July 31, 2019

City of Longmont
385 Kimbark Street
Longmont, Colorado 80501

Attn: Mr. Jason Elkins
P: (303) 651-8310
E: Jason.Elkins@longmontcolorado.gov

Re: Limited Air Monitoring
Rinn Valley Oil & Gas Production Facility
Weld County Road 20½
Longmont, Colorado
Terracon Project No. 22197001A

Dear Mr. Elkins:

Terracon Consultants, Inc. (Terracon) appreciates the opportunity to submit this summary of air monitoring data to the City of Longmont (City) for the above referenced site located near the Rinn Valley Oil and Gas (O&G) Production Facility located southeast of the City of Longmont, Colorado.

1.0 SITE DESCRIPTION

The site is located on Weld County Road 20½ in Longmont, Colorado, approximately north of the Rinn Valley O&G Production Facility. The Rinn Valley O&G Production Facility is located on the south side of Weld County Road (WCR) 20 ½ southeast of the intersection of WCR 20 ½ and Gooding Dailey Access Road. The facility services several O&G extraction and production (E&P) wells in the general area and serves as the central tank battery for temporary storage of crude petroleum extracted from local O&G wells.

2.0 SCOPE OF SERVICES

The objective of the environmental services was to provide ambient air quality monitoring and data for select parameters near the Rinn Valley O&G Production Facility utilizing the AEGIS 400 continuous air monitoring system. The air monitoring system measures volatile organic compounds (VOCs) and methane in ambient air with sensors provided by the City.

2.1 Standard of Care

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time. Terracon makes no warranties, either express or implied, regarding the findings, conclusions, or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report. LSI services were performed in accordance with the scope of work agreed with you, our client, as reflected in our proposal.

2.2 Additional Scope Limitations

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, nondetectable, or not present during these services. We cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified. Conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations, or exploratory services. The data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

2.3 Reliance

This report has been prepared for the exclusive use of the City of Longmont, and any authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the express written authorization of City of Longmont and Terracon. Any unauthorized distribution or reuse is at City of Longmont's sole risk. Notwithstanding the foregoing, reliance by authorized parties will be subject to the terms, conditions, and limitations stated in the proposal, reports, and Terracon's Master Services Agreement (Reference No. RFP-MD-18077, dated July 26, 2018).

3.0 SYSTEM INSTALLATION

The AEGIS 400 system was received by Terracon in a format set up for use in a laboratory setting equipped with a 120-volt AC power source. Components delivered to Terracon included:

- AEGIS 400 System Box
- Methane sensors
- Power wiring and DC to AC converter transformer for AEGIS system

- Ion total VOC (TVOC) meter
- Calibration kit
- Associated instruction manuals

Terracon updated the system components including the AEGIS 400 system box, four methane sensors and one TVOC sensor to a usable and working state capable of data collection in a remote (field) setting. Terracon also purchased and connected additional required equipment including the following:

- 24 volt power supply consisting of six 12-volt batteries, three solar panels and associated wiring and controllers
- Weather enclosure/security box for the power supply and associated controllers
- Mounting system for the solar panels
- Sensaphone Sentinel remote monitoring and datalogging system
- Miscellaneous wiring, conduits and connectors to create a working system.

Once the system was confirmed to be in a working state, Terracon installed the system within the City right-of-way and along the northern side of County Road 20 ½. Installation include placement of a steel pole for the solar panels and system equipment. The weather enclosure was placed adjacent to the steel pole and beneath the solar panels to assist in shielding the unit from weather and sun. The AEGIS system and Sensaphone were also mounted to the steel pole beneath the solar panels. The methane sensors and TVOC meter were installed at approximately the following locations:

- Zone 1 – methane sensor located at the AEGIS unit, approximately 7-feet above ground surface
- Zone 2 – methane sensor located at the AEGIS unit, approximately 2-feet above ground surface
- Zone 3 – methane sensor located approximately 125-feet east of the AEGIS unit, approximately 4-feet above ground surface
- Zone 4 – methane sensor located approximately 130 feet west of the AEGIS unit, approximately 4-feet above ground surface
- Zone 5 – TVOC sensor located at the AEGIS unit, approximately 3-feet above ground surface

Following system installation and troubleshooting, including the Sensaphone Sentinel remote monitoring and data logging system, each sensor was calibrated at the site, including adjusting the on-site readouts for each sensor. Calibration included applying span gases with known methane or VOC concentrations to each sensor. Span gases included a 0% lower explosive limit (LEL) and a 20% LEL gas applied to each methane sensor, and a 0 parts per million (ppm) VOC gas and 100 ppm VOC gas applied to the TVOC sensor. The remote data logging system was also calibrated to show the applied concentrations on the remote monitoring and logging system.

Calibrations were conducted on the methane sensors on May 2, 2019. A calibration was conducted on the TVOC sensor on April 29, 2019.

4.0 RESULTS OF THE AIR MONITORING DATA

System data is saved by the remote datalogging system approximately one time every 10 minutes during "normal" readings (when each methane sensor detection is less than 1% LEL and the TVOC sensor is less than 1 ppm) and additional readings are saved during "alarm" readings (when the methane sensor detection is greater than 1% LEL and the TVOC sensor is greater than 1 ppm). A chart of each sensor's data is provided as an attachment to this letter as Chart 1 through Chart 5. Sensor readings of less than zero were adjusted to zero for the charts. In addition, the Data Log chart provided by the Sensaphone system is included as an attachment to this letter and an excel file of the data for each sensor from May 1, 2019 through July 30, 2019 is provided electronically.

Note that the elevated reading for each methane sensor detected on May 2, 2019, shown on Chart 1 through Chart 4, are detections caused by Terracon personnel applying a span gas to each sensor as part of system checks and calibration. Fluctuation in the sensor data may be caused by natural and/or man-made factors including but not limited to interference with the wiring and connections, or vehicles and equipment located near the site and equipment, and may not represent releases from the Rinn Valley O&M Production Facility. In addition, concentration detected by the system may be influenced by many factors, including but not limited to wind direction and speed, weather conditions and individual sensor limitations and sensitivity.

We appreciate the opportunity to provide these environmental services to the City of Longmont. If you have any questions or comments regarding this letter or require additional services, please give us a call.

Sincerely,
Terracon Consultants, Inc.

John A. Skogman, P.E.
Senior Environmental Engineer

Michael J. Skridulis
Environmental Department Manager

John C. Graves, P.G.
Senior Principal/Regional Manager

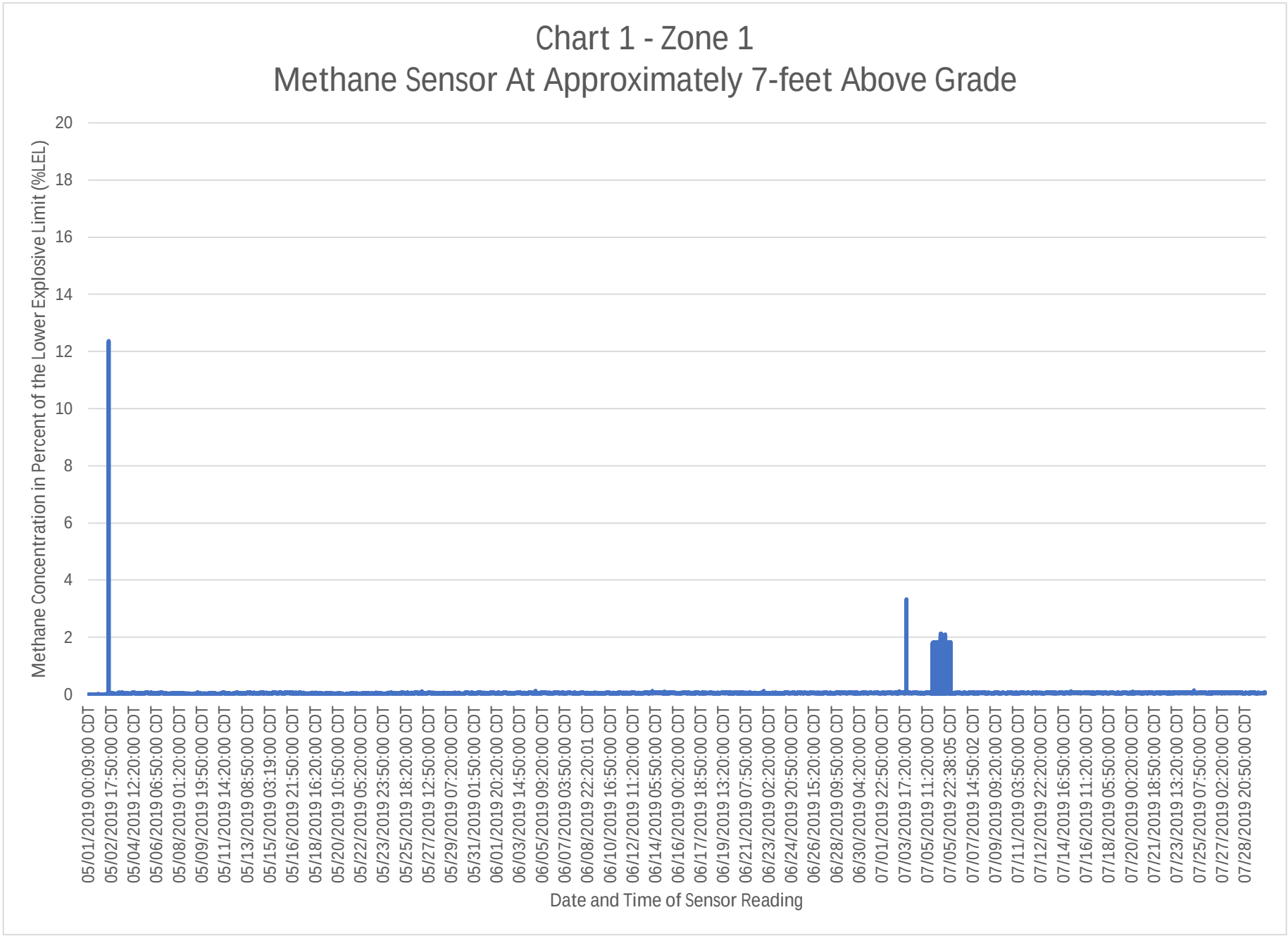
Chart 1 - Zone 1
Methane Sensor At Approximately 7-feet Above Grade
Methane Concentration in Percent of the Lower Explosive Limit (%LEL)
20
18
16
14
12
10
8
6
4
2
0
05/01/2019 00:09:00 CDT
05/02/2019 17:50:00 CDT
05/04/2019 12:20:00 CDT
05/06/2019 06:50:00 CDT
05/08/2019 01:20:00 CDT
05/09/2019 19:50:00 CDT
05/11/2019 14:20:00 CDT
05/13/2019 08:50:00 CDT
05/15/2019 03:19:00 CDT
05/16/2019 21:50:00 CDT
05/18/2019 16:20:00 CDT
05/20/2019 10:50:00 CDT
05/22/2019 05:20:00 CDT
05/23/2019 23:50:00 CDT
05/25/2019 18:20:00 CDT
05/27/2019 12:50:00 CDT
05/29/2019 07:20:00 CDT
05/31/2019 01:50:00 CDT
06/01/2019 20:20:00 CDT
06/03/2019 14:50:00 CDT
06/05/2019 09:20:00 CDT
06/07/2019 03:50:00 CDT
06/08/2019 22:20:01 CDT
06/10/2019 16:50:00 CDT
06/12/2019 11:20:00 CDT
06/14/2019 05:50:00 CDT
06/16/2019 00:20:00 CDT
06/17/2019 18:50:00 CDT
06/19/2019 13:20:00 CDT
06/21/2019 07:50:00 CDT
06/23/2019 02:20:00 CDT
06/24/2019 20:50:00 CDT
06/26/2019 15:20:00 CDT
06/28/2019 09:50:00 CDT
06/30/2019 04:20:00 CDT
07/01/2019 22:50:00 CDT
07/03/2019 17:20:00 CDT
07/05/2019 11:20:00 CDT
07/05/2019 22:38:05 CDT
07/07/2019 14:50:02 CDT
07/09/2019 09:20:00 CDT
07/11/2019 03:50:00 CDT
07/12/2019 22:20:00 CDT
07/14/2019 16:50:00 CDT
07/16/2019 11:20:00 CDT
07/18/2019 05:50:00 CDT
07/20/2019 00:20:00 CDT
07/21/2019 18:50:00 CDT
07/23/2019 13:20:00 CDT
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07/27/2019 02:20:00 CDT
07/28/2019 20:50:00 CDT
Date and Time of Sensor Reading

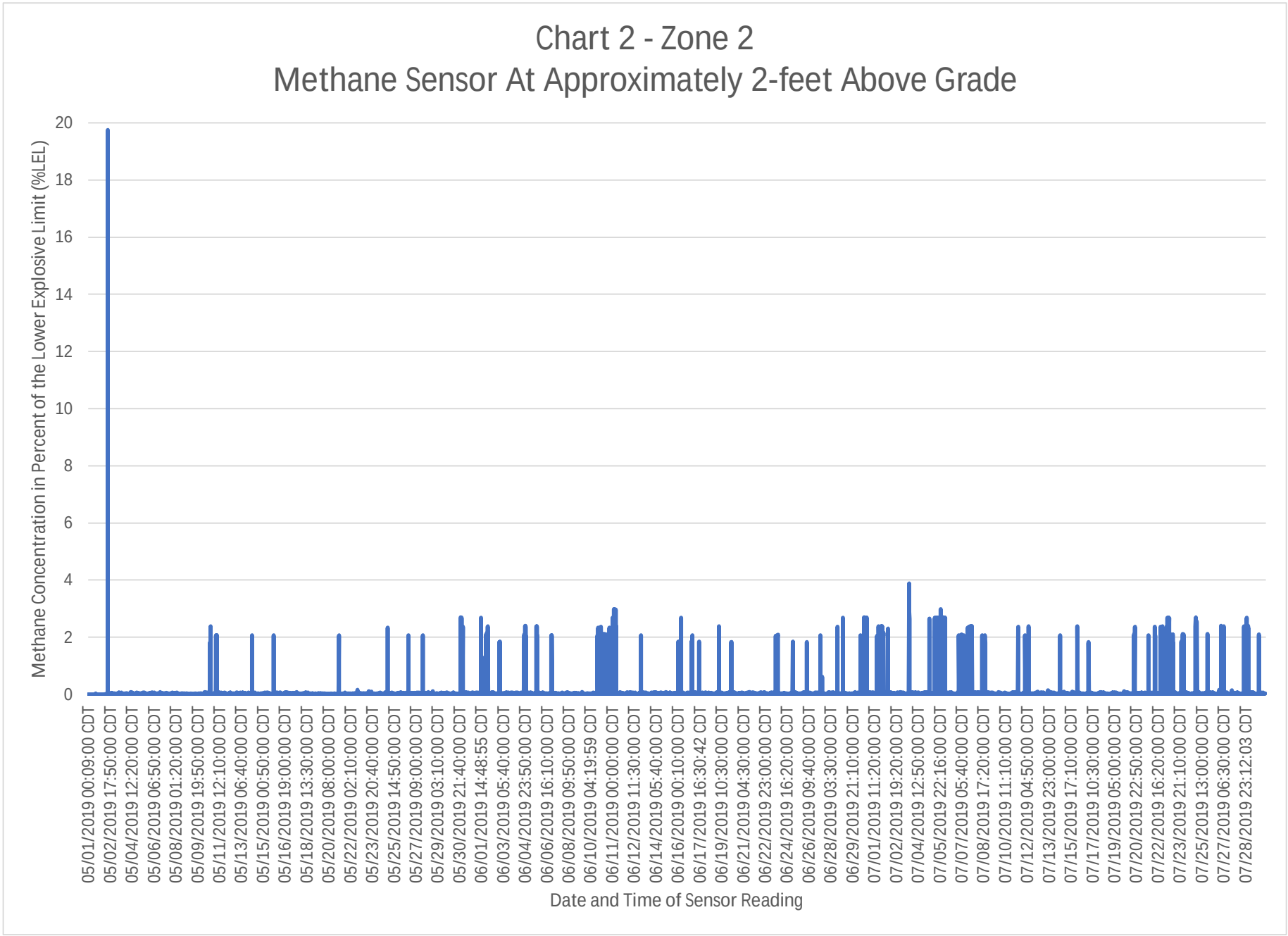
Chart 2 - Zone 2
Methane Sensor At Approximately 2-feet Above Grade
Methane Concentration in Percent of the Lower Explosive Limit (%LEL)
20
18
16
14
12
10
8
6
4
2
0
05/01/2019 00:09:00 CDT
05/02/2019 17:50:00 CDT
05/04/2019 12:20:00 CDT
05/06/2019 06:50:00 CDT
05/08/2019 01:20:00 CDT
05/09/2019 19:50:00 CDT
05/11/2019 12:10:00 CDT
05/13/2019 06:40:00 CDT
05/15/2019 00:50:00 CDT
05/16/2019 19:00:00 CDT
05/18/2019 13:30:00 CDT
05/20/2019 08:00:00 CDT
05/22/2019 02:10:00 CDT
05/23/2019 20:40:00 CDT
05/25/2019 14:50:00 CDT
05/27/2019 09:00:00 CDT
05/29/2019 03:10:00 CDT
05/30/2019 21:40:00 CDT
06/01/2019 14:48:55 CDT
06/03/2019 05:40:00 CDT
06/04/2019 23:50:00 CDT
06/06/2019 16:10:00 CDT
06/08/2019 09:50:00 CDT
06/10/2019 04:19:59 CDT
06/11/2019 00:00:00 CDT
06/12/2019 11:30:00 CDT
06/14/2019 05:40:00 CDT
06/16/2019 00:10:00 CDT
06/17/2019 16:30:42 CDT
06/19/2019 10:30:00 CDT
06/21/2019 04:30:00 CDT
06/22/2019 23:00:00 CDT
06/24/2019 16:20:00 CDT
06/26/2019 09:40:00 CDT
06/28/2019 03:30:00 CDT
06/29/2019 21:10:00 CDT
07/01/2019 11:20:00 CDT
07/02/2019 19:20:00 CDT
07/04/2019 12:50:00 CDT
07/05/2019 22:16:00 CDT
07/07/2019 05:40:00 CDT
07/08/2019 17:20:00 CDT
07/10/2019 11:10:00 CDT
07/12/2019 04:50:00 CDT
07/13/2019 23:00:00 CDT
07/15/2019 17:10:00 CDT
07/17/2019 10:30:00 CDT
07/19/2019 05:00:00 CDT
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07/22/2019 16:20:00 CDT
07/23/2019 21:10:00 CDT
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Date and Time of Sensor Reading

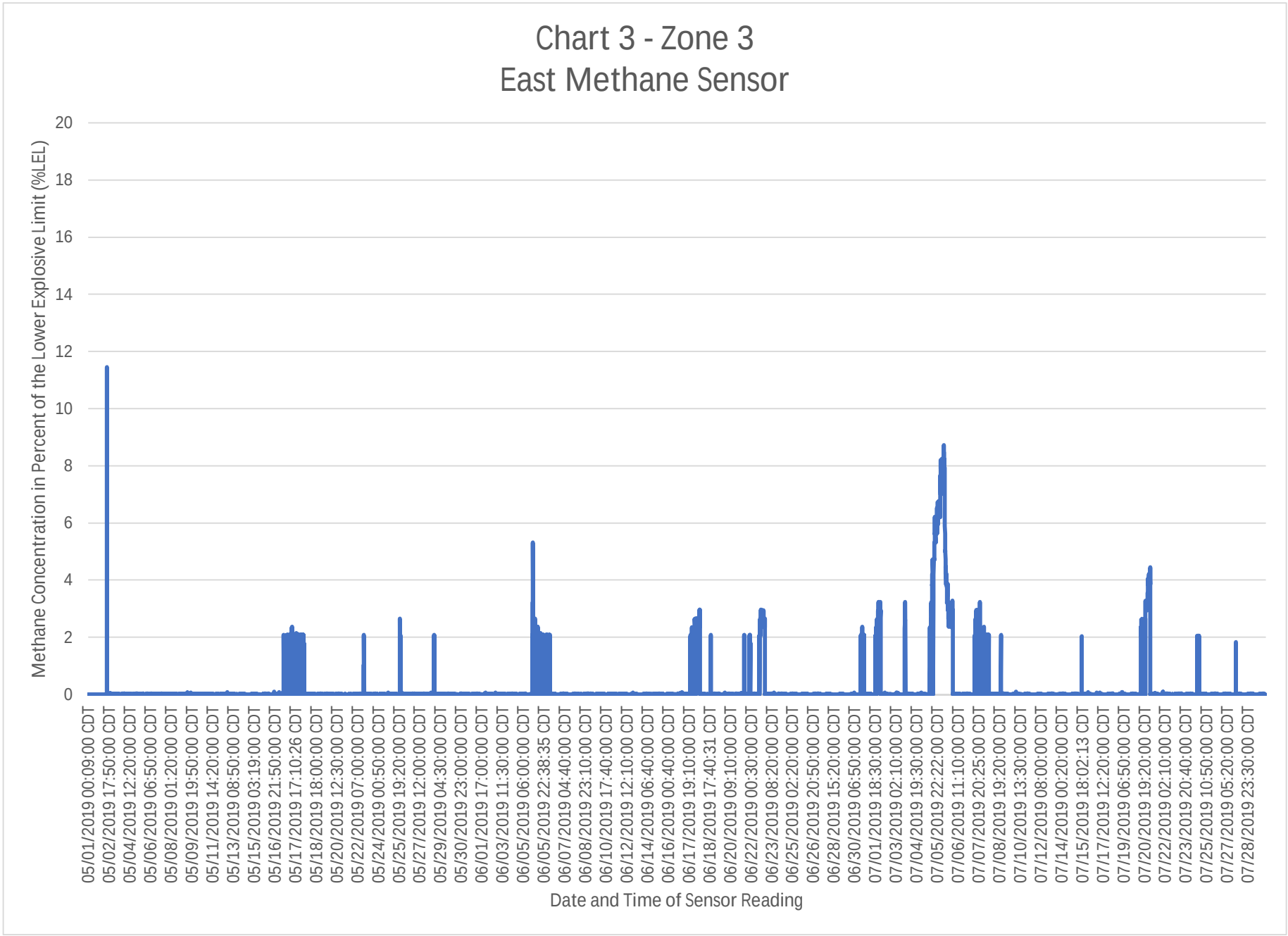
Chart 3 - Zone 3
East Methane Sensor
Methane Concentration in Percent of the Lower Explosive Limit (%LEL)
20
18
16
14
12
10
8
6
4
2
0
05/01/2019 00:09:00 CDT
05/02/2019 17:50:00 CDT
05/04/2019 12:20:00 CDT
05/06/2019 06:50:00 CDT
05/08/2019 01:20:00 CDT
05/09/2019 19:50:00 CDT
05/11/2019 14:20:00 CDT
05/13/2019 08:50:00 CDT
05/15/2019 03:19:00 CDT
05/16/2019 21:50:00 CDT
05/17/2019 17:10:26 CDT
05/18/2019 18:00:00 CDT
05/20/2019 12:30:00 CDT
05/22/2019 07:00:00 CDT
05/24/2019 00:50:00 CDT
05/25/2019 19:20:00 CDT
05/27/2019 12:00:00 CDT
05/29/2019 04:30:00 CDT
05/30/2019 23:00:00 CDT
06/01/2019 17:00:00 CDT
06/03/2019 11:30:00 CDT
06/05/2019 06:00:00 CDT
06/05/2019 22:38:35 CDT
06/07/2019 04:40:00 CDT
06/08/2019 23:10:00 CDT
06/10/2019 17:40:00 CDT
06/12/2019 12:10:00 CDT
06/14/2019 06:40:00 CDT
06/16/2019 00:40:00 CDT
06/17/2019 19:10:00 CDT
06/18/2019 17:40:31 CDT
06/20/2019 09:10:00 CDT
06/22/2019 00:30:00 CDT
06/23/2019 08:20:00 CDT
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06/26/2019 20:50:00 CDT
06/28/2019 15:20:00 CDT
06/30/2019 06:50:00 CDT
07/01/2019 18:30:00 CDT
07/03/2019 02:10:00 CDT
07/04/2019 19:30:00 CDT
07/05/2019 22:22:00 CDT
07/06/2019 11:10:00 CDT
07/07/2019 20:25:00 CDT
07/08/2019 19:20:00 CDT
07/10/2019 13:30:00 CDT
07/12/2019 08:00:00 CDT
07/14/2019 00:20:00 CDT
07/15/2019 18:02:13 CDT
07/17/2019 12:20:00 CDT
07/19/2019 06:50:00 CDT
07/20/2019 19:20:00 CDT
07/22/2019 02:10:00 CDT
07/23/2019 20:40:00 CDT
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07/28/2019 23:30:00 CDT
Date and Time of Sensor Reading

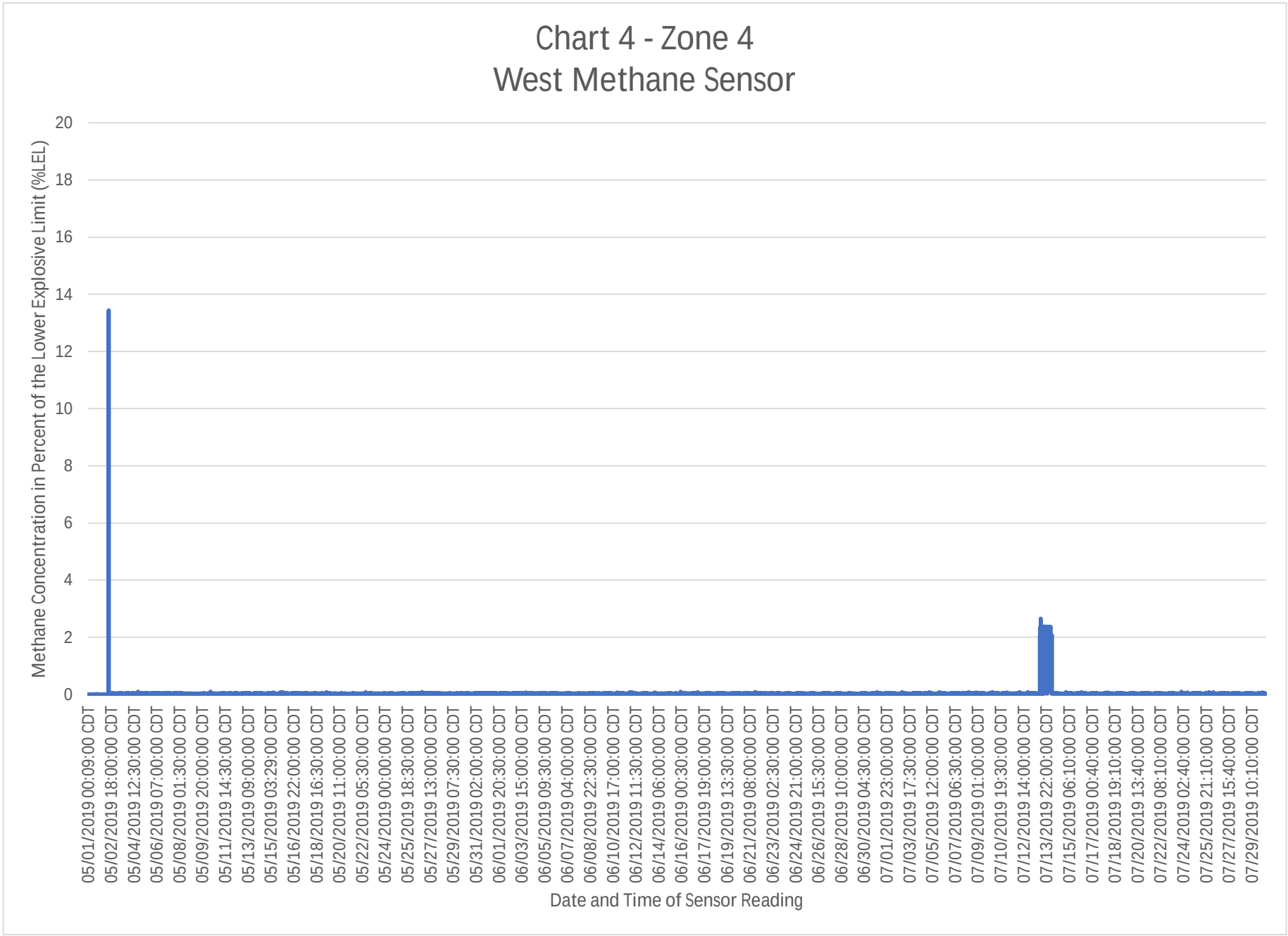
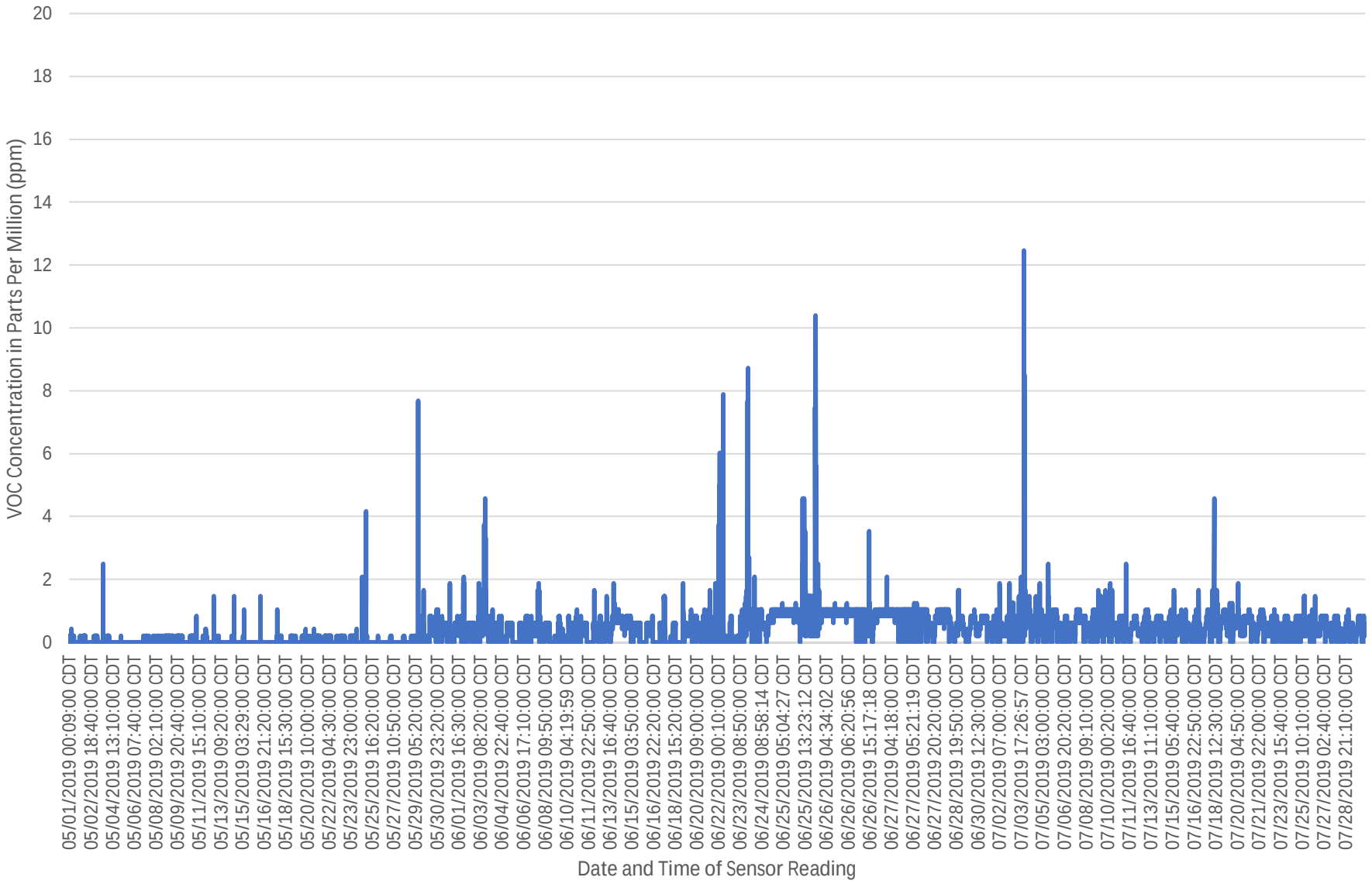
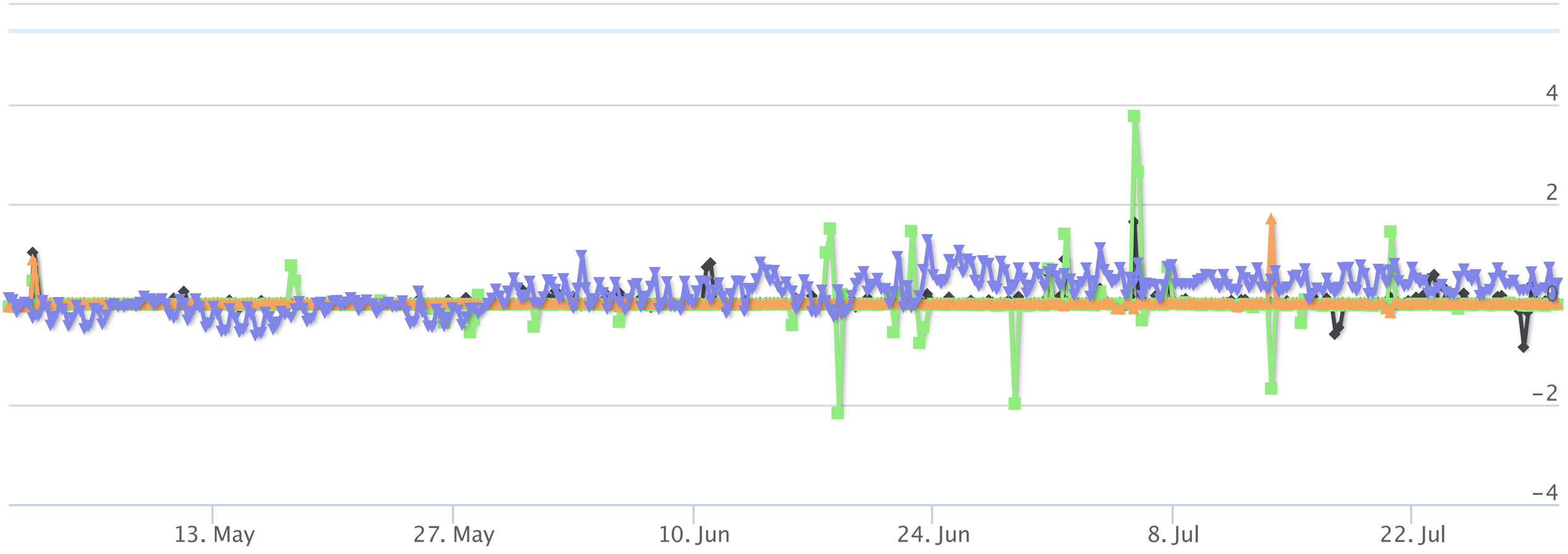


Chart 4 - Zone 4
West Methane Sensor
Methane Concentration in Percent of the Lower Explosive Limit (%LEL)
20
18
16
14
12
10
8
6
4
2
0
05/01/2019 00:09:00 CDT
05/02/2019 18:00:00 CDT
05/04/2019 12:30:00 CDT
05/06/2019 07:00:00 CDT
05/08/2019 01:30:00 CDT
05/09/2019 20:00:00 CDT
05/11/2019 14:30:00 CDT
05/13/2019 09:00:00 CDT
05/15/2019 03:29:00 CDT
05/16/2019 22:00:00 CDT
05/18/2019 16:30:00 CDT
05/20/2019 11:00:00 CDT
05/22/2019 05:30:00 CDT
05/24/2019 00:00:00 CDT
05/25/2019 18:30:00 CDT
05/27/2019 13:00:00 CDT
05/29/2019 07:30:00 CDT
05/31/2019 02:00:00 CDT
06/01/2019 20:30:00 CDT
06/03/2019 15:00:00 CDT
06/05/2019 09:30:00 CDT
06/07/2019 04:00:00 CDT
06/08/2019 22:30:00 CDT
06/10/2019 17:00:00 CDT
06/12/2019 11:30:00 CDT
06/14/2019 06:00:00 CDT
06/16/2019 00:30:00 CDT
06/17/2019 19:00:00 CDT
06/19/2019 13:30:00 CDT
06/21/2019 08:00:00 CDT
06/23/2019 02:30:00 CDT
06/24/2019 21:00:00 CDT
06/26/2019 15:30:00 CDT
06/28/2019 10:00:00 CDT
06/30/2019 04:30:00 CDT
07/01/2019 23:00:00 CDT
07/03/2019 17:30:00 CDT
07/05/2019 12:00:00 CDT
07/07/2019 06:30:00 CDT
07/09/2019 01:00:00 CDT
07/10/2019 19:30:00 CDT
07/12/2019 14:00:00 CDT
07/13/2019 22:00:00 CDT
07/15/2019 06:10:00 CDT
07/17/2019 00:40:00 CDT
07/18/2019 19:10:00 CDT
07/20/2019 13:40:00 CDT
07/22/2019 08:10:00 CDT
07/24/2019 02:40:00 CDT
07/25/2019 21:10:00 CDT
07/27/2019 15:40:00 CDT
07/29/2019 10:10:00 CDT
Date and Time of Sensor Reading

Chart 5 - Zone 5
VOC Sensor



Data Log


4
2
0
-2
-4
13. May
27. May
10. Jun
24. Jun
8. Jul
22. Jul
Zone 1 - Zone 1, at equipment, 7' high
Zone 2 - Zone 2, at equipment, 3' high
Zone 3 - Zone 3, East Sensor
Zone 4 - Zone 4, West Sensor
Zone 5 - VOC Meter