

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection**

N730363880

FACILITY: Bluewater Gas Storage Facility - Columbus		SRN / ID: N7303
LOCATION: 333 South Wales Center Road, COLUMBUS		DISTRICT: Warren
CITY: COLUMBUS		COUNTY: SAINT CLAIR
CONTACT: Jeff Westrick , Asset Manager- Gas Storage		ACTIVITY DATE: 08/02/2022
STAFF: Sebastian Kallumkal	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Scheduled annual inspection		
RESOLVED COMPLAINTS:		

On Tuesday, August 2, 2022, at about 11:15 AM, Michigan Department of Environment, Great Lakes, Energy-Air Quality Division Staff Sebastian Kallumkal conducted an annual inspection at the Bluewater Gas Storage (BWGS) facility located at 333 South Wales Center Road, Columbus Township, Michigan. The purpose of the inspection was to verify facility's compliance with requirements of Article II, Air Pollution Control, Part 55 of Act 451 of 1994, & Permits to Install (PTI) No. 77-14C.

PTI NO. 77-14 (approved 9/16/2014) incorporated permits issued during construction into a single facility-wide permit. PTI No. 77-14 was voided when PTI No. 77-14A (approved on 8/21/2019) was issued to change the operating temperature and correct the typo error in facility-wide natural gas usage. PTI No. 77-14A was voided when PTI No. 77-14B (approved on 11-13-2020) was issued to remove the vapor recovery unit from EUWGDEHY and for the installation of thermal oxidizer. PTI No. 77-14B was voided on March 8, 2021, when PTI No. 77-14C was approved on March 8, 2021, to change the stack exit diameter for SV-THERMALOXIDIZER. EGLE-AQD Consent Order (CO) No. 5-2005 was terminated upon request and compliance demonstration by the facility.

On August 1, 2022, I requested the facility, via email, to submit the records required by PTI 77-14C. These records were emailed to me timely.

At the facility I met Mr. Jeff Westrick, Asset Manager (Phone: Direct-810-642 9035, Office: 810 367 3404; Mobile: 810 531 8036; Fax: 810-367-7048), email:jeffrey.westrick@wecenergygroup.com); and Rita Reed, Compliance Engineering Specialist. James Jensen, Senior Engineer-Environmental, WEC Energy was also present during the meeting via phone. I introduced myself and stated the purpose of the visit. During the pre-inspection meeting, we discussed the facility operations, the permit conditions and changes at the facility. After the meeting, we had a walkthrough of the facility including the emergency engine, engine room (where all three engines are located), and the glycol dehydration unit including the new thermal oxidizer, JT system and crude oil production system (heater treater).

Bluewater Gas Storage is involved in the storage of natural gas received from customers such as Consumers Energy, Vector Pipeline, MichCon, Great Lakes Gas Transmission Company, American Natural Resources, and Duke Energy of Canada during warm season and its withdrawal and transfer into the pipeline during cold months. (Storage: dolomite, 3200' deep, 300' thick, up to 2012 psi). During late spring through early fall season, the facility receives and stores natural gas in the underground rock formations. Later the storage season, facility needs to use compressor engines to store the gas against the high field pressure. The withdrawal season is from late October through early May. During the initial withdrawal season, the gas into the pipeline is free flow, but later in the season, the gas usually needs to be pumped out using compressors due to the low field pressure.

Depending on the nature of the rock formations, the withdrawal gas may contain excess moisture than allowed by the federal regulations. In that case, the natural gas would be dehydrated to meet the requirements prior to pushing back into the pipelines. The facility also had discovered that the withdrawal gas contained high concentration of heavy

hydrocarbons than that is allowed. In order to reduce the hydrocarbon content, the facility installed a J-T System in January 2006 that takes advantage of the cooling effects of expanding gas (Joule-Thompson effect).

In the Joule-Thompson system, as the high-pressure gas is withdrawn from the reservoir across a Joule-Thompson valve, the pressure is reduced to 150 PSI. The gas is cooled due to Joule-Thompson effect. The cooling of the gas causes the hydrocarbons to condense, and the hydrocarbons are removed from the gas stream. This cooling also causes the water vapor to condense. To prevent the condensed water from freezing, glycol is injected into the gas stream before the J-T Valve to absorb the moisture. After the J-T Valve, the natural gas, and the liquids (which hydrocarbons/water/glycol mixture) goes to a J-T Vessel separator.

The cold gas from the J-T Vessel separator is passed through a gas-to-gas heat exchanger (a heat exchanger with warm gas flowing from the underground storage reservoir on one side, and cold flowing gas from the J-T Vessel Separator on the other side) to pre-cool the stored gas. From the heat exchanger, the natural gas goes to pipeline

The glycol/NGL/water mixture from the J-T vessel goes to a J-T liquid separator. This tank is heated to about 100°F to separate the hydrocarbons (NGL) and water/glycol. The top part NGL (similar to crude oil) goes to NGL tank and the bottom part, glycol/water, goes to a withdrawal gas reboiler unit to drive off excess moisture and then to flash tank.

The glycol from the flash tank is filtered using charcoal filter and recycled. Any NGL collected goes to NGL tank. The vapors from the reboiler go to reboiler still column and then to thermal oxidizer. Vapors from the flash tank also goes to the thermal oxidizer to be incinerated. The NGLs are sent to an aboveground storage tank, mixed with crude oil and eventually sold to various oil refining entities.

The facility is also permitted to extract crude oil from the ground. Facility had drilled six oil horizontal wells. Facility recently drilled another vertical well which currently produces oil. Natural gas and brine also come with the crude oil during extraction. The crude oil production is for about 6 weeks (Mid-March through April). This natural gas that comes up with the crude is not virgin gas; instead, it is part of the same gas the facility stores underground. This mixture is separated using a heater treater and an oil-water separator. The natural gas either put back to the underground if it is during storage season or will be dehydrated and put into the pipelines for transportation if it is during withdrawal season. EU-145BHPENG is normally used for this process. The brine is put back to the underground and crude oil is stored in one of the storage tanks and is transported out for processing.

The facility had provided information (correspondence from USEPA) to indicate that this facility is not subject to federal standards for Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants, as specified in 40 CFR, Part 60, Subpart KKK. The facility does not extract virgin natural gas while extracting crude oil. Instead, the facility extracts pipeline quality gas which was injected into the underground rock formations.

Inspection

At the time of the inspection, the facility was in the storage season. The EG-GEN, EU-COMP NORTH, EU-COMPEAST, EU-145BHPENG, the JT System, the Glycol Dehy-system heaters, heater treater, etc. were not operating because no gas was being withdrawn. The Dehy unit was shut down.

He told me that only EU-COMP-EAST and EU-COMP-WEST are used during this summer. During previous weeks, they used EU-COMPEAST engine and for the last three weeks and at the time of my inspection they were using EU-COMPWEST engine. I did not observe any visible emissions from the stack.

Compliance

EU-145BHPENG:

In 2009, facility installed a Caterpillar, 2008 model (Mfg Date: 7/2/2008), natural gas fired, 4-stroke, rich burn, 145 HP, reciprocating internal combustion engine which runs a compressor to inject producer gas back into the field and to boost the withdrawal gas pressure to add it to the pipeline. This RICE is exempt from PTI pursuant to Rule 285(2)(g). However, the engine is subject to 40 CFR 63, Subpart ZZZZ which requires this RICE to comply with 40 CFR 60, Subpart JJJJ-NSPS for Spark Ignition RICES. NSPS-Subpart JJJJ (40 CFR 60.6244) requires a one-time performance test within 10% of 100 percent peak (or the highest achievable) load for EU-145BHPENG. This engine was not operating at the time of the inspection.

40 CFR 60.4243 states that the facility must comply with the applicable emission standards by purchasing an engine certified to the emission standards in 40 CFR 60.4231. Additionally, if the engine is not operated or maintained as a certified engine (100-500 HP), the permittee must comply with the emission standards by keeping a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, permittee must conduct an initial performance test to demonstrate compliance. No subsequent performance testing every 8,760 hours or 3 years is not required (40 CFR 60.4243(a)(2)(ii)).

40 CFR 60.4233(e) states that a SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 of NSPS Subpart JJJJ performance test to demonstrate compliance. Table 1 has limits for NO_x, CO, VOC in g/Hp-hr and ppmvd at 15%O₂.

On August 13, 2013, facility conducted the required initial performance tests to demonstrate compliance with NO_x, CO and NMHC (as C₃H₈) limits. The test plan for the performance test was received by AQD on July 15, 2013, and was approved on August 1, 2013. AQD received the test report on September 23, 2013. See the "Emissions Compliance Study"- "Report Submittal Date: September 16, 2013)" for details.

Facility performs maintenance on this engine such as change spark plugs, oil samples and changes, compression checks, monitor catalyst temperatures. They only run this unit for the functional testing, so minimal maintenance has been performed based on hours of operation lately.

The primary use of EU-145BPENG is to re-inject natural gas generated during crude oil production. Jeff told me that currently they use the EU-COMP NORTH for this purpose.

Permits To Install (PTI) No. 77-14C

This permit includes Emergency Generator (EU-GEN), Withdrawal Gas Dehydration Unit (EU-WGDEHY), EU-DRAINTANK and FG ENGINES (EU-COMP NORTH, EU-COMP WEST, EU-COMP EAST-three internal combustion engines which drive compressors). The permit also includes FG-FACILITY table which sets facility wide limits for NO_x, CO, VOC and individual and aggregate hazardous air pollutants (HAPs). This facility is an area source (synthetic minor) for hazardous air pollutants (HAP). The VOC/HAP emissions from these five engines at the facility are controlled by individual catalytic oxidation system.

EU-GEN

8.5 MMBtu/hr heat input Caterpillar G3516 natural gas-fired engine driving an emergency generator. VOC and CO emissions are controlled with a catalytic oxidation system.

This engine is limited to operate less than 500 hours per year based on 12-month rolling time period. From the 2021 annual emission report via MAERS, EU-GEN was operated 52 hours; and from the submitted records, in 2020 and 2021, EU-GEN conducted weekly test runs (readiness testing) about 60 times each year and each run lasted about 23-30 minutes. In 2020, EU-GEN was operated about 15.88 hours and in 2021 about 10.13 hours for emergency operations due to power outage. It operated about 1.99 hours in 2022 due to power outage in addition to weekly readiness testing. The facility is only using pipeline quality natural gas to fuel EU-GEN. The fuel is limited to pipeline quality natural gas.

This engine is required to be operated with catalytic oxidation system installed and operated satisfactorily which includes cleaning the catalyst panels according to procedures in Appendix A of PTI No. 77-14C or an approved plan. EU-GEN is equipped with catalytic oxidation system. Submitted the catalyst bed differential pressure monitor calibration data for 2020 and maintenance records (oil analyses for 2021 and 2022).

Stack dimensions were not verified at the time of the inspection, but stack dimensions appear to be in compliance with the requirements of Special Conditions VIII.1.

This condition requires the permittee to comply with all provisions of National Emission Standards for Hazardous Air Pollutants, 40 CFR Part 63, Subpart ZZZZ, as they apply to EU-GEN. See discussion under 40 CFR 63, Subpart ZZZZ- NESHAP for Reciprocating Internal Combustion Engines.

EU-WGDEHY

Withdrawal Gas dehydration unit which contains a 3.26 MMBTU/Hr glycol reboiler burner which is associated with SV-REBOILER. Emissions from the reboiler are controlled by a thermal oxidizer which is associated with SV-THERMOXIDIZER.

Due to the presence of high hydrocarbon content, the EU-WGDEHY does not use the glycol contact towers. Instead, it is using the JT system as described previously. Glycol is sprayed into the gas stream to absorb moisture prior to entering the JT system. The wet glycol is reclaimed and reused; organic liquids are collected and sold; and gases are incinerated using a thermal oxidizer.

This facility does not use the organic gases from the flash tank as fuel for the reboiler because "gases are too wet". The vapors from the flash tank and reboiler are incinerated in the thermal oxidizer.

Emission Limits

Conditions 1.1a and 1.1b limits the NOx and VOC emissions to 5.14 tons per year and 2.57 tons per year based on 12-month rolling time period respectively. The records show that the total NOx emissions from this process (reboiler and TO) were 0.26 tons based on a 12-month rolling period as of July 2022 and the VOC emissions are 0.02 tons based on a 12-month rolling period as of July 2022. respectively. Facility provided electronic records of the emission calculations.

Material Usage Limits

The records show that the natural gas processed through the dehydration system was 17,567.17 MMCF as of April 2022 (12-month rolling) which is in compliance with the limit of 81,900 MMSCF based on a 12-month rolling period.

The natural gas fuel used in Glycol reboiler burner was 1.14 MMscf as of March 2022, (12-month rolling) which is in compliance with the annual limit of 28.0 MMscf based on a 12-month rolling time period.

The natural gas fuel used in thermal oxidizer is 4.81 MMscf as of April 2022, which is in compliance with the annual limit of 35.2 MMscf calculated based on a 12-month rolling time period.

Process/Operational Limits

The records show that glycol re-circulation rate for FGWGDEHY is below the permit limit of 26 gallons per minute. That capacity of the recirculation pump is set at 13 gpm. The normally the recirculation rate is between 3-5 gpm. The facility submitted of the records of the recirculation rates.

The PTI requires the facility to submit a malfunction abatement plan (MAP) for the operation of the thermal oxidizer. The most recent approvable MAP was received on September 14, 2020, which included the new thermal oxidizer.

Design/Equipment Parameters

The facility has installed the flash tank, and the thermal oxidizer (TO). The current TO was installed on October 16, 2020. The satisfactory operation of the TO requires it to have a minimum 95% (by weight) destruction efficiency and maintaining a minimum temperature of 1600 +/- 50°F and minimum retention time of 0.75 seconds. (See discussion under SC V.2).

The facility has installed devices to continuously monitor and record temperature of the TO and monitor the natural gas usage in the glycol reboiler burner and thermal oxidizer.

Testing/Sampling

The facility is required to conduct natural gas analysis during withdrawal season. Recent sampling was performed on December 3, 2020, January 29, 2021, and January 11, 2022. The submitted records include the gas analysis results and GlyCalc report.

The facility is required to verify VOC destruction efficiency from the thermal oxidizer by testing at the owner's expense, in accordance with Department requirements, within 180 days of the permit issuance date. PTI No. 77-14A was approved on August 21, 2019. AQD-TPU received the test plan on October 15, 2019 and approved on November 15, 2019. The testing was conducted on December 17, 2019, and the report was received on January 29, 2020. The report showed that the TO achieved 95% DE at 1400°F.

On Wednesday, December 09, 2020, the facility conducted stack test to verify the destruction efficiency (control efficiency) and to determine the operating temperature that can meet the minimum control efficiency of the newly installed thermal oxidizer (TO) for the glycol dehydration unit, pursuant to SC V.2 of PTI No.77-14B. The test plan was received on September 17, 2020, and AQD-TPU approved on November 13, 2020. Report received on February 1, 2021. Showed that the newly installed TO achieved 95% DE at 1400°F.

The facility requested approval from AQD, pursuant to SC IV.2, to operate the TO, at 1400°F instead of 1600 +/- 50°F. AQD approved the request because the TO achieved 95% DE at the lower temperature.

The facility submitted TO operating records for 2020, 2021 and 2022. Review of these records shows that the facility operated the thermal oxidizer between 1380 to 1400°F during most the days with a few hours in 1370's which are below the minimum temperature of 1400°F (PTI No. 77-14C), This appears to be a deviation of PTI No. 77-14c, SC IV.2. The TO also had a few malfunctions due to "Combustion Air Pressure Switch was out of adjustment". The facility quickly re-adjusted the switch and restarted the thermal oxidizer. During a few other occasions, the TO malfunctioned because of "water froze in the pilot gas line, resulting in a

flame failure trip event taking the thermal oxidizer offline. The facility believed this is related to water entering the combustion chamber that was addressed by the protective cap installed while gas is not being processed.”

On March 18, 2022, the facility rebooted the TO. When the thermal oxidizer was brought back online, the programming, including the temperature setpoint, for the equipment was removed. The thermal oxidizer reset to a "factory standard" setpoint condition for operating at a temperature lower than the required $1400^{\circ}\text{F} \pm 50$ degrees. When normal operations resumed after the restart, the facility was unaware the thermal oxidizer programming had reset to factory settings. As soon as noticed, the facility expeditiously worked to re-program the thermal oxidizer back to the required operating setpoints. During March 18-20, the TO was operated mostly between 1000 to 1150°F . The facility failed to notify EGLE-AQD of these malfunctions and deviations. This appears to be a violation of the requirements of PTI No. 77-14C, GC 7.

On Monday, August 22, I discussed the low operating temperature issue with James Jensen, BWGS contact. He told me that the facility was under the understanding that the minimum temperature was $1400 \pm 50^{\circ}\text{F}$, just as specified for the original operating temperature. I informed him that 1400°F is the minimum operating temperature and $(1400^{\circ}\text{F} - 50^{\circ}\text{F})$ is not an acceptable operating temperature. He told me that they did not exceed the VOC emission limits based on the GlyCalc calculations (calculating VOC emissions without control). I offered him to verify the minimum operating temperature interpretation and get back to him.

Following the conversation with James, I explained this situation to Joyce Zhu, District Supervisor, AQD-Warre DO. She also agreed that 1400°F is the lowest acceptable operating temperature.

Informed James Jensen about the requirement of minimum operating temperature and TO malfunction during March 18-20, 2022. The facility had corrected these issues. I told him that not reporting the malfunctions and operating the TO below the minimum temperature could be a deviation of the requirements of Rule 912.

I also discussed this with Jenelle Trowhill, AQD Permit Section, permit engineer for PTI 77-14C and explained the permit condition. She also agreed that 1400°F is the minimum temperature required because $\pm X^{\circ}\text{F}$ is not spelled out.

On August 25, 2022, James sent an email to AQD explaining that during the December 9, 2020, performance test for the newly installed TO, the three test runs were conducted at three different temperatures ranging from 1367°F to 1565°F .

Run Number	Range of Temperature Points ($^{\circ}\text{F}$)	Average Temperature (Over Sixty 1-Minute Data Points $^{\circ}\text{F}$)	VOC Destruction Efficiency (%)
1	1380 – 1565	1400	99.9
2	1380 – 1400	1390	99.9
3	1367 – 1398	1383	99.9

He explained further that:

- During the 2020-2021 and 2021-2022 Withdrawal Seasons, the Bluewater Gas Storage Columbus Station operated its thermal oxidizer using the same temperature parameters at which it was tested (e.g., 1400°F temperature set point). The facility recorded minute temperature data. This data was not averaged. Due to the voluminous nature of the data collected, the facility provided EGLE with the one-minute reading from the top of each hour for the 2020-2021 and 2021-2022 Withdrawal Seasons in response to its request for temperature data. Aside from certain identified malfunctions, the temperature data provided is generally consistent with the temperatures collected during the December 9, 2020, stack test, where such recorded temperatures were slightly below 1400°F. Given that the temperature readings provided to EGLE were consistent with the minute temperatures recorded during the December 9, 2020, emission test, Bluewater believes that the destruction efficiency of the thermal oxidizer would have been consistent with the 99.9% demonstrated during testing.
- Bluewater recognizes that its January 26, 2021, request to use the 1400°F temperature was imprecise and should have stated that a 1400°F set point would be used going forward. To ensure and further verify the destruction efficiency at temperatures lower than 1400°F, the facility will perform destruction efficiency testing this upcoming withdrawal season. The plan is to perform testing in the range of 1300-1350°F. Following this testing, the facility intends to request a use of a temperature that will account for the variation encountered when a thermal oxidizer is operated at a certain set point.

Regarding the operation of the TO during March 18-20, 2022, he explained that:

During the 2020-2021 and 2021-2022 Withdrawal Seasons, the Bluewater Gas Storage Columbus Station experienced eleven (11) malfunction events that either took the thermal oxidizer offline or significantly lowered the operating temperature of the thermal oxidizer. Six of these events affected the minute temperature data reported for one or two hours. Five of the events took than more than two hours to resolve. The lengthiest event occurred on March 18th, 2022. On this day, the thermal oxidizer was re-booted to address operating irregularities. Unbeknownst to the facility, however, this re-boot resulted in the temperature set points being reset to “factory conditions”. This reset was not evident to plant operators but was addressed expeditiously once discovered. The facility is taking steps to ensure that plant operators are aware of the potential for such a reset when working on the system so current programming will be maintained when the thermal oxidizer returns to service. During this event, the operating temperature of the thermal oxidizer ranged between 444.9 – 1370.69°F with the average temperature registering around 1091°F.

By the permit, notice must be submitted to the Department when the malfunction results in emissions of any air contaminant continuing for more than 2 hours in excess of a standard or limitation established by any applicable requirement. The thermal oxidizer has the following emission limitation set within the permit.

Pollutant	Limit	Time Period/Operating Scenario	Equipment	Monitoring/Testing Method	Underlying Requirements	Applicable
VOC	2.57 tpy	12-month rolling time period as determined at the end of each calendar month	Thermal oxidizer	SC VI.3	R 336.1225 & R 336.1702(a)	

During the March 18th, 2022 event, if BWGS were to take the most conservative approach and assume emissions were not controlled by the thermal oxidizer, which was not the case, total uncontrolled emissions would total 3.40 lbs during the event as calculated using GRI-GLYCalc Version 4.0 required in Permit Condition VI.3. of EUWGDEHY.

Annual VOC emissions from this unit generally range between 30-40 lbs. If one were to use this very conservative emission estimate of 3.40 lbs of VOC to account for emissions during the March 18th, 2022, event, 12-month rolling VOC emissions for this unit would not exceed the limit of 2.57 tons. Similarly, if one were to assume emissions were uncontrolled during the other reported malfunctions lasting more than 2-hours, there would be no exceedance of the 12-month rolling emission limitation. BWGS assumed emissions were uncontrolled for these events in the monthly VOC emissions provided in Table 12.

Based on these explanations and information the facility appears to be in compliance with the PTI No. 77-14C, SC IV.2 and General Condition 7.

Monitoring/Recordkeeping

The facility monitors the glycol recirculation rate and the natural gas processing rate, on a continuous basis. Mr. Westrick informed me that they calibrate the monitors as required.

Facility calculates NO_x, VOC and BTEX emission rates from the EU-WGDEHY as necessary. It uses GRI-GLYCalc to calculate the VOC and BTEX emissions. It keeps adequate records of natural gas processing rate, wet gas composition, natural gas fuel usage, glycol recirculation rate, thermal oxidizer exhaust gas temperature, documentation for the vapor recovery unit, etc. as required by conditions VI.4.

The stack/vent dimensions were not verified. However, the stack appears to be in compliance with the requirements of special conditions VIII.1 and 2.

FG-ENGINES

Natural gas fired 4 stroke lean burn reciprocating internal combustion engines driving Compressors. Controlled with catalytic oxidation systems

(Unit 1- EUCOMP NORTH, Unit 3-EUCOMP WEST, Unit 4-EUCOMP EAST)

Emission Limits:

The conditions 1.1 through 1.9 include emission limits for NO_x, CO and Formaldehyde, from the three engines. The stack tests show that these engines are in compliance with the emission limits.

Process/Operational Limits & Material Usage Limits:

Mr. Westrick informed me that they are burning pipeline quality natural gas in FG-ENGINES. The records show that the natural gas fuel usage for EU-COMP EAST and EU-COMP WEST together are 121.45 MMSCF as of June 2022. This is in compliance with the permit limit of 323 MMSCF based on a 12-month rolling period.

Design/Equipment Parameters

This condition requires that the FG-ENGINES shall not be operated unless the catalytic oxidation system on each engine is installed, maintained and operated in a satisfactory manner. Satisfactory operation includes cleaning of the catalyst panels. Each of the engines is installed with a catalytic oxidation system.

Mr. Westrick told me that currently the catalysts are being sent out to be cleaned on an annual basis. The engines are also maintained (oil analysis every month, adjust burner settings, valve settings, compressor checks, etc.) annually. Records for catalyst cleanings conducted in March 2020 for EUCOMP-EAST, on 6/8/2018 and 2/12/2019 for EUCOMP NORTH, EUCOMP WEST, and EUCOMP EAST were submitted. He informed me that they follow the

requirements in the SC IV.1 for the catalyst maintenance. The facility submitted records of the catalyst cleanings from 2020 and 2021.

Currently, the facility is using East and West Engines routinely. East Engine was operated during the previous weekend. Only West Engine was operating at the time of the inspection. The following readings were taken from Unit 3-EUCOMPWEST. They are monitoring the catalyst inlet temperature and exhaust gas temperature.

	Unit 3-EU-COMPWEST
Speed =	968 rpm
Left Catalyst (Pre-Cat Temp)	932 °F
Right Catalyst (Pre-Cat. Temp)	913 °F
Differential Pressure	2.1" WC
Torque =	72.2%
BHP	3305 (Set=4735)
Exhaust gas temperature	832.6°F (post catalyst)

Testing/Sampling

The facility is required to test each engine in FGENGINES for NOx and CO every 12 months. Previous test was conducted on September 15, 2020. Plan received on July 16, 2020, Approved on August 31, 2020. Report received on November 14, 2020. Most recent annual NOx and CO test for each engine, pursuant to PTI No. 77-14A and 40 CFR 63, Subpart ZZZZ was conducted on September 28, 2021. Test plan received on July 13, 2021 and approved on September 7, 2021. Report received on November 16, 2021.

EU-COMP NORTH:	CO ppmvd 15% O2	2021 Test Result = 0.403	NESHAP limit = 47
EU-COMPEAST:	CO ppmvd 15% O2	2021 Test Result = 5.04	NESHAP limit = 47
EU-COMP WEST	CO ppmvd 15% O2	2021 Test Result = 5.45	NESHAP limit = 47

The 2022 stack test plan was received on July 12, 2022 and is under TPU Staff review. The projected test date is September 12, 2022.

The five-year stack tests for NOx, CO, and formaldehyde were conducted September 19-20, 2018. The plan was received on July 11, 2018, and approved on September 15, 2018. Test report was received on November 13, 2018. The reports show compliance with emission limits

Monitoring/Recordkeeping

SC VI.1 requires facility to keep records of each measurement of NOx for each engine and keep on file for five years. The facility is keeping the emission measurement records.

SC VI.2 requires the facility to monitor the natural gas usage for EUCOMPEAST and EUCOMPWEST on a monthly basis. The facility is monitoring and keeping records as required.

SC VI.3 requires the facility to keep records of all maintenance on each catalytic system and keep records for five years. The facility is keeping necessary records. See attached.

Stack/Vent Restrictions

Stack dimensions were not verified at the time of the inspection, but stack dimensions appear to be in compliance with the requirements of Special Conditions VIII.1, 2 and 3.

Other Requirements:

SC IX.1 requires that all engines in FGENGINES comply with applicable requirements of 40 CFR 63, Subpart ZZZZ-NESHAP for RICE. See discussion under 40 CFR 63, Subpart ZZZZ-NESHAP for Reciprocating Internal Combustion Engines.

FG-FACILITY

Emission Limits:

SC I.1 through I.5 limit the annual emission rates for NO_x, CO, VOC, Individual HAP and Total HAPs to 89.59 TPY, 43 TPY, 21.1 TPY, less than 10 TPY, less 25 TPY, respectively based on a 12-month rolling period. The records show that 12-month rolling period emissions for NO_x, CO, VOC, Individual HAP and Total HAPs are 11.07 tons, 1.34 tons, 5.57 tons, (highest individual HAP = formaldehyde) 0.54 tons, and 1.48 tons, respectively as of June 2022.

Material Limits:

SC II.1 limits facility wide natural gas usage to 1,048 MMscf based on a 12-month rolling period. The records show that the facility wide fuel usage is 137.27 MMscf as of June 2022.

Monitoring/Recordkeeping:

SC VI. 1 & 2 requires the facility to keep monthly, and 12-month rolling time period emission rate calculations for NO_x, CO, VOC, single HAP and Total HAP and complete the calculations by the 30th of the calendar month. The facility is keeping adequate records and preparing calculations as necessary. They emailed the electronic records.

SC VI.3 requires the facility to keep monthly and 12-month rolling time period fuel usage for each emission unit in FGFACILITY. The facility is keeping adequate fuel usage records.

SC IXI.1 requires the facility to comply with all applicable provisions of federal New Source Performance Standards for New Stationary Sources as specified in 40 CFR 60, Subparts A, Dc and JJJJ. The facility is monitoring fuel gas usage, conducted the initial testing for NSPS RICE engine, etc. The facility appears to be compliance with the applicable NSPS requirements.

40 CFR 63, Subpart ZZZZ- NESHAP for Reciprocating Internal Combustion Engines

40 CFR 63.6590(a) (iii)-For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006. FG-ENGINES (EU-COMP NORTH, EU-COMP WEST, and EU-COMPEAST) and EU-GEN were installed prior to 2006 and are considered existing sources.

RICE MACT for existing RICES (> 500 hp, 4-Stroke Lean Burn, Non-emergency, (operates more than 24 hrs/year) at area sources requires installation of an oxidation catalyst to reduce HAP emissions from the stationary RICE, install a CPMS to continuously monitor catalyst inlet temperature according to the requirements in 40 CFR 63.6625(b), or install equipment to

automatically shut down the engine if the catalyst inlet temperature exceeds 1350 °F, conduct initial performance test or other initial compliance demonstration according to 40 CFR 63.6630(e) within 180 days after the compliance date (October 29, 2013). The RICE MACT also requires to demonstrate continuous compliance pursuant to 40 CFR 63.6640 and keep records as required in 40 CFR 63.6655.

EU-COMP NORTH, EU-GEN, EU-COMP WEST and EU-COMPEAST are subject to National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE), 40 CFR 63, Subpart ZZZZ (RICE MACT) located at an area source of HAP emissions. The compliance date for the facility was October 19, 2013. The MACT standards require initial testing for these engines which was done during August 13-15, 2013 and test report was received on September 23, 2014. Follow up annual tests, for EU-COMP NORTH, EU-COMP WEST and EU-COMPEAST are conducted, as required.

EU-145BHENG is subject to 40 CFR 63, Subpart ZZZZ which requires this RICE to comply with 40 CFR 60, Subpart JJJJ-NSPS for Spark Ignition RICEs. Complying with NSPS requirement is deemed compliance with MACT requirements.

The records submitted by the facility can be found at S:/Air Quality Division/STAFF/KALLUMKAL/2022 Inspections/N7303 BWGS

Conclusion: Bluewater Gas Storage appears to be compliance with the requirements of PTI No.77-14C. MIEGLE-AQD does not have delegated authority to enforce RICE MACT for area sources. Therefore, compliance with RICE MACT was not verified.

NAME Sebastiany Kallumkal

DATE 08/29/2022

SUPERVISOR Joyce