No Comment
GMP-14S	8/7/2019	3	9.8	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-14S	8/13/2019	3	10.3	No Comment
GMP-14S	8/20/2019	3	10.9	No Comment
GMP-14S	8/29/2019	3	10.8	No Comment
GMP-14S	9/5/2019	3	11.0	No Comment
GMP-14S	9/10/2019	3	11.5	No Comment
GMP-14S	9/17/2019	3	11.9	No Comment
GMP-14S	9/25/2019	3	12.6	No Comment
GMP-15D	7/2/2019	1	10.8	No Comment
GMP-15D	7/9/2019	1	10.4	No Comment
GMP-15D	7/16/2019	1	10.8	No Comment
GMP-15D	7/23/2019	1	10.9	No Comment
GMP-15D	7/30/2019	1	10.8	No Comment
GMP-15D	8/7/2019	1	11.1	No Comment
GMP-15D	8/13/2019	1	11.1	No Comment
GMP-15D	8/20/2019	1	11.6	No Comment
GMP-15D	8/29/2019	1	11.0	No Comment
GMP-15D	9/5/2019	1	11.1	No Comment
GMP-15D	9/10/2019	1	11.7	No Comment
GMP-15D	9/17/2019	1	11.9	No Comment
GMP-15D	9/25/2019	1	11.5	No Comment
GMP-15S	7/2/2019	1	7.1	No Comment
GMP-15S	7/9/2019	1	7.5	No Comment
GMP-15S	7/16/2019	1	7.2	No Comment
GMP-15S	7/23/2019	1	7.0	No Comment
GMP-15S	7/30/2019	1	7.1	No Comment
GMP-15S	8/7/2019	1	7.4	No Comment
GMP-15S	8/13/2019	1	7.2	No Comment
GMP-15S	8/20/2019	1	7.4	No Comment
GMP-15S	8/29/2019	1	7.2	No Comment
GMP-15S	9/5/2019	1	7.2	No Comment
GMP-15S	9/10/2019	1	7.2	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-15S	9/17/2019	1	7.4	No Comment
GMP-15S	9/25/2019	1	7.4	No Comment
GMP-16D	7/2/2019	1	5.5	No Comment
GMP-16D	7/9/2019	1	5.2	No Comment
GMP-16D	7/16/2019	1	5.4	No Comment
GMP-16D	7/23/2019	1	5.3	No Comment
GMP-16D	7/30/2019	1	5.3	No Comment
GMP-16D	8/7/2019	1	5.9	No Comment
GMP-16D	8/13/2019	1	5.7	No Comment
GMP-16D	8/20/2019	1	6.1	No Comment
GMP-16D	8/29/2019	1	5.1	No Comment
GMP-16D	9/5/2019	1	5.7	No Comment
GMP-16D	9/10/2019	1	5.8	No Comment
GMP-16D	9/17/2019	1	6.2	No Comment
GMP-16D	9/25/2019	1	6.5	No Comment
GMP-16S	7/2/2019	1	5.7	No Comment
GMP-16S	7/9/2019	1	5.4	No Comment
GMP-16S	7/16/2019	1	5.7	No Comment
GMP-16S	7/23/2019	1	5.6	No Comment
GMP-16S	7/30/2019	1	5.6	No Comment
GMP-16S	8/7/2019	1	6.2	No Comment
GMP-16S	8/13/2019	1	6.0	No Comment
GMP-16S	8/20/2019	1	6.4	No Comment
GMP-16S	8/29/2019	1	6.8	No Comment
GMP-16S	9/5/2019	1	6.1	No Comment
GMP-16S	9/10/2019	1	6.1	No Comment
GMP-16S	9/17/2019	1	6.5	No Comment
GMP-16S	9/25/2019	1	6.8	No Comment
GMP-4D	7/2/2019	4	7.5	No Comment
GMP-4D	7/9/2019	4	6.9	No Comment
GMP-4D	7/16/2019	4	7.9	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-4D	7/23/2019	4	7.9	No Comment
GMP-4D	7/30/2019	4	8.3	No Comment
GMP-4D	8/7/2019	4	9.6	No Comment
GMP-4D	8/13/2019	4	9.7	No Comment
GMP-4D	8/20/2019	4	10.5	No Comment
GMP-4D	8/29/2019	4	10.4	No Comment
GMP-4D	9/5/2019	4	10.5	No Comment
GMP-4D	9/10/2019	4	11.5	No Comment
GMP-4D	9/17/2019	4	12.8	No Comment
GMP-4D	9/25/2019	4	12.1	No Comment
GMP-4S	7/2/2019	4	7.2	No Comment
GMP-4S	7/9/2019	4	6.6	No Comment
GMP-4S	7/16/2019	4	7.5	No Comment
GMP-4S	7/23/2019	4	7.2	No Comment
GMP-4S	7/30/2019	4	8.0	No Comment
GMP-4S	8/7/2019	4	8.7	No Comment
GMP-4S	8/13/2019	4	9.3	No Comment
GMP-4S	8/20/2019	4	10.0	No Comment
GMP-4S	8/29/2019	4	9.8	No Comment
GMP-4S	9/5/2019	4	10.1	No Comment
GMP-4S	9/10/2019	4	10.5	No Comment
GMP-4S	9/17/2019	4	12.2	No Comment
GMP-4S	9/25/2019	4	11.7	No Comment
GMP-5D	7/2/2019	3	18.0	No Comment
GMP-5D	7/9/2019	3	17.7	No Comment
GMP-5D	7/16/2019	3	18.1	No Comment
GMP-5D	7/23/2019	3	17.8	No Comment
GMP-5D	7/30/2019	3	18.2	No Comment
GMP-5D	8/7/2019	3	18.5	No Comment
GMP-5D	8/13/2019	3	18.7	No Comment
GMP-5D	8/20/2019	3	18.6	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-5D	8/29/2019	3	18.6	No Comment
GMP-5D	9/5/2019	3	18.4	No Comment
GMP-5D	9/10/2019	3	18.4	No Comment
GMP-5D	9/17/2019	3	18.8	No Comment
GMP-5D	9/25/2019	3	19.0	No Comment
GMP-5S	7/2/2019	3	12.8	No Comment
GMP-5S	7/9/2019	3	12.3	No Comment
GMP-5S	7/16/2019	3	13.0	No Comment
GMP-5S	7/23/2019	3	12.6	No Comment
GMP-5S	7/30/2019	3	13.3	No Comment
GMP-5S	8/7/2019	3	13.8	No Comment
GMP-5S	8/13/2019	3	13.7	No Comment
GMP-5S	8/20/2019	3	14.2	No Comment
GMP-5S	8/29/2019	3	13.8	No Comment
GMP-5S	9/5/2019	3	13.9	No Comment
GMP-5S	9/10/2019	3	13.9	No Comment
GMP-5S	9/17/2019	3	14.5	No Comment
GMP-5S	9/25/2019	3	14.8	No Comment
GMP-6D	7/2/2019	1	8.9	No Comment
GMP-6D	7/9/2019	1	9.1	No Comment
GMP-6D	7/16/2019	1	9.6	No Comment
GMP-6D	7/23/2019	1	9.5	No Comment
GMP-6D	7/30/2019	1	9.6	No Comment
GMP-6D	8/7/2019	1	10.0	No Comment
GMP-6D	8/13/2019	1	10.1	No Comment
GMP-6D	8/20/2019	1	10.1	No Comment
GMP-6D	8/29/2019	1	9.9	No Comment
GMP-6D	9/5/2019	1	9.8	No Comment
GMP-6D	9/10/2019	1	9.9	No Comment
GMP-6D	9/17/2019	1	10.2	No Comment
GMP-6D	9/25/2019	1	10.5	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-6S	7/2/2019	1	5.6	No Comment
GMP-6S	7/9/2019	1	5.5	No Comment
GMP-6S	7/16/2019	1	6.6	No Comment
GMP-6S	7/23/2019	1	6.4	No Comment
GMP-6S	7/30/2019	1	6.5	No Comment
GMP-6S	8/7/2019	1	7.1	No Comment
GMP-6S	8/13/2019	1	7.0	No Comment
GMP-6S	8/20/2019	1	7.0	No Comment
GMP-6S	8/29/2019	1	6.3	No Comment
GMP-6S	9/5/2019	1	6.3	No Comment
GMP-6S	9/10/2019	1	6.3	No Comment
GMP-6S	9/17/2019	1	7.0	No Comment
GMP-6S	9/25/2019	1	7.4	No Comment
GMP-7D	7/2/2019	1	16.1	No Comment
GMP-7D	7/9/2019	1	16.0	No Comment
GMP-7D	7/16/2019	1	15.8	No Comment
GMP-7D	7/23/2019	1	16.5	No Comment
GMP-7D	7/30/2019	1	16.3	No Comment
GMP-7D	8/7/2019	1	16.3	No Comment
GMP-7D	8/13/2019	1	15.8	No Comment
GMP-7D	8/20/2019	1	17.0	No Comment
GMP-7D	8/29/2019	1	16.2	No Comment
GMP-7D	9/5/2019	1	16.5	No Comment
GMP-7D	9/10/2019	1	16.3	No Comment
GMP-7D	9/17/2019	1	17.0	No Comment
GMP-7D	9/25/2019	1	17.3	No Comment
GMP-7S	7/2/2019	1	14.7	No Comment
GMP-7S	7/9/2019	1	14.7	No Comment
GMP-7S	7/16/2019	1	14.3	No Comment
GMP-7S	7/23/2019	1	13.8	No Comment
GMP-7S	7/30/2019	1	14.3	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
GMP-7S	8/7/2019	1	15.0	No Comment
GMP-7S	8/13/2019	1	13.8	No Comment
GMP-7S	8/20/2019	1	18.0	No Comment
GMP-7S	8/29/2019	1	14.8	No Comment
GMP-7S	9/5/2019	1	15.5	No Comment
GMP-7S	9/10/2019	1	16.1	No Comment
GMP-7S	9/17/2019	1	16.1	No Comment
GMP-7S	9/25/2019	1	16.5	No Comment
TMP-1D	7/2/2019	2	17.6	No Comment
TMP-1D	7/9/2019	2	17.8	No Comment
TMP-1D	7/16/2019	2	18.4	No Comment
TMP-1D	7/23/2019	2	18.4	No Comment
TMP-1D	7/30/2019	2	18.8	No Comment
TMP-1D	8/7/2019	2	19.1	No Comment
TMP-1D	8/13/2019	2	19.3	No Comment
TMP-1D	8/20/2019	2	19.4	No Comment
TMP-1D	8/29/2019	2	19.3	No Comment
TMP-1D	9/5/2019	2	19.3	No Comment
TMP-1D	9/10/2019	2	19.3	No Comment
TMP-1D	9/17/2019	2	19.7	No Comment
TMP-1D	9/25/2019	2	20.2	No Comment
TMP-1M	7/2/2019	2	18.9	No Comment
TMP-1M	7/9/2019	2	18.0	No Comment
TMP-1M	7/16/2019	2	18.9	No Comment
TMP-1M	7/23/2019	2	18.8	No Comment
TMP-1M	7/30/2019	2	19.3	No Comment
TMP-1M	8/7/2019	2	19.9	No Comment
TMP-1M	8/13/2019	2	19.9	No Comment
TMP-1M	8/20/2019	2	19.0	No Comment
TMP-1M	8/29/2019	2	19.1	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
TMP-1M	9/5/2019	2	19.1	No Comment
TMP-1M	9/10/2019	2	19.2	No Comment
TMP-1M	9/17/2019	2	20.2	No Comment
TMP-1M	9/25/2019	2	20.4	No Comment
TMP-1S	7/2/2019	2	17.7	No Comment
TMP-1S	7/9/2019	2	17.2	No Comment
TMP-1S	7/16/2019	2	18.1	No Comment
TMP-1S	7/23/2019	2	17.9	No Comment
TMP-1S	7/30/2019	2	18.3	No Comment
TMP-1S	8/7/2019	2	18.9	No Comment
TMP-1S	8/13/2019	2	19.0	No Comment
TMP-1S	8/20/2019	2	19.3	No Comment
TMP-1S	8/29/2019	2	18.9	No Comment
TMP-1S	9/5/2019	2	18.8	No Comment
TMP-1S	9/10/2019	2	18.9	No Comment
TMP-1S	9/17/2019	2	19.4	No Comment
TMP-1S	9/25/2019	2	19.7	No Comment
TMP-2D	7/2/2019	2	18.4	No Comment
TMP-2D	7/9/2019	2	17.7	No Comment
TMP-2D	7/16/2019	2	18.6	No Comment
TMP-2D	7/23/2019	2	17.5	No Comment
TMP-2D	7/30/2019	2	18.6	No Comment
TMP-2D	8/7/2019	2	19.5	No Comment
TMP-2D	8/13/2019	2	19.5	No Comment
TMP-2D	8/20/2019	2	20.1	No Comment
TMP-2D	8/29/2019	2	20.1	No Comment
TMP-2D	9/5/2019	2	19.2	No Comment
TMP-2D	9/10/2019	2	19.5	No Comment
TMP-2D	9/17/2019	2	20.3	No Comment
TMP-2D	9/25/2019	2	20.8	No Comment
TMP-2M	7/2/2019	2	18.5	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
TMP-2M	7/9/2019	2	17.5	No Comment
TMP-2M	7/16/2019	2	18.6	No Comment
TMP-2M	7/23/2019	2	17.5	No Comment
TMP-2M	7/30/2019	2	19.6	No Comment
TMP-2M	8/7/2019	2	19.6	No Comment
TMP-2M	8/13/2019	2	19.5	No Comment
TMP-2M	8/20/2019	2	20.1	No Comment
TMP-2M	8/29/2019	2	19.1	No Comment
TMP-2M	9/5/2019	2	19.2	No Comment
TMP-2M	9/10/2019	2	19.5	No Comment
TMP-2M	9/17/2019	2	20.2	No Comment
TMP-2M	9/25/2019	2	20.8	No Comment
TMP-2S	7/2/2019	2	17.5	No Comment
TMP-2S	7/9/2019	2	16.9	No Comment
TMP-2S	7/16/2019	2	17.5	No Comment
TMP-2S	7/23/2019	2	16.3	No Comment
TMP-2S	7/30/2019	2	17.4	No Comment
TMP-2S	8/7/2019	2	17.5	No Comment
TMP-2S	8/13/2019	2	17.5	No Comment
TMP-2S	8/20/2019	2	17.5	No Comment
TMP-2S	8/29/2019	2	17.5	No Comment
TMP-2S	9/5/2019	2	17.5	No Comment
TMP-2S	9/10/2019	2	17.5	No Comment
TMP-2S	9/17/2019	2	17.5	No Comment
TMP-2S	9/17/2019	2	17.5	No Comment
TMP-2S	9/25/2019	2	17.5	No Comment
TMP-3D	7/2/2019	2	17.0	No Comment
TMP-3D	7/9/2019	2	16.5	No Comment
TMP-3D	7/16/2019	2	17.1	No Comment
TMP-3D	7/23/2019	2	16.9	No Comment
TMP-3D	7/30/2019	2	18.3	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
TMP-3D	8/7/2019	2	17.6	No Comment
TMP-3D	8/13/2019	2	17.9	No Comment
TMP-3D	8/20/2019	2	18.1	No Comment
TMP-3D	8/29/2019	2	17.9	No Comment
TMP-3D	9/5/2019	2	18.0	No Comment
TMP-3D	9/10/2019	2	18.1	No Comment
TMP-3D	9/17/2019	2	18.7	No Comment
TMP-3D	9/25/2019	2	19.2	No Comment
TMP-3M	7/2/2019	2	17.7	No Comment
TMP-3M	7/9/2019	2	17.1	No Comment
TMP-3M	7/16/2019	2	17.4	No Comment
TMP-3M	7/23/2019	2	17.5	No Comment
TMP-3M	7/30/2019	2	17.8	No Comment
TMP-3M	8/7/2019	2	18.2	No Comment
TMP-3M	8/13/2019	2	18.5	No Comment
TMP-3M	8/20/2019	2	18.4	No Comment
TMP-3M	8/29/2019	2	18.4	No Comment
TMP-3M	9/5/2019	2	18.4	No Comment
TMP-3M	9/10/2019	2	18.8	No Comment
TMP-3M	9/17/2019	2	18.7	No Comment
TMP-3M	9/25/2019	2	18.9	No Comment
TMP-3S	7/2/2019	2	16.6	No Comment
TMP-3S	7/9/2019	2	16.4	No Comment
TMP-3S	7/16/2019	2	17.3	No Comment
TMP-3S	7/23/2019	2	17.5	No Comment
TMP-3S	7/30/2019	2	19.0	No Comment
TMP-3S	8/7/2019	2	20.1	No Comment
TMP-3S	8/13/2019	2	19.3	No Comment
TMP-3S	8/20/2019	2	19.4	No Comment
TMP-3S	8/29/2019	2	18.6	No Comment
TMP-3S	9/5/2019	2	18.8	No Comment

Point Name	Date	Quadrant	Depth to Water (ft)	Comments
TMP-3S	9/10/2019	2	18.9	No Comment
TMP-3S	9/17/2019	2	20.4	No Comment
TMP-3S	9/25/2019	2	18.5	No Comment

APPENDIX A

LANDFILL GAS CORRECTIVE ACTION PLAN UPDATE, JULY 26, 2013

BRIDGETON LANDFILL

LANDFILL GAS CORRECTIVE ACTION PLAN UPDATE

Submitted Pursuant to Section 23 of Agreed Order
Case No. 13SL-CC01088, Effective May 13, 2013

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July 26, 2013

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Appendix B – GMP and TMP Boring Logs/Construction Logs
Appendix C – Bridgeton Landfill Infrastructure As-Built Drawing, July 2013

1.0 INTRODUCTION

On May 13, 2013, Bridgeton Landfill entered into an Agreed Order with the State of Missouri which requires actions to address what was called a subsurface smoldering event (SSE). Section 23 of the Agreed Order requires the preparation of an updated "Landfill Gas Corrective Action Plan" (CAP) and requests that the update consider SSE control measures.

Missouri Solid Waste Management Regulations require that subsurface landfill gas be controlled so that it does not exceed 2.5% (which is equal to 50% of the lower explosive limit, or LEL) in the ground at the facility property boundary. If this level is exceeded at the property boundary, the facility must implement enhanced monitoring and corrective measures. Corrective Action Plans are frequently used to present and communicate these measures.

Bridgeton Landfill has been monitoring for gas migration using permanent gas monitoring probes since 1998. Since that time, landfill gas Corrective Action Plans have been implemented, additional monitoring locations have been added, and many control features have been installed. These efforts have been previously documented and are incorporated by reference as background for this current work.

Lateral landfill gas migration is common at unlined municipal solid waste (MSW) landfills, and especially in quarry fill environments. Bridgeton Landfill has some areas where the property line is close to solid waste limits (near the edge of the quarry wall) and monitoring has detected methane near the property line in certain locations. In addition, the SSE that Bridgeton Landfill has been experiencing since 2010, and that intensified in 2012, has further challenged methane control in those areas.

The purpose of this document, as required by the Agreed Order, is to provide an update to the November 27, 2012 CAP that considers the SSE control measures. As such, this document includes monitoring data up to July 2013, reviews the status of gas migration control, presents recent (since the approved November 27, 2012 CAP) efforts to reduce methane migration, and discusses forward-going monitoring and reporting procedures. It is intended that this CAP supplements and/or supersedes the previous CAPs and agreements.

2.0 REVIEW OF CURRENT GAS MIGRATION CONTROL STATUS

The intensification of the SSE has created conditions that have made control of gas migration more challenging, including:

- Increased pressure within the landfill waste with pressure-gradient which forces gas outward;
- Increased liquid generation resulting in steam and saturated gas which effects collection efficiency, and
- Carefully controlled and reduced application of gas extraction well vacuum with efforts to minimize oxygen content in the gas well.

Detailed graphs showing methane concentrations for the past three years are included in Appendix A. Appendix B includes a list of the gas monitoring probes monitored at the Bridgeton Landfill along with the boring logs and/or construction logs for each probe. Please note, the gas monitoring probes has been referenced with different abbreviations and the table in Appendix B is included to provide clarity.

As can be seen on the graphs, there are several compliance point and sentry monitoring probe locations that have been historically elevated (GMP-01, GMP-04, GMP-05 GMP-06 and GMP-07), as well as elevated levels in new gas monitoring probes where monitoring began in October 2012 after the SSE intensified (GMP-5S, GMP-14S, GMP-14D). Temporary monitoring probes installed to determine the rate and extent of the methane migration in the vicinity of impacted probe GMP-01 (TMP-1S, TMP-2S, TMP-2M, TMP-2D, TMP-3S, TMP-3M, and TMP-3D) have also exhibited elevated levels of methane since installation.

Due to the additional gas monitoring probes, which initiated monitoring in October 2012 to better define the zone of migration on the eastern boundary of the landfill, GMP-04 through GMP-07 located closer to the landfill are typically monitored on a quarterly basis but are sentry probes and are no longer utilized as the compliance probes in accordance with Missouri Solid Waste Law and Rules. Tables 1 through 4 present the probe results for the monitoring period November 21, 2012 through July 5, 2013.

Along the southern boundary of the landfill, adjacent to Boenker Road, GMP-01 has continued to show elevated levels above the regulatory threshold. Corrective measures have not been effective to address the migration in this vicinity. Corrective actions taken to date have focused on methane migration within the soil overburden due to investigative action demonstrating shallow migration. However, after the installation of the interceptor trench, which was constructed to the soil/bedrock interface between the waste disposal area and impacted GMP-01, elevated levels continued to be exhibited in GMP-01. Due to the ineffectiveness of the perimeter gas wells (2005) and interceptor trench (2010) installed in the vicinity of GMP-01 to eliminate or reduce methane impacts, further investigation was deemed necessary under the conditions of the Settlement Agreement.

In order to effectively determine the zone of migration in the vicinity of GMP-01, temporary probes (TMP-1, TMP-2 and TMP-3) were installed as investigation probes to better define the zone of migration. In order to do this, each temporary probe were installed as nested probes with three monitored zones – shallow (S), middle (M) and deep (D). The shallow zone was screened within the soil overburden; the middle zone was screened through the uppermost weathered/fractured bedrock and the deep zone within the saturated bedrock. As presented in Appendix A, TMP-1 located west of GMP-01 is impacted with elevated methane levels within the soil overburden and weathered bedrock. TMP-2, located east of GMP-01, and TMP-3, located north of GMP-01, has observed elevated methane in each of the monitored zones. It is likely the observed elevated methane within the deep monitored zone observed in TMP-2 and TMP-3 are a result of diffusion transport due to these probes located less than 75 feet from the waste mass as well as the pressure-gradient force caused by the SSE as noted with increased relative pressure during monitoring of the probes.

As noted in the TMP boring logs, weathered bedrock was observed at lower elevations than the base of the interceptor trench. TMP-1, located west of GMP-1, the weathered bedrock was observed between 36 feet below ground surface (bgs) to 66.5 feet bgs. TMP-2, located east of GMP-1, the weathered bedrock was observed between 18 feet bgs to 47 feet bgs. TMP-3, located between the landfill and GMP-1, the weathered bedrock was observed between 31 feet bgs to 50 feet bgs. TMP-2, located between the landfill and GMP-1, the weathered bedrock was observed between 31 feet bgs to 50 feet bgs. Due to weathered bedrock observed at lower elevations than the base of the interceptor trench, it is likely methane continues to migrate through these weathered zones. Table 3 presents the temporary gas monitoring probe data.

The intensification of the SSE in 2012, resulting in increased pressure within the landfill, brought challenges associated within dewatering the interceptor trench located south of the waste boundary and maintaining sufficient vacuum on select gas extraction wells located within the south quarry. As a result, elevated levels of methane continue to be observed since October 2012.

Currently the public safety probes located across Boenker Road, on private property (GMP-09, GMP-10, GMP-11, and GMP-12) have no detectable levels of methane and have not observed elevated methane in two years (GMP-11). There is no evidence of methane migration onto adjacent properties at this time. Table 4 presents the gas monitoring probe data for the public safety probes.

Along the east property boundary, adjacent to the south quarry, elevated methane has been observed at two gas monitoring probe locations utilized for compliance: GMP-5S, GMP-14S, GMP-14D. The gas monitoring probes installed between August and September 2012 were installed as nested probes with two monitoring zones - shallow (S) and deep (D). The shallow zone was screened within the soil overburden; the deep zone was screened through the uppermost weathered bedrock to approximately 10 feet below the historic low water table.

The intent of these nested probes is to determine if methane migration is occurring at the property boundary as well as to ascertain the zone in which it is occurring. Similar to GMP-01, weathered bedrock was observed below the soil overburden at GMP-14 where GMP-14D is screened. The weathered bedrock is likely providing a zone of migration within the deeper zone, GMP-14D.

As described in Section 3.0, Bridgeton Landfill has performed recent improvements that should ultimately reduce landfill gas migration.

3.0 RECENT GAS MIGRATION CONTROL EFFORTS

Many recent additional measures have been recently undertaken that should ultimately reduce gas migration, including:

1. The SSE has impacted the facility's infrastructure designed to remove liquid efficiently from the waste mass which results in increased liquid in the force main and the gas conveyance system resulting in a reduction of their efficiency to remove landfill gas. Adding new gas extraction wells, replacing compromised gas extraction wells, and adding liquid pumps and extraction points will improve landfill gas collection and improve overall efficiency of the system. The following features have been installed per the November 27, 2012 CAP and in addition to the measures proposed in the CAP:

    - In November 2012 the Bridgeton Landfill installed 5 new trench wells, 5 new liquid sumps, and 7 new gas extraction wells.
    - During the January 1, 2013 through June 30, 2013 period the following additional extraction points were installed at the Bridgeton Landfill:
    - In February 2013 the Bridgeton Landfill installed 9 new gas extraction wells,
    - In March 2013 the Bridgeton Landfill installed 3 new gas extraction wells,
    - In April 2013 the Bridgeton Landfill installed 11 new gas extraction wells,
    - In May 2013 the Bridgeton Landfill installed 13 new gas extraction wells,

2. Addition of a 2,500 scfm utility flare in the southeastern portion of the disposal area in June 2013. This flare has improved vacuum distribution around the well field, especially in the southern and southeastern end where migration has been problematic.

3. Installation of 25 perimeter liquid sumps connected by perforated liquid/gas collection piping in May and June 2013. These were installed as part of the South Quarry capping project, and will allow collection of additional gas at the perimeter of the landfill, and

4. Placement of 32 acres of geomembrane cap and enhanced gas collection features which should be completed in August 2013. The cap will allow additional vacuum to be pulled from the cover integrity system consisting of a composite liner system which will reduce concern for oxygen intrusion. This should result in better long term gas capture and, in time, reduced gas pressure.

An updated as-built map that shows all of these features that were in place as of June 30, 2013 is included in Appendix C.

Due to the increased liquid generation and increased pressure within the landfill the improvements completed within the past nine months have not yet resulted in a reduction of methane observed within the gas monitoring probes. It is premature to evaluate the

effectiveness of the recent gas migration control efforts outlined in this section due to impacts associated with increased liquid generation and the continued dynamic movement and changes of the SSE in the South Quarry area.

4.0 PROPOSED AND ONGOING GAS MIGRATION CONTROL EFFORTS

The recent additional measures outlined in Section 3.0 are on-going efforts to improve landfill gas control at the Bridgeton Landfill. These upgrades should reduce pressure within the waste mass that may be contributing to the exceedances and in turn alleviate methane migration along the southern and eastern property boundaries. Improvements to the landfill are on-going and will continue until the SSE is controlled. Below are additional improvements that are being proposed or currently implemented:

1. The SSE has resulted in an increase in condensate generation. In order to improve liquid removal at the site a third party consultant has been contracted to evaluate the effectiveness of the existing force main. Due to the increased liquid movement within the force main pressure has built up within the system resulting in back pressure and reduced pump functionality. Pressure relief valves have been installed on numerous pneumatic pumps to address this issue. However, due to the increased liquid generation additional capacity within the force main is needed. As such, the preliminary design proposes utilizing the existing force main for management of liquid removed from the LCSs and a second separate force main for liquids removed from the remaining extraction points. The additional liquid force main will allow optimum operations of the pumps while providing increased available vacuum on the landfill gas collection system. This corrective action measure will be submitted to the MDNR in third quarter 2013 sealed by a Missouri Professional Engineer.

2. In order to improve liquid management once the liquids are removed from the disposal area the Bridgeton Landfill has contracted with a third party consulting firm for additional storage and pretreatment of the extracted liquid. During the second quarter 2013 the landfill installed a 316,000 gallon above ground liquid storage and treatment tank The preliminary treatment plant design includes incorporation of the existing 96,000 gallon tank located near Boenker Road, the newly installed 316,000 gallon tank, four-1,000,000 gallon tanks and a pretreatment facility. This will provide the landfill additional capacity to remove the liquid from the disposal area at a design capacity of 300,000 gallons per day. The treatment plant design will be submitted to the MDNR in third quarter 2013 sealed by a Missouri Professional Engineer.

3. The Bridgeton Landfill has submitted a Permit to Construct application to the St. Louis County Department of Health for the installation of two 4,000 scfm utility flares. These utility flares would replace the existing enclosed flares with a design flow of 3,500 scfm each. The replacement of the enclosed flares with the two 4,000 scfm utility flares coupled with the existing 3,500 scfm John Zink utility flare and the 2,500 scfm LFG Specialties utility flare will provide a combined design flow of the four utility flares of 14,000 scfm. Authorization to Construct is anticipated to be issued by the end of July 2013. The installation of the 4,000 scfm utility flares is anticipated to be completed shortly after permit issuance with operations of each unit by the end of third quarter

2013. Utility flares are better suited to handle the lower heating value gas at the Bridgeton Landfill resulting in less downtime of the control devices.

4. A natural gas line has been installed in the vicinity of the flare compound. It will be connected to the gas collection system if the lower heating value or hydrogen concentration drop below levels to effectively operate the landfill gas control devices.

5. The Bridgeton Landfill will be upgrading the landfill gas coolers at the east utility flare (2,500 scfm LFG Specialties) and at the flare compound in the near future. This improvement will result in additional vacuum available to the well field.

The improvements associated with the liquid conveyance system and the landfill gas control devices are essential to address methane migration at the facility. These efforts should result in a decrease in pressure within the landfill and improved landfill gas collection efficiencies within the south quarry. The liquid force main modification and the liquid treatment system will be submitted to the MDNR for review and approval. The landfill appreciates the continued support to address the SSE in a timely manner and appreciates an expedited review of these submittals.

Monitoring results of the nested gas and temporary monitoring probes have shown that methane is migrating through the weathered bedrock and additional controls are likely needed to address these exceedances. However, due to increased liquid generation associated with the SSE, the effectiveness of the recent improvements could not be determined. It is requested to further evaluate the zone of migration of the impacted gas monitoring and temporary monitoring probes with weekly water level readings and monitoring of the impacted probes to better delineate if methane is migrating through deeper zones. It is requested that this evaluation period be extended through the third quarter 2013. At that time a comprehensive corrective action plan will be submitted evaluating the impact of the recently-completed capping, other recent measures, and the proposed measures described above. During this period the landfill will continue to complete improvements to the liquid conveyance system in efforts to minimize liquids within the gas collection system.

5.0 CONTINUED MONITORING AND REPORTING

The Bridgeton Landfill will initiate weekly monitoring of all monitoring probes including the gas monitoring probes, sentry probes and temporary monitoring probes. The Bridgeton Landfill proposes that landfill gas corrective summary reports to be incorporated into the quarterly report and submitted by the 15th of each month following a calendar quarter. These reports will summarize all corrective action completed to address methane migration within the prior quarter and, if elevated levels persist, provide a corrective action plan to address the methane exceedances.

Bridgeton Landfill understands that the submittal of quarterly landfill gas corrective action summary reports and corrective action plans is at a higher frequency than outlined in Paragraph 4 of the January 17, 2011 Settlement Agreement between the MDNR and the Bridgeton Landfill but believes that incorporation in the quarterly report is valuable.

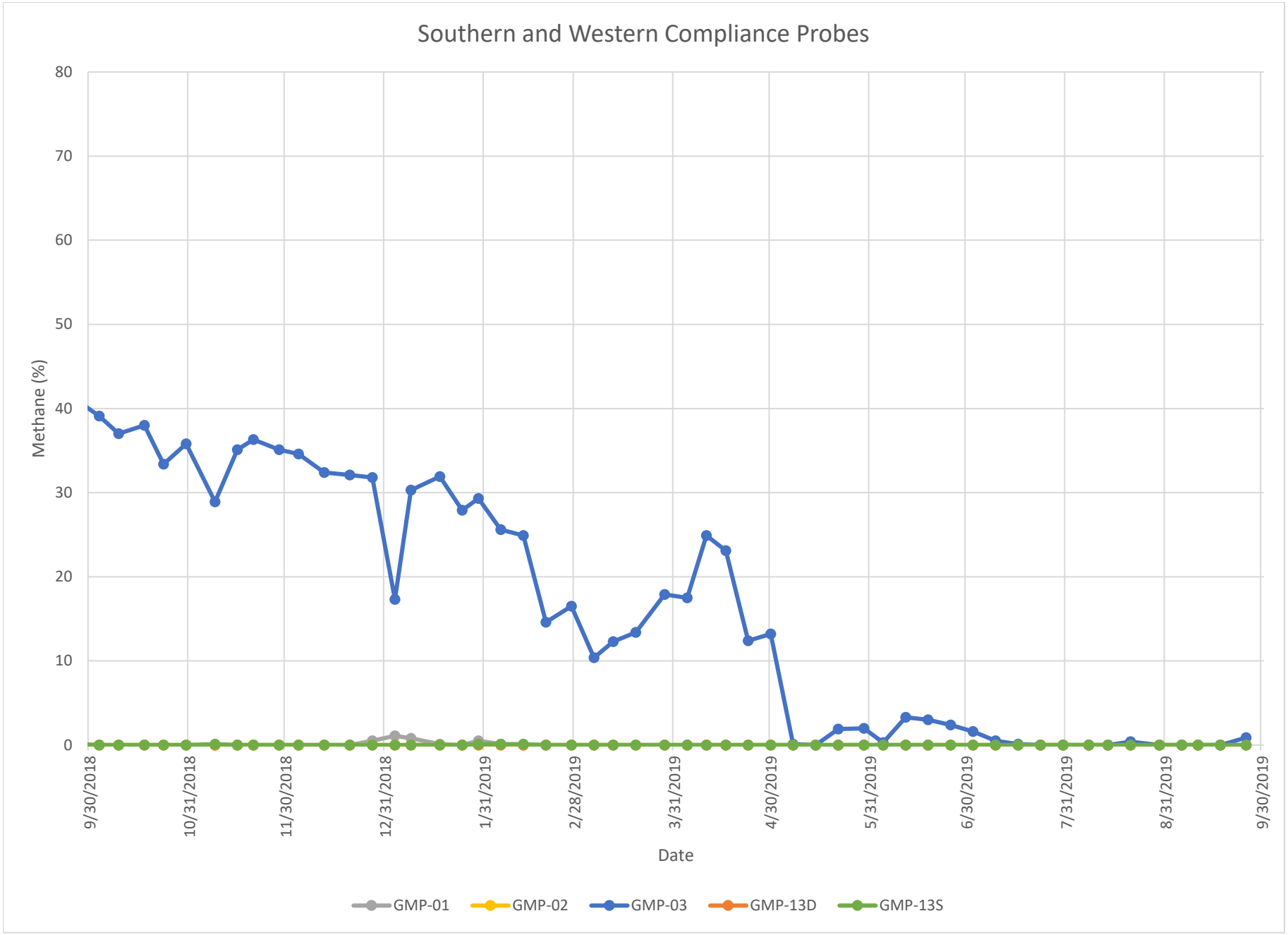
This section of the report will include at a minimum a review previous data, evaluate effectiveness of efforts made to control migration, and propose additional measures directed at eliminating detection levels in gas monitoring probes. As a regular procedure, these reports will be submitted by the 15th of each month following a calendar quarter.

Bridgeton Landfill will continue to take aggressive action to control the impacts of the SSE, evaluate corrective measures to address methane migration within the weathered bedrock and improve gas collection within the limits of waste. Any major new gas migration control features needed--particularly those located outside the limit of waste--would be designed and sealed by a Missouri professional engineer and submitted to the MDNR for comment and approval.

The MDNR will continue to provide ongoing review, comment, and approval of actions as it deems necessary. This reporting process will continue until Bridgeton Landfill demonstrates uninterrupted compliance with the MDNR's methane regulations (all compliance gas monitoring probes less than 2.5% methane) for a period of one year.

APPENDIX B

GAS MONITORING PROBE METHANE LEVEL GRAPHS


Southern and Western Compliance Probes
Methane (%)
80
70
60
50
40
30
20
10
0
9/30/2018
10/31/2018
11/30/2018
12/31/2018
1/31/2019
2/28/2019
3/31/2019
4/30/2019
5/31/2019
6/30/2019
7/31/2019
8/31/2019
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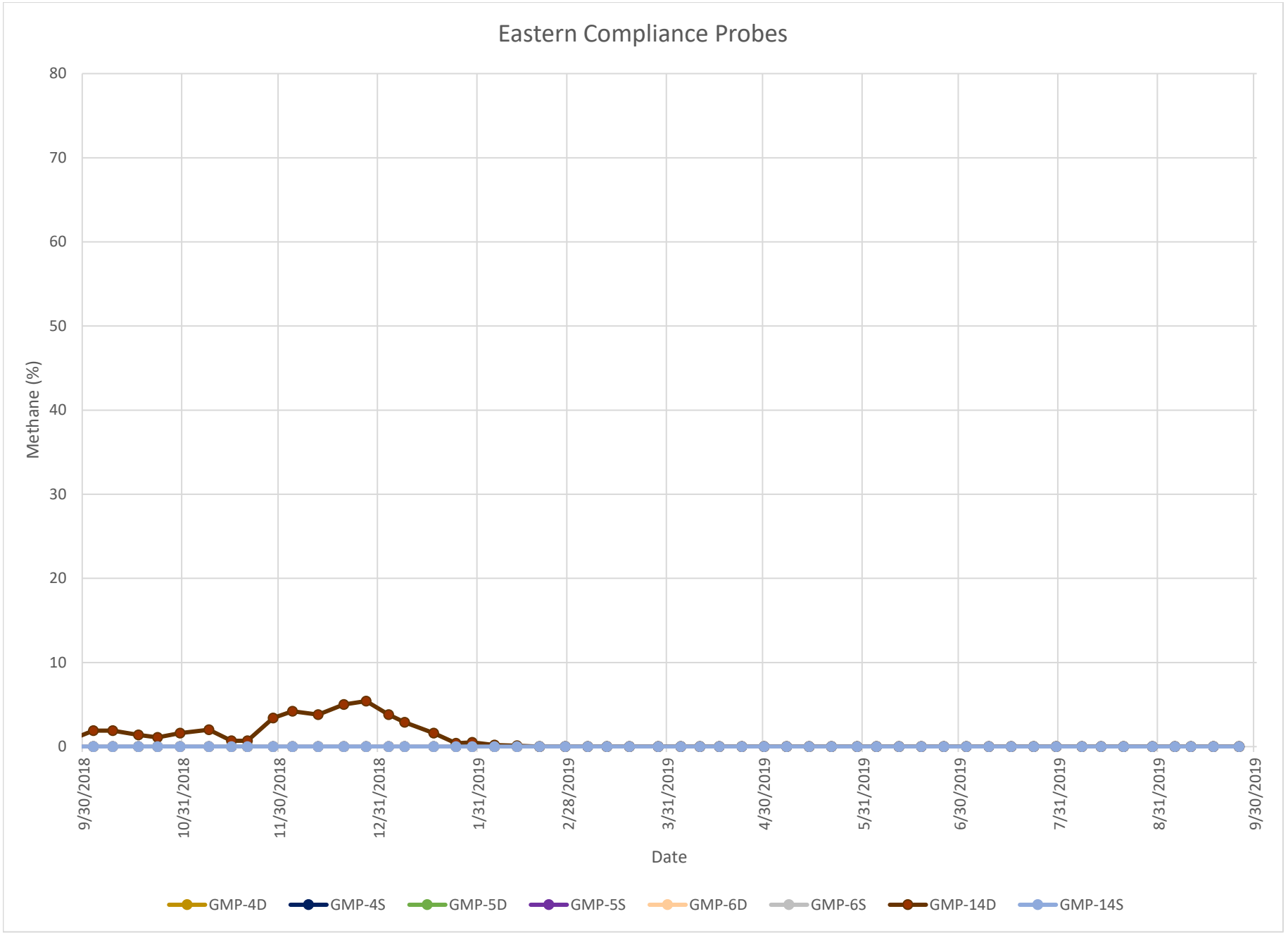
GMP-02
GMP-03
GMP-13D
GMP-13S


Eastern Compliance Probes
Methane (%)
80
70
60
50
40
30
20
10
0
9/30/2018
10/31/2018
11/30/2018
12/31/2018
1/31/2019
2/28/2019
3/31/2019
4/30/2019
5/31/2019
6/30/2019
7/31/2019
8/31/2019
9/30/2019
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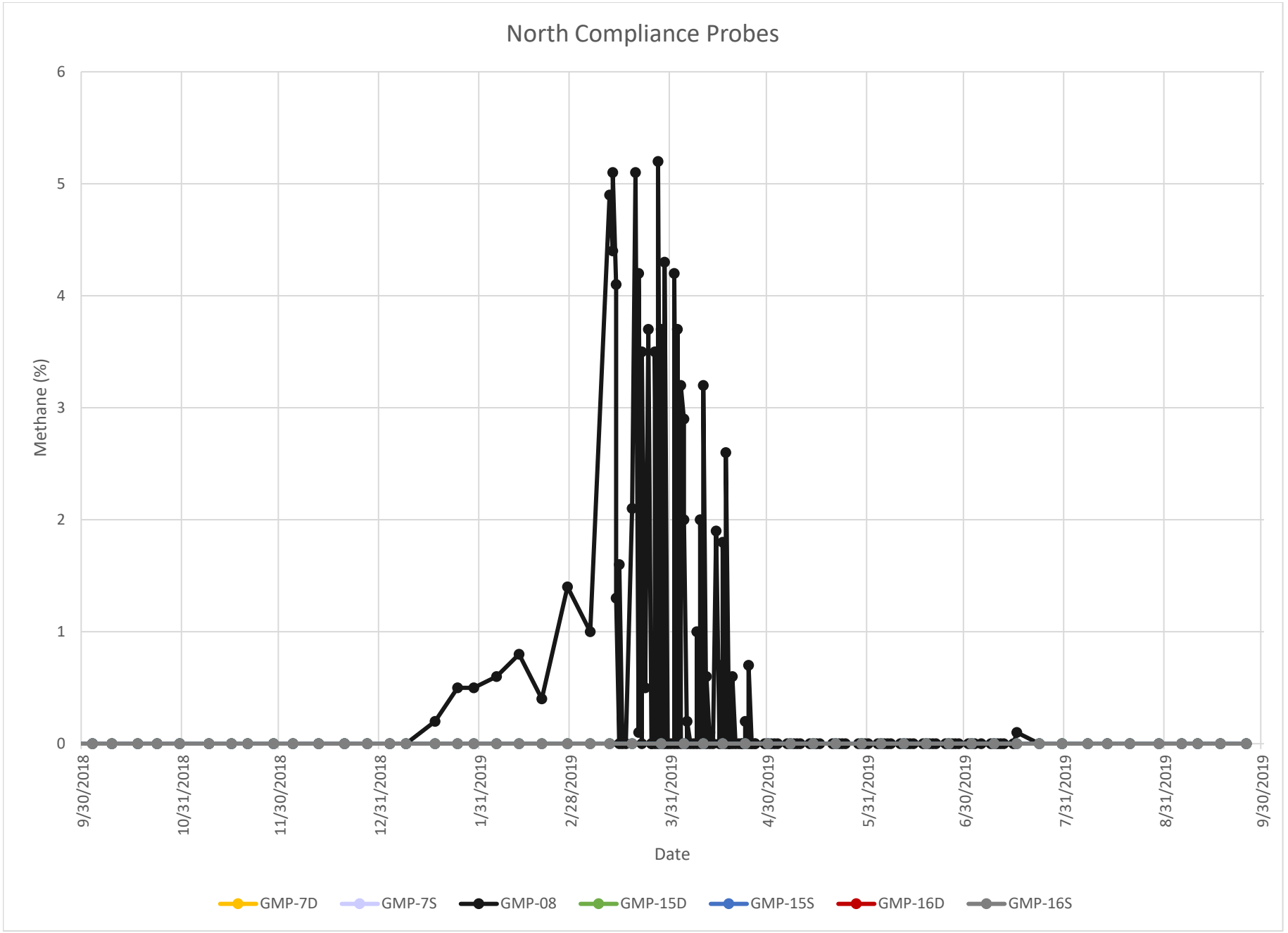
GMP-14S


North Compliance Probes
Methane (%)
6
5
4
3
2
1
0
9/30/2018
10/31/2018
11/30/2018
12/31/2018
1/31/2019
2/28/2019
3/31/2019
4/30/2019
5/31/2019
6/30/2019
7/31/2019
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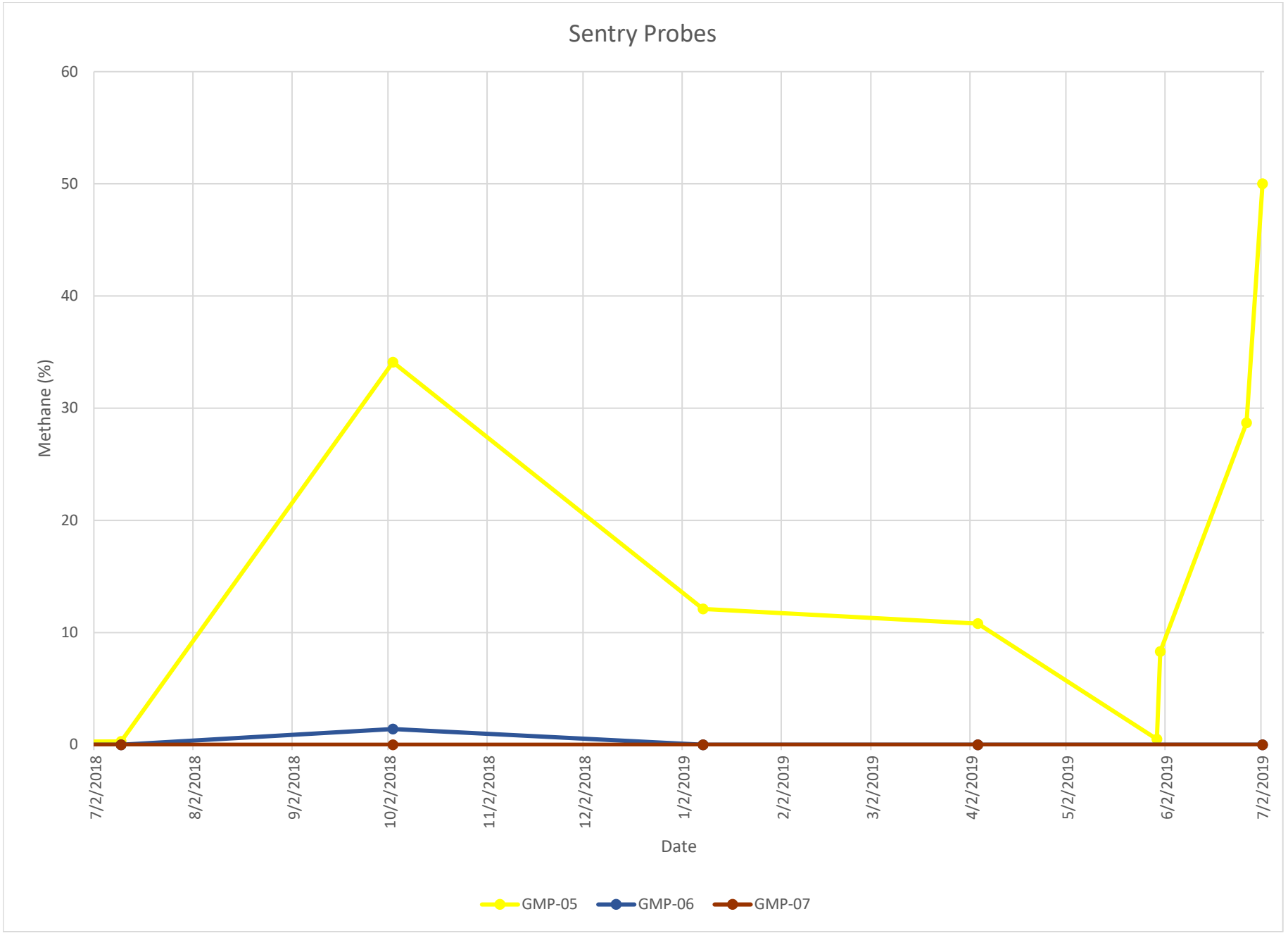
GMP-15S
GMP-16D
GMP-16S


Sentry Probes
60
50
40
30
20
10
0
Methane (%)
7/2/2018
8/2/2018
9/2/2018
10/2/2018
11/2/2018
12/2/2018
1/2/2019
2/2/2019
3/2/2019
4/2/2019
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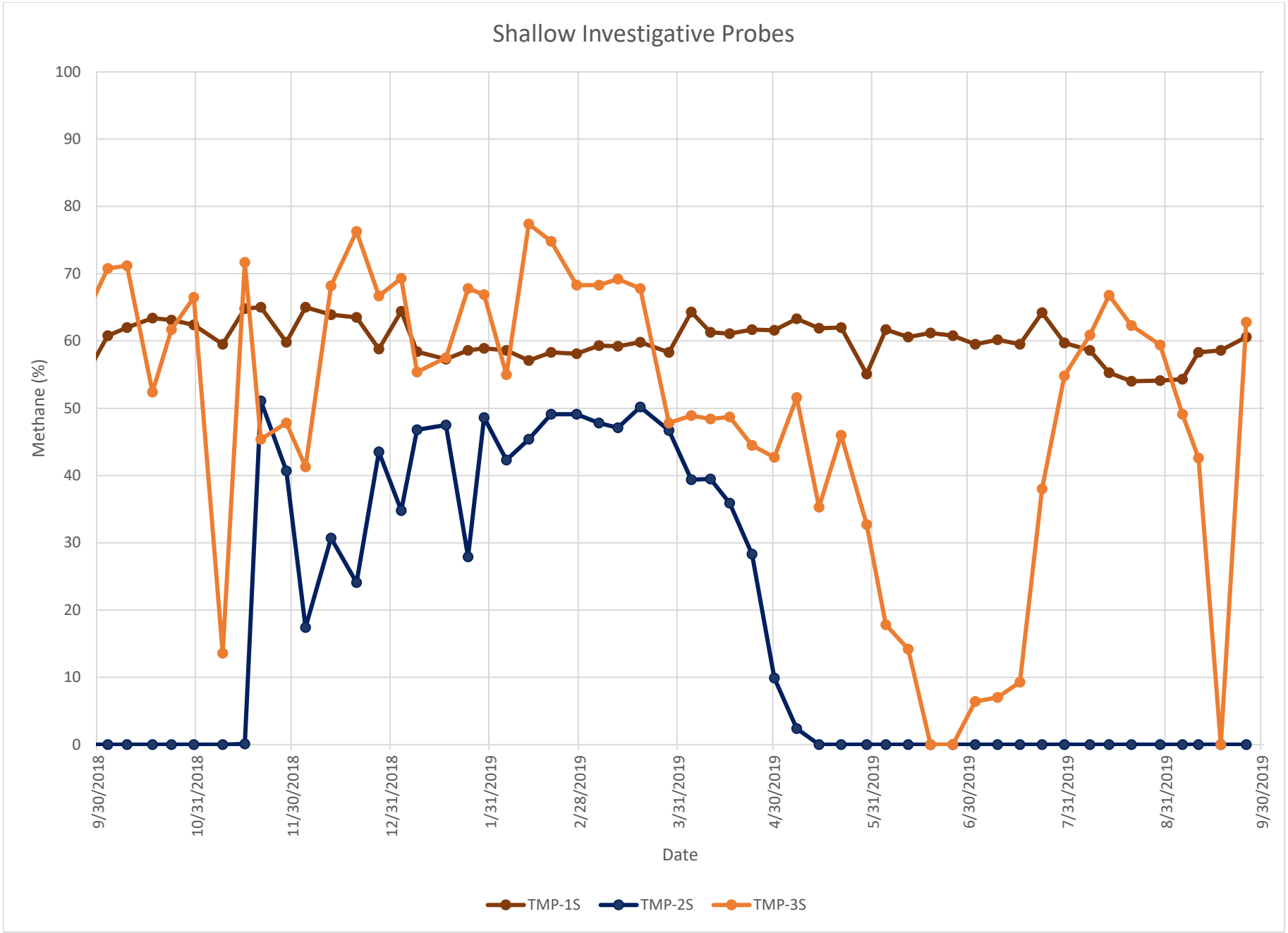
7/2/2019
Date
GMP-05
GMP-06
GMP-07


Shallow Investigative Probes
Methane (%)
100
90
80
70
60
50
40
30
20
10
0
9/30/2018
10/31/2018
11/30/2018
12/31/2018
1/31/2019
2/28/2019
3/31/2019
4/30/2019
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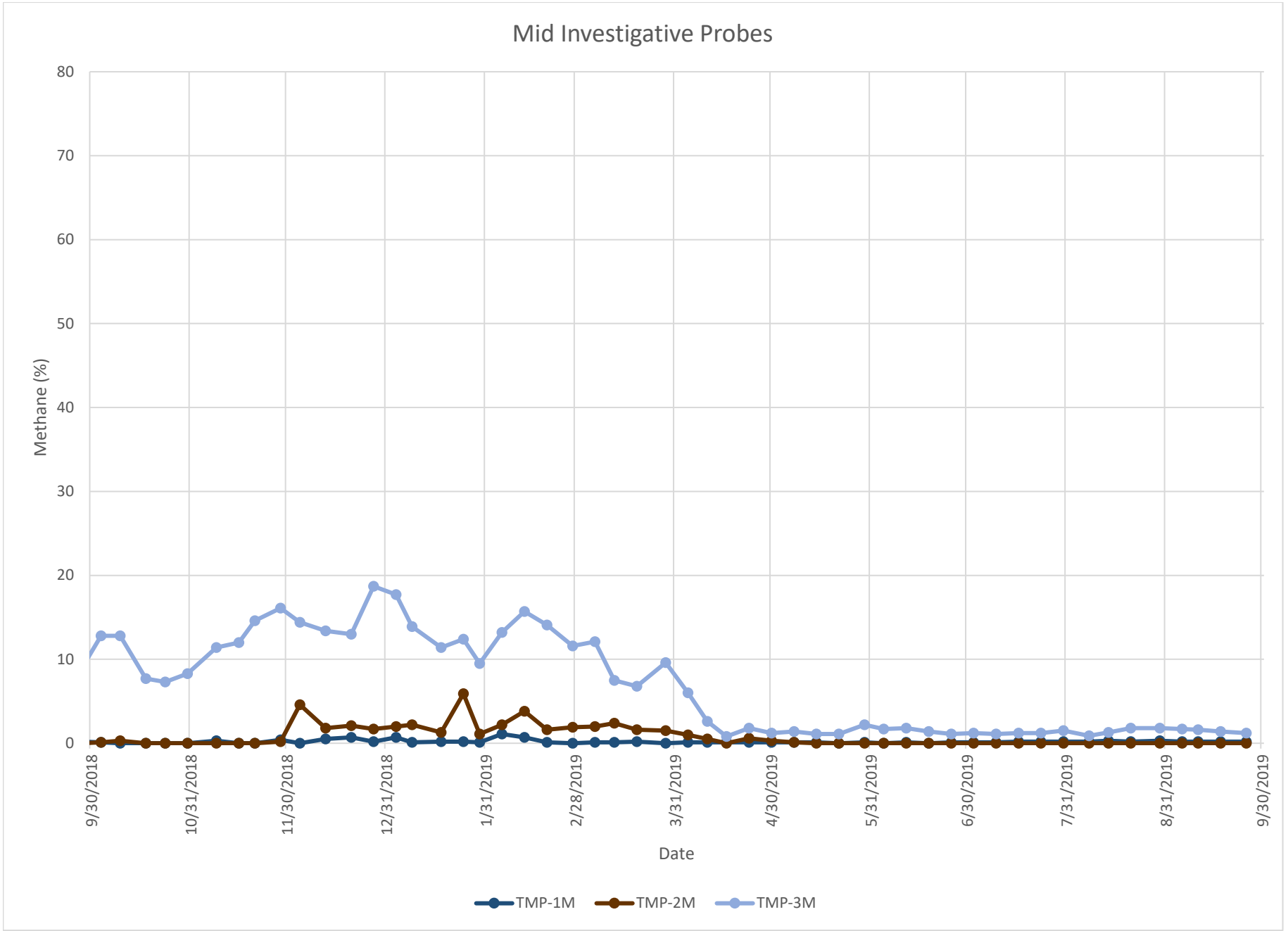
TMP-1S
TMP-2S
TMP-3S


Mid Investigative Probes
Methane (%)
80
70
60
50
40
30
20
10
0
9/30/2018
10/31/2018
11/30/2018
12/31/2018
1/31/2019
2/28/2019
3/31/2019
4/30/2019
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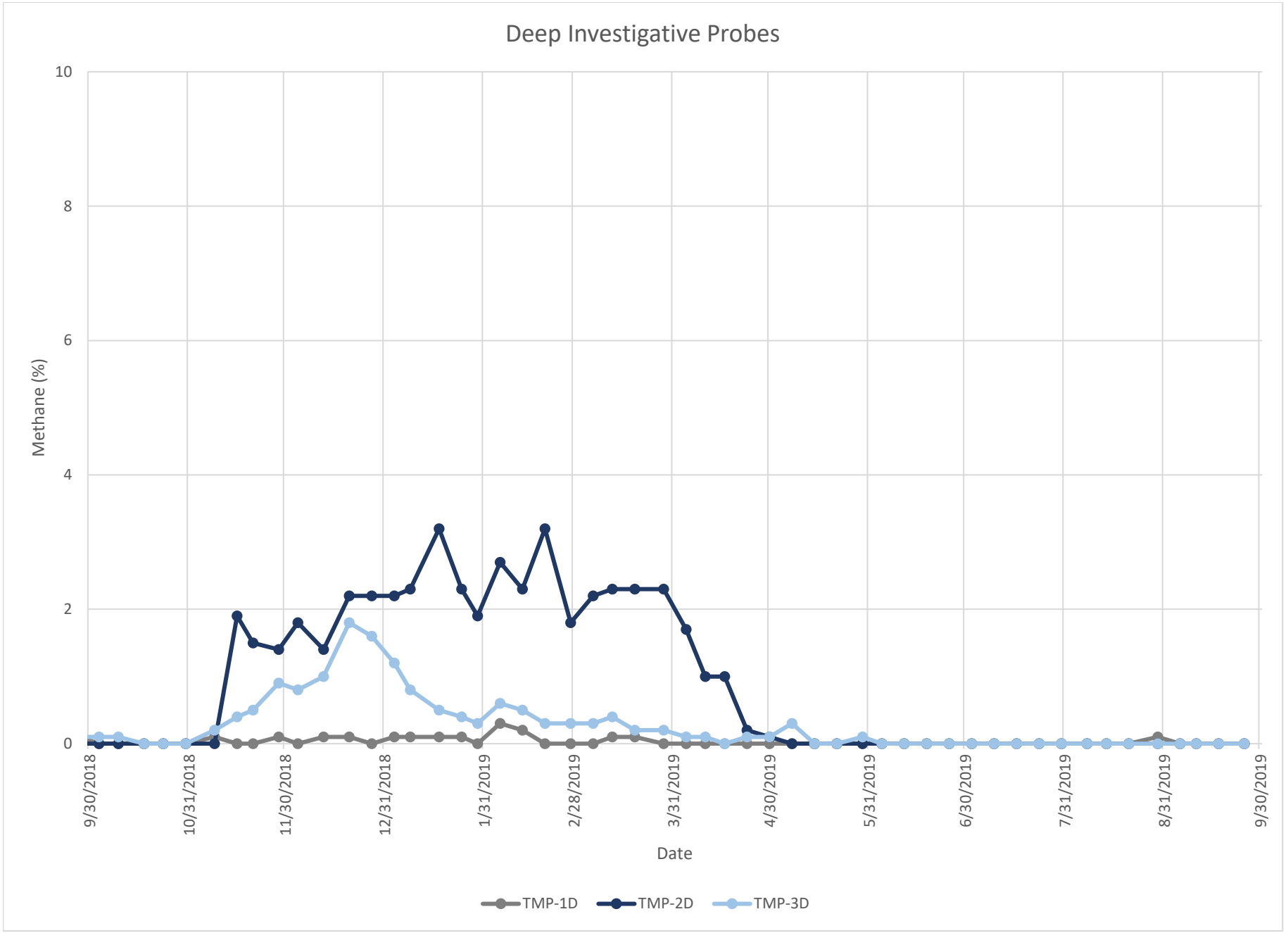
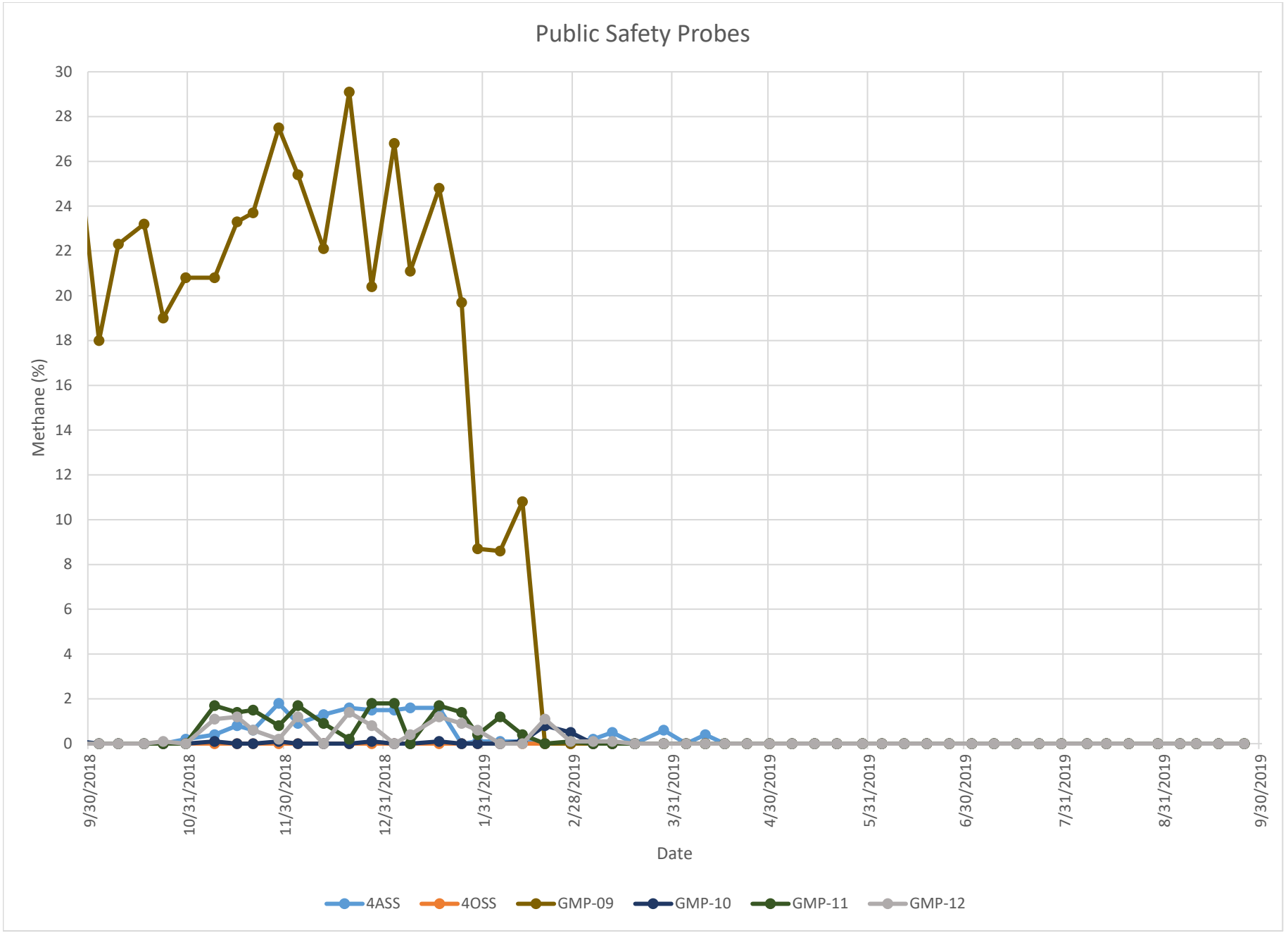
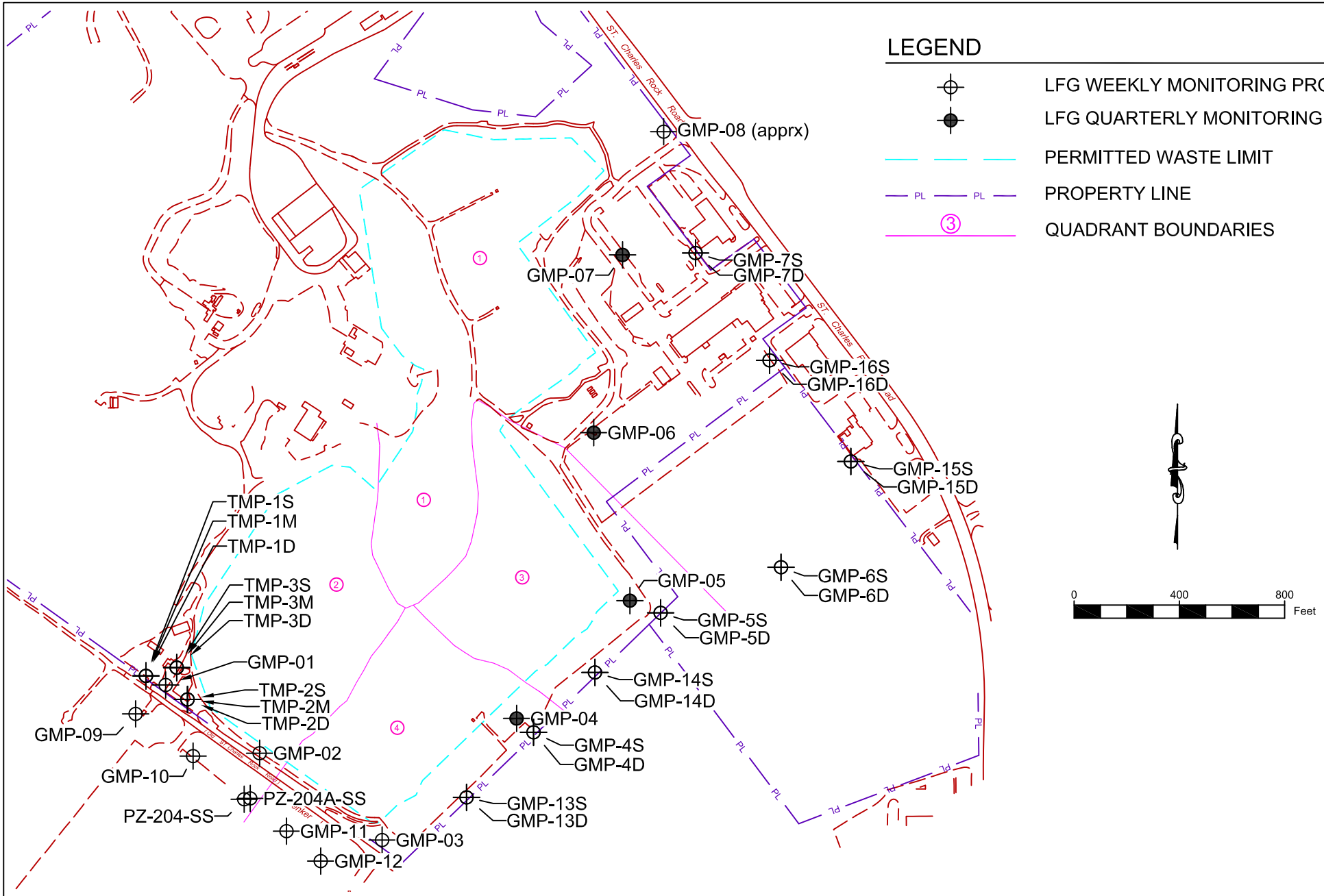
TMP-1M
TMP-2M
TMP-3M


Deep Investigative Probes
10
8
6
4
2
0
Methane (%)
9/30/2018
10/31/2018
11/30/2018
12/31/2018
1/31/2019
2/28/2019
3/31/2019
4/30/2019
5/31/2019
6/30/2019
7/31/2019
8/31/2019
9/30/2019
Date
TMP-1D
TMP-2D
TMP-3D


Public Safety Probes
Methane (%)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
9/30/2018
10/31/2018
11/30/2018
12/31/2018
1/31/2019
2/28/2019
3/31/2019
4/30/2019
5/31/2019
6/30/2019
7/31/2019
8/31/2019
9/30/2019
Date
4ASS
4OSS
GMP-09
GMP-10
GMP-11
GMP-12

APPENDIX C

INFRASTRUCTURE SITE PLAN, GAS MONITORING PROBE LOCATIONS



BRIDGETON LANDFILL LLC
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MISSOURI 63044

BRIDGETON LANDFILL
SITE INFRASTRUCTURE

GAS MONITORING PROBES

PROJECT NUMBER: BT-133

FILE PATH: BT-024\Corrective Action Plan Updates\2014 October\3 - Appendices\Appendix C\Drawing\gas Monitoring System 2nd Quarter 2014.dwg

Engineering for a Better World
FEEZOR ENGINEERING, INC.

JULY 2019
DESIGNED BY: PML
APPROVED BY: DRF

REVISION	DATE

DRAWING NO.:
001

APPENDIX D

2019 GCCS IMPROVEMENTS

AS-BUILT RECORD DRAWINGS FOR THE

BRIDGETON LANDFILL
2019 GCCS INSTALLATION

SEPTEMBER 2019
PREPARED FOR:

Bridgeton Landfill, LLC

13570 ST. CHARLES ROCK ROAD
BRIDGETON, MISSOURI 63044

LOCATION MAP

N

INDEX OF DRAWINGS	
	TITLE PAGE
001	GCCS PLAN VIEW
002	DETAILS

Engineering for a Better World
FEEZOR ENGINEERING, INC.

3377 HOLLENBERG DRIVE
BRIDGETON, MO 63044
TEL. (217) 483-3118

STATE OF MISSOURI
DANIEL RICHARD FEEZOR
NUMBER PE-030292
PROFESSIONAL ENGINEER
9-26-19

LEGEND

	SOLID WASTE BOUNDARY
Q	QUARRY WALL
GEW-38	GAS EXTRACTION WELL
PEW-20	PERIMETER GAS EXTRACTION WELL
SEW-63	SURFACE EXTRACTION WELL
CT-1	CONDENSATE SUMP
PEW-20	PERIMETER GAS EXTRACTION WELL
GIW-1	GAS INTERCEPTOR WELL
GIW-4	GAS INTERCEPTOR WELL/HEAT EXTRACTION POINT
GEW-38(S)	GAS EXTRACTION WELL WITH 4" STINGER
GEW-38	2019 GAS EXTRACTION WELL
4G 4G	4" ABOVE GROUND LFG COLLECTION LATERAL PIPING
6G 6G	6" ABOVE GROUND LFG COLLECTION LATERAL PIPING

0 60 120 Feet

NOTES:
- *AERIAL TOPOGRAPHY PROVIDED BY COOPER AERIAL SURVEYS CO. AND IS DATED DECEMBER 12, 2018*

DANIEL RICHARD FEEZOR
PE-030292

STATE OF MISSOURI · DANIEL RICHARD FEEZOR · NUMBER PE-030292 · PROFESSIONAL ENGINEER

PREPARED BY
Engineering for a Better World
FEEZOR ENGINEERING, INC.
3377 Hollenberg Dr, Bridgeton, MO 63044, Ph: 217-483-3118
Missouri State Certificate Of Authority #: E-2009012211

PROJECT
BRIDGETON LANDFILL
2019 GCCS INSTALLATION
BRIDGETON, ST. LOUIS COUNTY, MO

PREPARED FOR
BRIDGETON LANDFILL, LLC.
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MISSOURI 63044

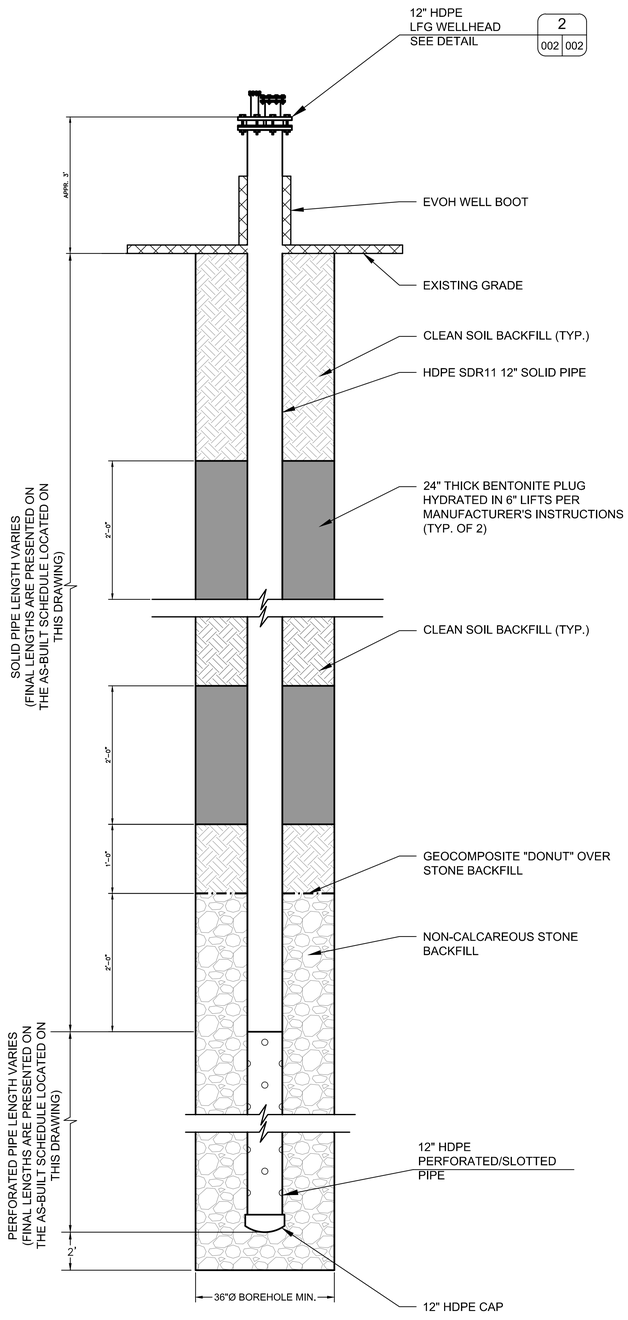
SEPTEMBER 2019
DESIGNED BY: AMR
APPROVED BY: DRF

DRAWING #
001

REVISIONS:	DATE	DSN.	APV.

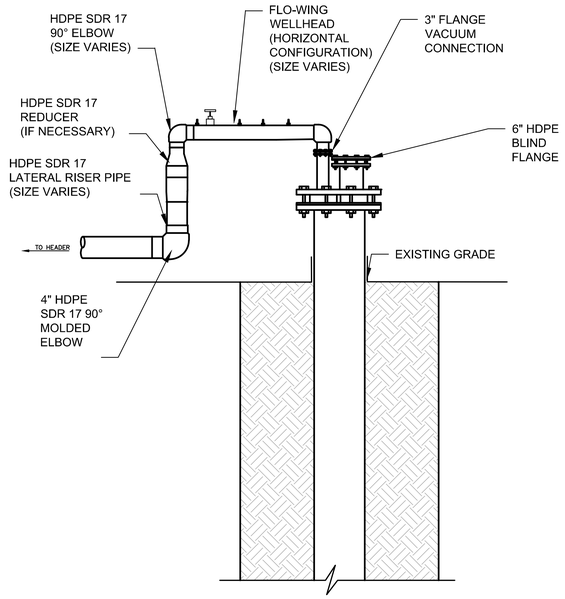
DRAWING TITLE
2019 GCCS PLAN VIEW

PROJECT NUMBER: BT-143-19 FILE PATH: C:\Users\ardan\Dropbox (Feezor Engineering)\Bridgeton\100-149\BT-143 (2017 Gas Well)\2019\1-Report\1 • Appendices\C • Drawings



LFG EXTRACTION WELL DETAIL 1
001 002

NOT TO SCALE



GEW WELLHEAD DETAIL 2
002 002

NOT TO SCALE

NOTES:

1. CONTRACTOR WILL INSTALL BRIDGETON LANDFILL TYPICAL WELLHEAD.

2019 GCCS AS-BUILT WELL SCHEDULE

WELL ID	Northing	Easting	As-Built Survey	Db Boring Depth	Solid Pipe Above Grade	Solid Pipe Below Grade	Dp Perforated Pipe	Thickness of Gravel Pack
			(Feet MSL)	(Feet)	(Feet)	(Feet)	(Feet)	(Feet)
GEW-232	1,067,533.5	515,882.1	477.77	70	2.90	20	48	52
GEW-233	1,067,180.0	515,519.7	470.58	54	2.56	20	30	36
GEW-234	1,066,943.3	515,522.6	481.17	89	1.67	15	70	76
GEW-235	1,066,832.7	515,508.1	479.66	85	2.74	20	60	67
GEW-236	1,067,086.7	515,764.6	497.71	93	2.25	20	70	75
GEW-237	1,067,232.5	516,794.7	498.01	85	2.95	20	60	67
GEW-238	1,067,455.3	515,763.4	483.35	85	1.96	20	60	67
GEW-239	1,067,517.5	516,377.1	485.66	82	2.51	20	60	66
GEW-240	1,066,987.7	516,082.9	502.35	92	1.59	20	70	74

NOTES:

- *AERIAL TOPOGRAPHY PROVIDED BY COOPER AERIAL SURVEYS CO. AND IS DATED DECEMBER 12, 2018*

DANIEL RICHARD FEEZOR
PE-030292

STATE OF MISSOURI
DANIEL RICHARD FEEZOR
NUMBER PE-030292
PROFESSIONAL ENGINEER
9/12/19

PREPARED BY
Engineering for a Better World
FEEZOR ENGINEERING, INC.
3377 Hollenberg Dr, Bridgeton, MO 63044, Ph: 217-483-3118
Missouri State Certificate Of Authority #: E-2009122211

PROJECT
BRDIGETON LANDFILL
2019 GCCS INSTALLATION
BRIDGETON, ST. LOUIS COUNTY, MO

PREPARED FOR
BRIDGETON LANDFILL, LLC,
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MISSOURI 63044

SEPTEMBER 2019
DESIGNED BY: AMR
APPROVED BY: DRF

DRAWING # 002

REVISIONS:	DATE	DSN.	APV.

DRAWING TITLE
GCCS DETAILS

PROJECT NUMBER: BT-143-19 | FILE PATH: C:\Users\amr\Dropbox (Feezor Engineering)\Bridgeton\100-149\BT-143 (2017 Gas Wells)\2019\E - Report\1 = Appendices\C - Drawings

APPENDIX E

GMP-8 LANDFILL GAS CORRECTIVE ACTION PLAN

APPENDIX E.1

GMP-8 LANDFILL GAS CORRECTIVE ACTION PLAN

SUBMITTIAL TO MDNR

MARCH 26, 2019

March 26, 2019

Mr. Chris Nagel
Missouri Department of Natural Resources
Solid Waste Management Program
1730 East Elm Street
Jefferson City, Missouri 65101

Re: Landfill Gas Corrective Action Plan – GMP-8
Bridgeton Landfill, Bridgeton, Missouri
Permit No. 0118912

Dear Mr. Nagel:

Bridgeton Landfill LLC is pleased to submit this Landfill Gas Corrective Action Plan (LCAP) associated with GMP-8 located near the northeast corner of the property. This is likely the result of the extension of the north quarry Ethylene Vinyl Alcohol (EVOH) Cap completed in August 2018.

The initial methane exceedance at GMP-8 occurred on March 12, 2019 and has been intermittent since this date. Corrective measures completed to date have focused on fine wellfield tuning and pump maintenance. Although the methane is intermittent, the Bridgeton Landfill is moving forward with additional gas control measures to address this exceedance.

As discussed with you on March 22, 2019 during the site visit, the Bridgeton Landfill is proposing a three-step, phased approach to improving landfill gas (LFG) collection within this area of the landfill as follows:

1. Installation of a surface gas collector beneath the EVOH cap. Drawing 1 outlines the proposed location of the surface gas collector and detail. The underlying perforated rectangular collector combined with a 4-inch HDPE perforated pipe will provide the pathway for gas collection. Per our conversation, the Bridgeton Landfill will move forward with this installation and the construction is anticipated to be complete within one week.
2. If Option 1 above is not effective at lowering the methane level at GMP-8 below the regulatory limit, the Bridgeton Landfill will install a LFG collector trench. Drawing 2 outlines the preliminary location and supporting details of the collection trench. As shown, the trench will be approximately five feet in depth with the lower two feet consisting of a 6-inch HDPE perforated pipe and stone backfill for LFG collection. If methane above the regulatory limit is present at GMP-8 one month after the installation of the surface gas collector outlined in Task 1 above, the Bridgeton Landfill will proceed with construction of the LFG collector trench. It is anticipated the trench will take approximately one week to construct.

3. If Option 2 above is not effective at lowering the methane level at GMP-8 below the regulatory limit, the Bridgeton Landfill will install a LFG extraction well in the vicinity of the proposed LFG collector trench outline in Task 2 above. Drawing 3 outlines the preliminary location of the gas extraction well and supporting details. The shallow gas extraction well proposes 12 feet of solid piping below the surface to collect the shallow methane migration and maximize the perforated piping. If needed for gas control, this gas extraction well would be installed during the scheduled gas system expansion event slated to begin June 1, 2019.

All three options outlined above are focused to address the methane migration observed at GMP-8. The above options are all within the EVOH capped area; however, LFG production has gradually lessened as the waste stabilizes resulting in lower LFG collected in this area of the landfill. These additional gas controls, as outlined above, need operational flexibility in order to minimize air intrusion. Attached is a proposed alternative to the standard operating procedures as outlined in 40 CFR Part 60 Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills) and 10 CSR 10-5.490, Municipal Solid Waste Landfills. Obtaining an alternative prior to installation of these collection points to allow operational flexibility would be greatly appreciated.

This LCAP is being submitted to propose corrective measures to mitigate the methane gas within the northeast area of the landfill to satisfy 10 CSR 80-3.010(14)(C) and (D) and as outlined in the MDNR-WMP's Methane Gas Policy dated May 2017. The Bridgeton Landfill is committed to addressing methane migration at the landfill and believes the corrective measures outlined above are the essential steps to developing and implementing an effective corrective action plan to address the recent exceedances observed at GMP-8. We greatly appreciate you working with the Bridgeton Landfill to address the elevated methane in a timely manner.

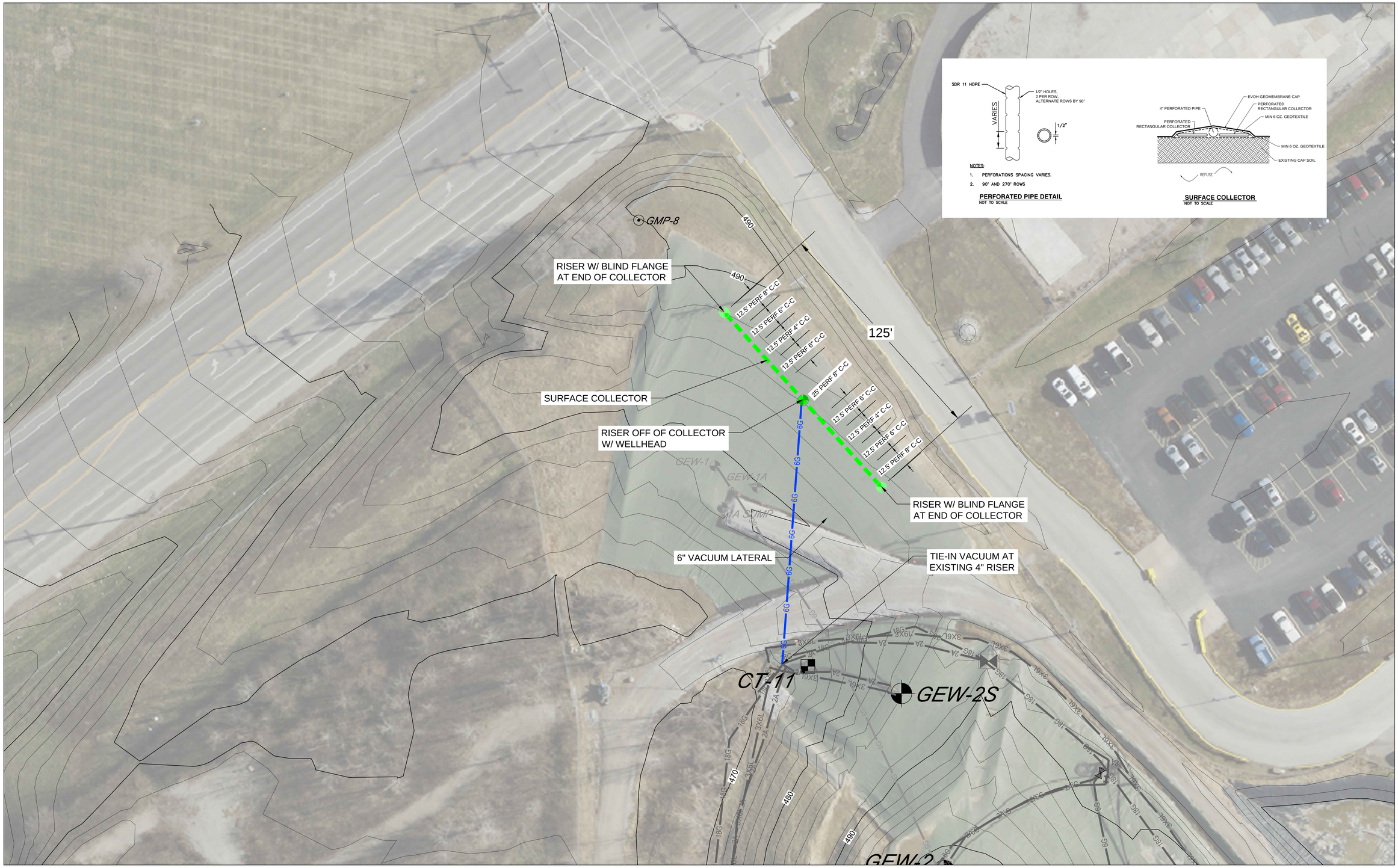
Thank you very much for your time, and please do not hesitate to contact me at (209) 227-9531 or efanning@republicservies.com.

Kindest regards,

Erin Fanning
Division Manager

cc: Mark Milward, Saint Louis County Department of Public Health

Attachments:
Option 1 – Surface gas collector Drawing
Option 2 – Preliminary Collector Trench Drawing
Option 3 – Preliminary Gas Extraction Well Drawing
NSPS Standard Operating Procedure Alternative



0 10 20 40 Feet
1:240

LEGEND

- 500 — QUARRY BOTTOM TOPOGRAPHY (10' CONTOUR) (APPROXIMATE)
- 12/12/19 AERIAL GRADING (2' CONTOUR)
- 500 — 12/12/19 AERIAL GRADING (10' CONTOUR)
- GMP-8 — GAS MONITORING PROBE
- GEW-2 — GAS EXTRACTION WELL
- GEW-1 — PREVIOUSLY ABANDONED EXTRACTION POINT
- PROPOSED SURFACE COLLECTOR
- PROPOSED SURFACE COLLECTOR RISER STUB
- PROPOSED SURFACE COLLECTOR CLEANOUT
- 6G — 6G — 6G — PROPOSED 6" VACUUM LATERAL

PRELIMINARY

DETAILS DEPICTED ARE CONCEPTUAL IN NATURE. AS-CONSTRUCTED DETAILS WILL BE PRESENTED IN RECORD DRAWINGS.

DANIEL RICHARD FEEZOR
PE-030292
DANIEL RICHARD FEEZOR NUMBER E-30292 STATE OF MISSOURI PROFESSIONAL ENGINEER
3-26-19

PREPARED BY
Engineering for a Better World
FEEZOR ENGINEERING, INC.
3377 Hollenberg Dr, Bridgeton, MO 63044, Ph: 217-483-3118
Missouri State Certificate Of Authority #: E-2009122111

PROJECT
BRIDGETON LANDFILL
GMP-8
BRIDGETON, ST. LOUIS COUNTY, MISSOURI

PREPARED FOR
BRIDGETON LANDFILL LLC
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MO 63044

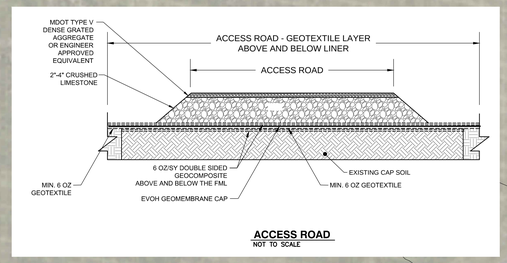
MARCH 2019
DESIGNED BY: BJV
APPROVED BY: DRF

DRAWING #
1

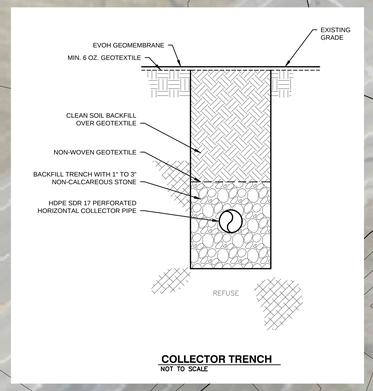
REVISIONS:	DATE	DSN.	APV.
#:	--/--/--	---	---

DRAWING TITLE
OPTION 1 - SURFACE COLLECTOR

PROJECT NUMBER: BT-133 | FILE PATH: D:\Dropbox (Feezor Engineering)\Bridgeton\100-149\BT-133 LFG\BT-133 2019\GMP-8 Profile\GMP-8 Option 1



ACCESS ROAD
NOT TO SCALE



COLLECTOR TRENCH
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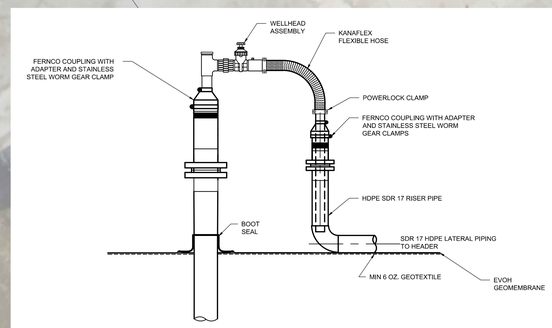
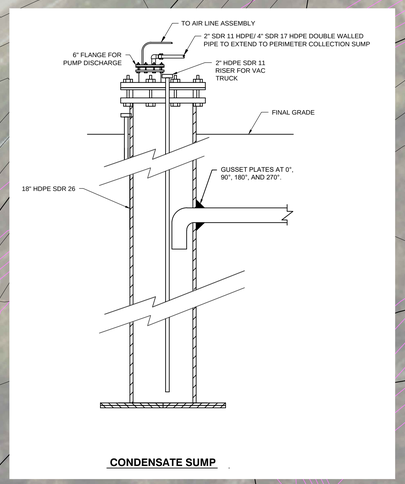


WELLHEAD
NOT TO SCALE



CONDENSATE SUMP

COLLECTOR TRENCH

INSTALL GAS EXTRACTION AT HIGH END OF TRENCH

OPTION 1 SURFACE COLLECTOR

INSTALL SUMP AT LOW END OF TRENCH

TIE-IN AIR AND FORCEMAIN

GMP-8

CT-11

GEW-2S

GEW-2

GEW-1

GEW-A

4A SDMP

0 10 20 40 Feet
1:240

LEGEND

- 500 — QUARRY BOTTOM TOPOGRAPHY (10' CONTOUR) (APPROXIMATE)
- 12/12/19 AERIAL GRADING (2' CONTOUR)
- 500 — 12/12/19 AERIAL GRADING (10' CONTOUR)
- GMP-8 — GAS MONITORING PROBE
- GEW-2 — GAS EXTRACTION WELL
- GEW-1 — PREVIOUSLY ABANDONED EXTRACTION POINT
- COLLECTOR TRENCH
- PROPOSED EXTRACTION POINT
- 6G 6G 6G — PROPOSED 6" VACUUM LATERAL
- 2A 2A 2A — PROPOSED 2" AIRLINE
- 3X6L 3X6L — PROPOSED 3" x 6" FORCEMAIN

PRELIMINARY

DETAILS DEPICTED ARE CONCEPTUAL IN NATURE. AS-CONSTRUCTED DETAILS WILL BE PRESENTED IN RECORD DRAWINGS.

DANIEL RICHARD FEEZOR
PE-030292
STATE OF MISSOURI · DANIEL RICHARD FEEZOR · NUMBER E-30292 · REGISTERED PROFESSIONAL ENGINEER
3-26-19

PREPARED BY
FEEZOR ENGINEERING, INC.
Engineering for a Better World
3377 Hollenberg Dr, Bridgeton, MO 63044. Ph: 217-483-3118
Missouri State Certificate Of Authority #: E-2009122111

PROJECT
BRIDGETON LANDFILL
GMP-8
BRIDGETON, ST. LOUIS COUNTY, MISSOURI

PREPARED FOR
BRIDGETON LANDFILL LLC
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MO 63044

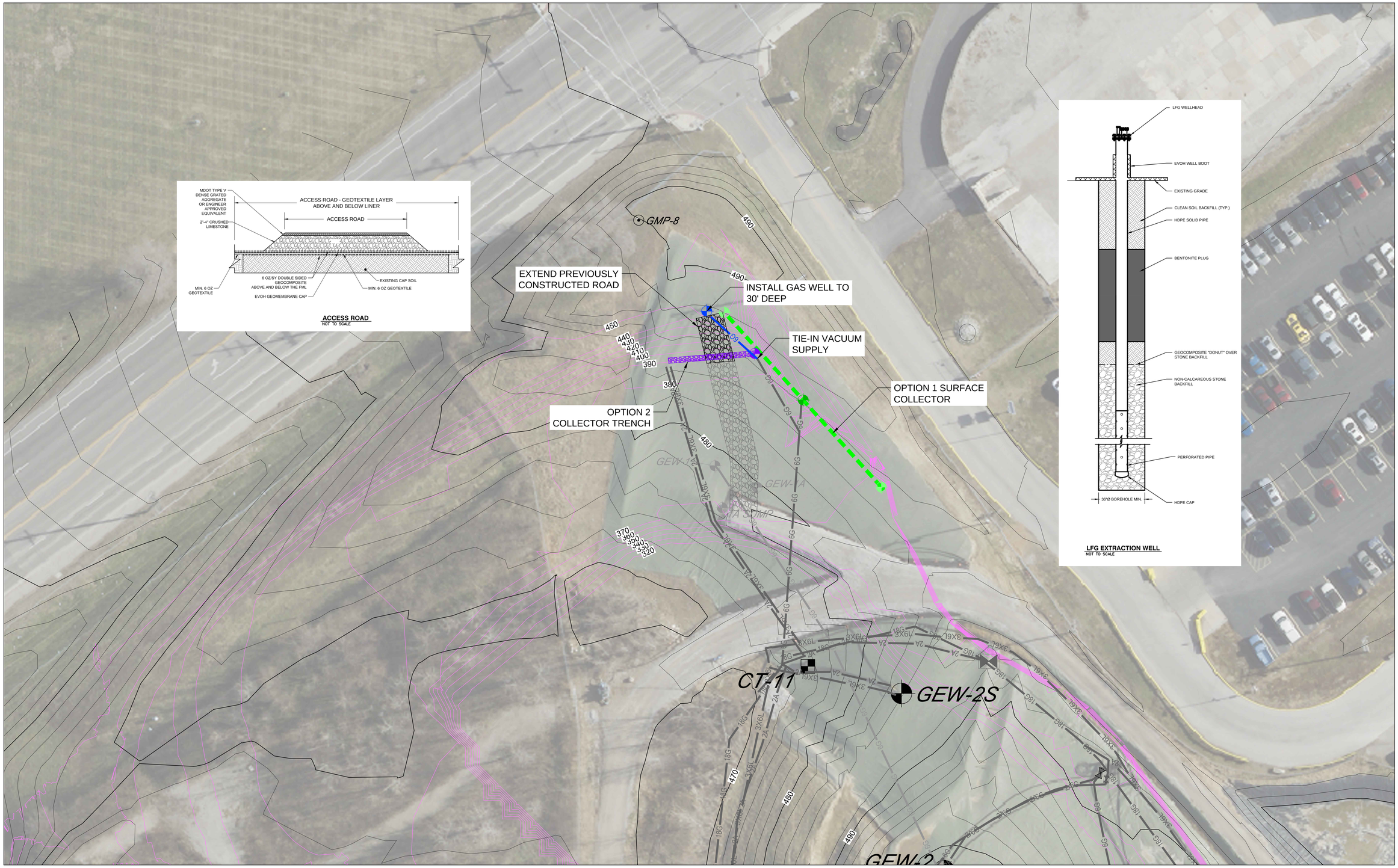
MARCH 2019
DESIGNED BY: BJV
APPROVED BY: DRF

DRAWING #
2

REVISIONS:	DATE	DSN	APV.
#:	--/--/--	---	---

DRAWING TITLE
OPTION 2 - COLLECTOR TRENCH

PROJECT NUMBER: AA-000 | FILE PATH: O:\Dropbox (Feezor Engineering)\Bridgeton\100-149\BT-133 LFG\BT-133 2019\GMP-8 Profile\GMP-8 Option 2



ACCESS ROAD
NOT TO SCALE

LFG EXTRACTION WELL
NOT TO SCALE

0 10 20 40 Feet
1:240

LEGEND

- 500 — QUARRY BOTTOM TOPOGRAPHY (10' CONTOUR) (APPROXIMATE)
- 12/12/19 AERIAL GRADING (2' CONTOUR)
- 500 — 12/12/19 AERIAL GRADING (10' CONTOUR)
- GMP-8 — GAS MONITORING PROBE
- GEW-2 — GAS EXTRACTION WELL
- GEW-1 — PREVIOUSLY ABANDONED EXTRACTION POINT
- PROPOSED 6" VACUUM LATERAL
- PROPOSED GAS EXTRACTION WELL

PRELIMINARY

DETAILS DEPICTED ARE CONCEPTUAL IN NATURE. AS-CONSTRUCTED DETAILS WILL BE PRESENTED IN RECORD DRAWINGS.

DANIEL RICHARD FEEZOR
PE-030292
STATE OF MISSOURI — DANIEL RICHARD FEEZOR — NUMBER E-30292 — REGISTERED PROFESSIONAL ENGINEER
3-26-19

PREPARED BY
FEEZOR ENGINEERING, INC.
Engineering for a Better World
3377 Hollenberg Dr, Bridgeton, MO 63044, Ph: 217-483-3118
Missouri State Certificate Of Authority #: E-2009122111

PROJECT
BRIDGETON LANDFILL
GMP-8
BRIDGETON, ST. LOUIS COUNTY, MISSOURI

PREPARED FOR
BRIDGETON LANDFILL LLC
13570 ST. CHARLES ROCK ROAD
BRIDGETON, MO 63044

MARCH 2019
DESIGNED BY: BJV
APPROVED BY: DRF

DRAWING #
3

REVISIONS:	DATE	DSN.	APV.
#:	--/--/--	---	---

DRAWING TITLE
OPTION 3 - GAS EXTRACTION WELL

PROJECT NUMBER: AA-000 | FILE PATH: D:\Dropbox (Feezor Engineering)\Bridgeton\100-149\BT-133 LFG\BT-133 2019\GMP-8 Profile\GMP-8 Option 3

March 26, 2019

Jeremy Rogus
Air Pollution Control Program
St. Louis County Department of Public Health
4562 Lemay Ferry Rd.
St. Louis, Missouri 63129

Re: Gas Collection and Control System Design Plan Addendum
Standard Operating Procedure Alternative: North Quarry Shallow Gas Collectors
MO Part 70 / Title V Air Operating Permit No. OP2010-063
FIPs Identification: 189-0312
St. Louis County, Missouri

Dear Mr. Rogus:

Bridgeton Landfill, LLC, located in Bridgeton, Missouri, is a closed sanitary landfill that is subject to the control requirements outlined in 40 CFR Part 60 Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills) and 10 CSR 10-5.490, Municipal Solid Waste Landfills. As such, Bridgeton personnel perform frequent monitoring of the gas extraction system and other compliance points connected to the Gas Collection and Control System (GCCS) within the permitted waste boundary at a higher frequency as prescribed in §60.756 and 10 CSR 10-5.490.

On March 12, 2019, an elevated concentration of methane was observed at Gas Monitoring Probe GMP-8 located near the northeast corner of the Bridgeton Landfill. Upon detection of the elevated concentration of methane, Bridgeton Landfill began a comprehensive review of the infrastructure in the vicinity of GMP-8, including frequent monitoring of GMP-8 as well as additional monitoring and maintenance of associated infrastructure. Additional monitoring of GMP-8 and associated infrastructure initially identified the elevated concentration as a gas system malfunction, and continued monitoring has shown that methane detections in GMP-8 are intermittent. However, due to the presence but sporadic nature of elevated methane concentrations at GMP-8, the Bridgeton Landfill is evaluating landfill gas (LFG) control options in addition to the existing infrastructure to address methane migration. Based on preliminary investigations, shallow LFG collection will be effective at collecting the subliner LFG which is likely the source of the elevated methane concentrations observed at GMP-8.

Previous consideration had been given to installation of subliner collection during the preliminary design of the EVOH cap in this area; however, the intermittent nature of LFG in this area led to concerns of balancing surficial LFG collection with the potential for oxygen intrusion, thus subliner collection was not incorporated into the final approved design, and focus was placed on ensuring efficient, optimal collection of LFG utilizing existing LFG infrastructure. The installation of the EVOH in this area was completed in August 2018, and

there have been no methane exceedances at GMP-8 until March 2019, further supporting the concept that LFG in this area is intermittent.

The Bridgeton Landfill is proposing to the Missouri Department of Natural Resources' Waste Management Program (MDNR-WMP) and SLCDPH a three-step, phased approach to improve LFG collection within the northeastern area of the landfill. Each of these options proposes shallow LFG collection, which could promote the potential for oxygen intrusion. These options are as follows:

1. Installation of surface gas collector beneath the EVOH cap;
2. Installation of LFG collector trench; and
3. Installation of shallow gas extraction well.

The above options with corresponding drawings are outlined in the Landfill Gas Corrective Action Plan (LCAP) submitted to Chris Nagel, MDNR-WMP. At this time, the Bridgeton Landfill is moving forward with the installation of the surface gas collector. In the event that the surface gas collector beneath the EVOH is ineffective at controlling methane migration in this area of the landfill, Bridgeton Landfill will proceed with installation of the LFG collector trench. In the event that the surface gas collector and the LFG collector trench are ineffective at controlling methane migration in this area of the landfill, Bridgeton Landfill will proceed with installation of the shallow gas extraction well.

These proposed shallow gas collectors would be installed within the north quarry area which is more indicative of a closed landfill. In this area of the landfill, the LFG production has gradually lessened as the municipal solid waste stabilizes, resulting in lower LFG generated as evidenced by the gas collected within the LFG extraction wells in this area of the landfill. It is anticipated that these shallow gas collectors, due to the location in the north quarry as well as the design, will have limited LFG flow available for gas collection.

To allow flexibility in the operation of Gas Collection and Control System (GCCS) in areas where LFG generation has lessened, the Bridgeton Landfill requests an amendment to the Standard Operating Procedures outlined in the NSPS for the shallow gas collector. Per 40 CFR 60.753(b), (c) and (d) and 10 CSR 10-5.490(4) the Bridgeton Landfill is required to:

1. Operate the collection system with negative pressure at each wellhead except under certain conditions such as increased well temperature, when a geomembrane cap is installed and an acceptable pressure limit is specified in the GCCS design plan, or when a landfill fire is present;

2. Operate each wellhead with a LFG temperature less than 55 degrees Celsius (131 degrees Fahrenheit) and either a nitrogen level less than 20 percent or an oxygen concentration less than 5 percent by volume; and

3. Operate the GCCS so that the methane concentration at the surface of the landfill is less than 500 parts per million by volume (ppmv).

The first and third criteria listed above were included in NSPS in order to require landfill owners/operators to minimize fugitive emissions of LFG to the atmosphere. The second criteria listed above is based on historical LFG industry operations and maintenance guidelines aimed at reducing the potential for landfill fires or negatively affecting microbes involved in the anaerobic decomposition of the waste. High oxygen or nitrogen concentrations can occur due to operating the well field too aggressively, resulting in the potential for infiltration of ambient air through the cover soils.

Unfortunately, the Rule does not provide guidance on how to address an individual criterion when it has the potential to conflict with one of the other criteria. For example, in some situations it may not be possible to maintain compliance with both the vacuum and gas quality requirements of the NSPS. This is evident in the case of a low or diminishing LFG generation rate, when the application of even a small vacuum (i.e., -0.1 to -0.5 inches of water column (in-w.c.)) to a well or collector may cause the oxygen or nitrogen concentration to exceed the NSPS limit. This typically occurs because LFG is not being generated at a sufficient rate to allow for continuous extraction by the GCCS.

If the LFG generation rate is so low, applying vacuum typically will only degrade the gas quality (i.e., increase the oxygen/nitrogen content and/or reduce methane content). One approach to remedy this situation is to shut down the collection point for a period of time until gas quality improves and the oxygen concentration declines to below five percent or nitrogen concentration declines to below twenty percent. Once concentration is below this level, the collection point can be reopened and LFG extraction resumed. However, because this approach requires a non-negative pressure at the wellhead, this technique is not compliant with the NSPS.

The Bridgeton Landfill proposes an addendum to the standard operating procedure for the shallow gas collectors within the north quarry that experience poor quality gas despite the application of minimum vacuum (i.e., less than 0.5 inches water column.). The addendum is requested for shallow gas collectors within the north quarry associated with corrective measures to address methane migration at GMP-8.

For the shallow gas collector points at which methane levels are significantly below typical collection (less than 40 percent by volume) or oxygen/nitrogen exceedances are persistent and not the result of operations and/or maintenance issues, the wellhead valve will be adjusted to minimize vacuum. If after more than one hour of decreased vacuum the oxygen and/or nitrogen concentration does not decline to allowable levels or methane levels do not stabilize above 40 percent by volume, the wellhead will be shut off until the gas quality improves. Gas concentration and pressure will continue to be monitored and recorded during routine monitoring events in which the wells are shut off.

During routine monitoring, if a positive pressure is recorded, the shallow gas collector will be reopened to relieve any pressure and to purge the accumulated gas from the shallow gas collector. Additionally, during quad checks, if pillowing of the exposed EVOH is observed in the vicinity of a shallow gas collector, that shallow gas collector will be reopened to

relieve any pressure and to purge the accumulated gas from the shallow gas collector. If the gas quality has improved, the shallow gas collector will remain opened and returned to service. However, if high oxygen or nitrogen concentrations are still present in the shallow gas collector, after purging the shallow gas collector and removing any positive pressure, the wellhead valve will again be closed and the shallow gas collector will not be monitored until the next round of routine monitoring. A zero pressure or high oxygen/nitrogen concentration will not be considered an exceedance of the wellhead operating criteria included in 40 CFR 60.753(b) and (c) and 10 CSR 10-5.490(4), and remedial actions including rechecks will not be required during these periods. If, during routine monitoring, the oxygen concentration is below five percent and the balance gas concentration is below 20 percent and methane concentration above 40 percent, the shallow gas collector will be brought back online until the gas quality again declines.

Surface emissions monitoring will continue to be used to demonstrate the effective capture and control of LFG from the landfill. In the case of exceedance of the 500-ppmv surface emissions monitoring limit, standard remediation steps will be conducted, including evaluating the need for returning the shallow gas collector to full-time service or additional controls. These events will be documented in the Semi Annual NSPS Report.

Operations of the gas collection and control system to minimize air infiltration are of the utmost importance to the Bridgeton Landfill. This is a daily focus for all landfill personnel to ensure the system is operated as effectively as possible. We greatly appreciate your consideration of granting this alternative prior to installation of the shallow gas collectors. This will allow operational flexibility so that methane migration can be controlled, and the associated infrastructure can be monitored and maintained in compliance with applicable rules.

Thank you very much for your time, and please do not hesitate to contact me at (209) 227-9531 or efanning@republicservies.com.

Kindest regards,

Erin Fanning

Erin Fanning
Division Manager

APPENDIX E.2

GMP-8 LANDFILL GAS CORRECTIVE ACTION PLAN

SUBMITTIAL TO ST. LOUIS COUNTY DEPARTMENT OF PUBLIC HEALTH

MARCH 26, 2019

March 26, 2019

Jeremy Rogus
Air Pollution Control Program
St. Louis County Department of Public Health
4562 Lemay Ferry Rd.
St. Louis, Missouri 63129

Re: Gas Collection and Control System Design Plan Addendum
Standard Operating Procedure Alternative: North Quarry Shallow Gas Collectors
MO Part 70 / Title V Air Operating Permit No. OP2010-063
FIPs Identification: 189-0312
St. Louis County, Missouri

Dear Mr. Rogus:

Bridgeton Landfill, LLC, located in Bridgeton, Missouri, is a closed sanitary landfill that is subject to the control requirements outlined in 40 CFR Part 60 Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills) and 10 CSR 10-5.490, Municipal Solid Waste Landfills. As such, Bridgeton personnel perform frequent monitoring of the gas extraction system and other compliance points connected to the Gas Collection and Control System (GCCS) within the permitted waste boundary at a higher frequency as prescribed in §60.756 and 10 CSR 10-5.490.

On March 12, 2019, an elevated concentration of methane was observed at Gas Monitoring Probe GMP-8 located near the northeast corner of the Bridgeton Landfill. Upon detection of the elevated concentration of methane, Bridgeton Landfill began a comprehensive review of the infrastructure in the vicinity of GMP-8, including frequent monitoring of GMP-8 as well as additional monitoring and maintenance of associated infrastructure. Additional monitoring of GMP-8 and associated infrastructure initially identified the elevated concentration as a gas system malfunction, and continued monitoring has shown that methane detections in GMP-8 are intermittent. However, due to the presence but sporadic nature of elevated methane concentrations at GMP-8, the Bridgeton Landfill is evaluating landfill gas (LFG) control options in addition to the existing infrastructure to address methane migration. Based on preliminary investigations, shallow LFG collection will be effective at collecting the subliner LFG which is likely the source of the elevated methane concentrations observed at GMP-8.

Previous consideration had been given to installation of subliner collection during the preliminary design of the EVOH cap in this area; however, the intermittent nature of LFG in this area led to concerns of balancing surficial LFG collection with the potential for oxygen intrusion, thus subliner collection was not incorporated into the final approved design, and focus was placed on ensuring efficient, optimal collection of LFG utilizing existing LFG infrastructure. The installation of the EVOH in this area was completed in August 2018, and

there have been no methane exceedances at GMP-8 until March 2019, further supporting the concept that LFG in this area is intermittent.

The Bridgeton Landfill is proposing to the Missouri Department of Natural Resources' Waste Management Program (MDNR-WMP) and SLCDPH a three-step, phased approach to improve LFG collection within the northeastern area of the landfill. Each of these options proposes shallow LFG collection, which could promote the potential for oxygen intrusion. These options are as follows:

1. Installation of surface gas collector beneath the EVOH cap;
2. Installation of LFG collector trench; and
3. Installation of shallow gas extraction well.

The above options with corresponding drawings are outlined in the Landfill Gas Corrective Action Plan (LCAP) submitted to Chris Nagel, MDNR-WMP. At this time, the Bridgeton Landfill is moving forward with the installation of the surface gas collector. In the event that the surface gas collector beneath the EVOH is ineffective at controlling methane migration in this area of the landfill, Bridgeton Landfill will proceed with installation of the LFG collector trench. In the event that the surface gas collector and the LFG collector trench are ineffective at controlling methane migration in this area of the landfill, Bridgeton Landfill will proceed with installation of the shallow gas extraction well.

These proposed shallow gas collectors would be installed within the north quarry area which is more indicative of a closed landfill. In this area of the landfill, the LFG production has gradually lessened as the municipal solid waste stabilizes, resulting in lower LFG generated as evidenced by the gas collected within the LFG extraction wells in this area of the landfill. It is anticipated that these shallow gas collectors, due to the location in the north quarry as well as the design, will have limited LFG flow available for gas collection.

To allow flexibility in the operation of Gas Collection and Control System (GCCS) in areas where LFG generation has lessened, the Bridgeton Landfill requests an amendment to the Standard Operating Procedures outlined in the NSPS for the shallow gas collector. Per 40 CFR 60.753(b), (c) and (d) and 10 CSR 10-5.490(4) the Bridgeton Landfill is required to:

1. Operate the collection system with negative pressure at each wellhead except under certain conditions such as increased well temperature, when a geomembrane cap is installed and an acceptable pressure limit is specified in the GCCS design plan, or when a landfill fire is present;

2. Operate each wellhead with a LFG temperature less than 55 degrees Celsius (131 degrees Fahrenheit) and either a nitrogen level less than 20 percent or an oxygen concentration less than 5 percent by volume; and

3. Operate the GCCS so that the methane concentration at the surface of the landfill is less than 500 parts per million by volume (ppmv).

The first and third criteria listed above were included in NSPS in order to require landfill owners/operators to minimize fugitive emissions of LFG to the atmosphere. The second criteria listed above is based on historical LFG industry operations and maintenance guidelines aimed at reducing the potential for landfill fires or negatively affecting microbes involved in the anaerobic decomposition of the waste. High oxygen or nitrogen concentrations can occur due to operating the well field too aggressively, resulting in the potential for infiltration of ambient air through the cover soils.

Unfortunately, the Rule does not provide guidance on how to address an individual criterion when it has the potential to conflict with one of the other criteria. For example, in some situations it may not be possible to maintain compliance with both the vacuum and gas quality requirements of the NSPS. This is evident in the case of a low or diminishing LFG generation rate, when the application of even a small vacuum (i.e., -0.1 to -0.5 inches of water column (in-w.c.)) to a well or collector may cause the oxygen or nitrogen concentration to exceed the NSPS limit. This typically occurs because LFG is not being generated at a sufficient rate to allow for continuous extraction by the GCCS.

If the LFG generation rate is so low, applying vacuum typically will only degrade the gas quality (i.e., increase the oxygen/nitrogen content and/or reduce methane content). One approach to remedy this situation is to shut down the collection point for a period of time until gas quality improves and the oxygen concentration declines to below five percent or nitrogen concentration declines to below twenty percent. Once concentration is below this level, the collection point can be reopened and LFG extraction resumed. However, because this approach requires a non-negative pressure at the wellhead, this technique is not compliant with the NSPS.

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For the shallow gas collector points at which methane levels are significantly below typical collection (less than 40 percent by volume) or oxygen/nitrogen exceedances are persistent and not the result of operations and/or maintenance issues, the wellhead valve will be adjusted to minimize vacuum. If after more than one hour of decreased vacuum the oxygen and/or nitrogen concentration does not decline to allowable levels or methane levels do not stabilize above 40 percent by volume, the wellhead will be shut off until the gas quality improves. Gas concentration and pressure will continue to be monitored and recorded during routine monitoring events in which the wells are shut off.

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Surface emissions monitoring will continue to be used to demonstrate the effective capture and control of LFG from the landfill. In the case of exceedance of the 500-ppmv surface emissions monitoring limit, standard remediation steps will be conducted, including evaluating the need for returning the shallow gas collector to full-time service or additional controls. These events will be documented in the Semi Annual NSPS Report.

Operations of the gas collection and control system to minimize air infiltration are of the utmost importance to the Bridgeton Landfill. This is a daily focus for all landfill personnel to ensure the system is operated as effectively as possible. We greatly appreciate your consideration of granting this alternative prior to installation of the shallow gas collectors. This will allow operational flexibility so that methane migration can be controlled, and the associated infrastructure can be monitored and maintained in compliance with applicable rules.

Thank you very much for your time, and please do not hesitate to contact me at (209) 227-9531 or efanning@republicservies.com.

Kindest regards,

Erin Fanning

Erin Fanning
Division Manager

APPENDIX E.3

GMP-8 LANDFILL GAS CORRECTIVE ACTION PLAN

APPROVAL FROM ST. LOUIS COUNTY DEPARTMENT OF PUBLIC HEALTH

MARCH 27, 2019

Steven V. Stenger
County Executive

Saint Louis COUNTY PUBLIC HEALTH

Dr. Emily Doucette
Acting Director

Spring Schmidt
Acting Director

March 27, 2019

Attn. Erin Fanning
Bridgeton Landfill
13570 St. Charles Rock Rd.
Bridgeton MO 63044

Re: Bridgeton LF GCCS Design Plan Addendum submitted March 26, 2019
NSPS Design Plan Alternative for N. Quarry Shallow Gas Collectors

Ms. Fanning,

On March 26, 2019 the St. Louis County Department of Public Health Air Pollution Control Program (APCP) received a request (dated March 26, 2019) from Bridgeton Landfill to approve a gas collection and control system design plan addendum as allowed by 40 CFR Part 60 Subpart WWW §60.752(b)(2)(i)(B). The request outlines alternatives to procedures and compliance methods for shallow gas collectors associated with infrastructure installed to prevent elevated concentration of methane at Gas Monitoring Probe GMP-8 located near the northeast corner of the Bridgeton Landfill in the North Quarry. Previous GCCS design plan alternatives or addendums for surface collectors or remedial extraction points were approved only for the South Quarry (see approved OM&M Plan Volume 2).

The St. Louis County Department of Public Health APCP approves the addendum requested for shallow gas collectors (surface gas collectors, collector trench, shallow gas extraction well) within the north quarry associated with corrective measures to address methane migration at GMP-8. The Department concludes that each shallow gas collector is subject to 40 CFR Part 60 Subpart WWW. As such, each NSPS extraction point shall be reported in accordance with NSPS (oxygen, temperature, and pressure) in the semi-annual NSPS report. However, the Department concludes that expansion of the GCCS is not required for the shallow gas collectors described in the March 26, 2019 letter. If the monitoring and corrective action procedures outlined in the March 26, 2019 GCCS Design Plan Addendum are taken for shallow gas collectors associated with corrective measures to address methane migration at GMP-8, the monitored exceedance is not a violation of the operation requirements of NSPS. Supplemental reports, in accordance with the

Title V permit, will not be required if these procedures are followed. The monitoring and corrective action procedure information for these shallow gas collectors shall be summarized in the NSPS semi-annual report(s) and must be consistent with the procedures described in your March 26, 2019 GCCS Design Plan Addendum.

Due to the fact that this approval is an alternative to NSPS requirements, concurrence from the Missouri Department of Natural Resources (MDNR) APCP is necessary for approval of the March 26, 2019 GCCS Design Plan Addendum and conditions or requirements outlined in this letter. In the event that MDNR APCP has an approval or conditions which are different from those outlined in this letter, then the St. Louis County Department of Public Health APCP accepts the MDNR APCP approval.

The St. Louis County Department of Public Health Waste Management Program approves all options of the three step phased Landfill Gas Corrective Action Plan detailed in the March 26, 2019 GCCS Design Plan Addendum prepared by Bridgeton Landfill for the St. Louis County Department of Public Health APCP and the March 26, 2019 Landfill Gas Corrective Action Plan prepared by Bridgeton Landfill for Mr. Chris Nagel, MDNR Waste Management Program.

Sincerely,

Jeremy Rogus
Supervisor
Air Pollution Control Program

c: Richard Swartz, Missouri Department of Natural Resources APCP
Derek Apel, Missouri Department of Natural Resources APCP
Chris Nagel, Missouri Department of Natural Resources WMP
Mark Milward, St. Louis County Department of Public Health WMP

March 26, 2019

Jeremy Rogus
Air Pollution Control Program
St. Louis County Department of Public Health
4562 Lemay Ferry Rd.
St. Louis, Missouri 63129

Re: Gas Collection and Control System Design Plan Addendum
Standard Operating Procedure Alternative: North Quarry Shallow Gas Collectors
MO Part 70 / Title V Air Operating Permit No. OP2010-063
FIPs Identification: 189-0312
St. Louis County, Missouri

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Previous consideration had been given to installation of subliner collection during the preliminary design of the EVOH cap in this area; however, the intermittent nature of LFG in this area led to concerns of balancing surficial LFG collection with the potential for oxygen intrusion, thus subliner collection was not incorporated into the final approved design, and focus was placed on ensuring efficient, optimal collection of LFG utilizing existing LFG infrastructure. The installation of the EVOH in this area was completed in August 2018, and

there have been no methane exceedances at GMP-8 until March 2019, further supporting the concept that LFG in this area is intermittent.

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1. Installation of surface gas collector beneath the EVOH cap;
2. Installation of LFG collector trench; and
3. Installation of shallow gas extraction well.

The above options with corresponding drawings are outlined in the Landfill Gas Corrective Action Plan (LCAP) submitted to Chris Nagel, MDNR-WMP. At this time, the Bridgeton Landfill is moving forward with the installation of the surface gas collector. In the event that the surface gas collector beneath the EVOH is ineffective at controlling methane migration in this area of the landfill, Bridgeton Landfill will proceed with installation of the LFG collector trench. In the event that the surface gas collector and the LFG collector trench are ineffective at controlling methane migration in this area of the landfill, Bridgeton Landfill will proceed with installation of the shallow gas extraction well.

These proposed shallow gas collectors would be installed within the north quarry area which is more indicative of a closed landfill. In this area of the landfill, the LFG production has gradually lessened as the municipal solid waste stabilizes, resulting in lower LFG generated as evidenced by the gas collected within the LFG extraction wells in this area of the landfill. It is anticipated that these shallow gas collectors, due to the location in the north quarry as well as the design, will have limited LFG flow available for gas collection.

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Unfortunately, the Rule does not provide guidance on how to address an individual criterion when it has the potential to conflict with one of the other criteria. For example, in some situations it may not be possible to maintain compliance with both the vacuum and gas quality requirements of the NSPS. This is evident in the case of a low or diminishing LFG generation rate, when the application of even a small vacuum (i.e., -0.1 to -0.5 inches of water column (in-w.c.)) to a well or collector may cause the oxygen or nitrogen concentration to exceed the NSPS limit. This typically occurs because LFG is not being generated at a sufficient rate to allow for continuous extraction by the GCCS.

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relieve any pressure and to purge the accumulated gas from the shallow gas collector. If the gas quality has improved, the shallow gas collector will remain opened and returned to service. However, if high oxygen or nitrogen concentrations are still present in the shallow gas collector, after purging the shallow gas collector and removing any positive pressure, the wellhead valve will again be closed and the shallow gas collector will not be monitored until the next round of routine monitoring. A zero pressure or high oxygen/nitrogen concentration will not be considered an exceedance of the wellhead operating criteria included in 40 CFR 60.753(b) and (c) and 10 CSR 10-5.490(4), and remedial actions including rechecks will not be required during these periods. If, during routine monitoring, the oxygen concentration is below five percent and the balance gas concentration is below 20 percent and methane concentration above 40 percent, the shallow gas collector will be brought back online until the gas quality again declines.

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Operations of the gas collection and control system to minimize air infiltration are of the utmost importance to the Bridgeton Landfill. This is a daily focus for all landfill personnel to ensure the system is operated as effectively as possible. We greatly appreciate your consideration of granting this alternative prior to installation of the shallow gas collectors. This will allow operational flexibility so that methane migration can be controlled, and the associated infrastructure can be monitored and maintained in compliance with applicable rules.

Thank you very much for your time, and please do not hesitate to contact me at (209) 227-9531 or efanning@republicservices.com.

Kindest regards,

Erin Fanning
Division Manager

APPENDIX E.4

GMP-8 LANDFILL GAS CORRECTIVE ACTION PLAN

APPROVAL FROM MDNR

APRIL 09, 2019

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

APR 0 9 2019

Ms. Erin Fanning
Division Manager
Republic Services, Inc.
13570 St. Charles Rock Road
Bridgeton, MO 63044

RE: Landfill Gas Corrective Action Plan-GMP-8, Bridgeton Landfill, LLC, Permit Number 0118912, St. Louis County

Dear Ms. Fanning:

This letter is in response to Bridgeton Landfill's letter proposing the "Landfill Gas Corrective Action Plan-GMP-8 – Bridgeton Landfill". This submittal consisted of a two-page letter to Mr. Chris Nagel, Director of the Missouri Department of Natural Resources' Waste Management Program (WMP), three drawings prepared by Feezor Engineering, Inc. and a four-page letter to Mr. Jeremy Rogus, St. Louis County Department of Public Health. This was submitted to the WMP via email on March 26, 2019, to Chris Nagel, Director, WMP.

The project was first presented to the WMP on March 22, 2019, on a facility site visit, with the follow-up email mentioned above. The three-phase plan begins with a surface collector installed under the ethylene vinyl alcohol (EVOH) cap. If this is not successful in reducing the gas readings at GMP-8, a gas collection trench will be installed under the EVOH. If needed, the third phase will be a shallow gas extraction well installed in the area.

Approval to begin the first phase of construction, the surface collector, was sent by email on March 26, 2019, to Ms. Erin Fanning, Bridgeton Landfill. This letter is a follow-up to that approval and to approve Phase 2 and Phase 3 of the project, if they are needed.

You are approved for all three phases of the Landfill Gas Corrective Action Plan-GMP-8 with the following conditions:

CONDITIONS:

1. As-built drawings for each phase shall be submitted within 30 days of completion of each phase.
2. Please include the perimeter of the EVOH on the as-built drawings.

3. Please include all dimensions and sizes on the as-built drawings.

Please respond to these comments within 30 days; an email response is acceptable.

COMMENTS:

1. Does the design for Phase 3, gas extraction well include a leachate removal pump or will it be designed to add one if needed?
2. If additional phases are required, will the previous phase continue to be operated or will the new phase replace the previous phase and it would be removed?
3. Is the design of the surface collector such that it may be extended and vacuum may be attached to the ends? With the vacuum attached to the middle of the collector, please explain the step down and step up in sizes on this collector.

The Department reserves the right to revoke, suspend, or modify Permit Number 0118912 after due notice, if the permit holder fails to operate the facility in compliance with the Missouri Solid Waste Management Law and regulations, terms and conditions of the permit, and the approved engineering plans and specifications.

If you have any questions or comments regarding this letter, please contact Mr. J.P. Boessen at 573-526-3842, at john.boessen@dnr.mo.gov, or at P.O. Box 176, Jefferson City, MO 65102-0176. Thank you.

Sincerely,

WASTE MANAGEMENT PROGRAM

Charlene S. Fitch, P.E.
Chief, Engineering Section

CSF:jbl

c: Daniel Feezor, P.E., Feezor Engineering, Inc.
Mark Milward, R.G., St. Louis County Department of Public Health
Mr. Mike Parris, Chief, Compliance/Enforcement Section, WMP
St. Louis Regional Office