

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

N557266573

FACILITY: Howell Compressor Station		SRN / ID: N5572
LOCATION: 3990 Crooked Lake Rd, HOWELL		DISTRICT: Lansing
CITY: HOWELL		COUNTY: LIVINGSTON
CONTACT: Ian Campbell , EHS Coordinator		ACTIVITY DATE: 03/08/2023
STAFF: Matthew Karl	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled site inspection conducted as part of a full compliance evaluation (FCE) to determine compliance with MI-ROP-N5572-2021.		
RESOLVED COMPLAINTS:		

On Wednesday, March 8, 2023, I (Matt Karl) conducted a scheduled site inspection of the Howell Compressor Station (N5572) located at 3990 Crooked Lake Road, Howell, Livingston County, Michigan. This inspection was part of a full compliance evaluation (FCE) of the facility to determine compliance with permit MI-ROP-N5572-2021.

Contacts:

Facility Contact: Ian Campbell, EHS Coordinator

Cell: 517-525-8158 Email: Ian.Campbell@energytransfer.com

Facility Contact: Kristin Bollerman, Senior Environmental Specialist

Cell: 317-432-5738 Email: Kristin.bollerman@energytransfer.com

Facility Description:

The Howell Compressor Station is part of the Panhandle Eastern Pipeline. It is a natural gas transmission and storage facility located in Section 20 of Genoa Township, Livingston County, about one mile west of Crooked Lake and about 5 miles southeast of the City of Howell. The compressor station operates in conjunction with an underground natural gas storage field located near the eastern end of a natural gas pipeline originating in western Kansas and the Texas Panhandle. The original natural gas formation deposits were depleted, and the field was converted to natural gas storage in 1961. The storage field has a maximum storage capacity of 31.2 billion cubic feet (BCF) and a working capacity of 17.75 BCF. Four (4) Reciprocating internal combustion engine (RICE) driven compressors are used to compress pipeline natural gas and inject gas into the storage field during the summer months and alternately to withdraw gas from the storage field for re-delivery into the transmission pipeline during the winter months. Two (2) compressor engines are rated at 2000 horsepower (HP) and two (2) at 1000 HP. Other equipment at the facility includes three (3) withdrawal gas heaters, a 465 HP emergency engine/generator set, and liquid storage tanks for methanol, wastewater, and petroleum distillates. The facility also uses a triethylene glycol (TEG) dehydration system to remove the water from the natural gas.

Regulatory Overview:

The facility is considered a "major source" subject to the requirements of 40 CFR Part 70, because the potential to emit (PTE) of nitrogen oxides (NOx) exceeds 100 tons per year, and because the PTE of a single hazardous air pollutant (HAP), formaldehyde, exceeds 10 tons per year.

The four (4) compressor engines were installed prior to August 1967 and are considered “grandfathered” from new source review (NSR) permitting requirements. The compressor engines are also exempt from the Prevention of Significant Deterioration (PSD) regulations of the Michigan Air Pollution Control Rules Part 18, Prevention of Significant Deterioration of Air Quality or federal PSD requirements 40 CFR 52.21 because they were constructed/installed prior to June 19, 1978, the promulgation date of the PSD regulations.

The compressor engines (EUKVS6ICENGINE-1601, EUKVS6ICENGINE-1602, EUKVS12ICENGINE-1603, EUKVS12ICENGINE-1604) and emergency engine (EUGEN-1626) are subject to 40 CFR Part 63, Subpart A and ZZZZ: National Emission Standard for Hazardous Air Pollutants (NESHAP) for Stationary RICE. 40 CFR 63.6590(b)(3)(ii) excludes the compressor engines (EUKVS6ICENGINE-1601, EUKVS6ICENGINE-1602, EUKVS12ICENGINE-1603, EUKVS12ICENGINE-1604) from the requirements of 40 CFR Part 63, Subpart A and ZZZZ including the initial notification requirements.

The heaters (EUWB-HTR-1, EUWB-HTR-2, EUWB-HTR-3) are subject to 40 CFR Part 63, Subpart A and DDDDD: NESHAP for New or Existing Process Heater Equal to or Greater Than 10 MMBTU/hr.

The process heater (EUPLANT-HTR-1) and glycol dehydration system (EUDEHY) are subject to 40 CFR Part 63, Subpart A and DDDDD: NESHAP for Existing or New Boiler Process Heater, Small Unit.

The glycol dehydration system (EUDEHY) is subject to 40 CFR Part 63, Subpart A and HHH: NESHAP for Small New Glycol Dehydrators.

Michigan Air Emissions Reporting System (MAERS) 2022 Report:

Pollutant	Amount (pounds/year)	Amount (tons/year)
Ammonia	159.95	0.08
CO	32687.38	16.34
Lead	0.01	0.00
NOx	943855.27	471.93
PM10, FILTERABLE	21.80	0.01
PM10, PRIMARY	413.87	0.21
PM2.5, FILTERABLE	21.80	0.01

PM2.5, PRIMARY	413.87	0.21
SO2	119.39	0.06
TOC	25.29	0.01
VOC	14248.33	7.12
Benzene	35.33	0.02
Formaldehyde	6020.96	3.01

Inspection of Howell Compressor Station:

I (Matt Karl) arrived on site at 09:00. I signed in at the facility office and met with facility contact Ian Campbell. We proceeded to a conference room and discussed the inspection and the records that needed to be reviewed. We then proceeded to perform a walkthrough of the facility to review the permitted equipment. I signed out and departed the facility at 10:15. I have included a summary of the equipment inspected and records reviewed below.

EUKVS6ICENGINE-1601, EUKVS6ICENGINE-1602, EUKVS12ICENGINE-1603, EUKVS12ICENGINE-1604 (FGENGINES)- Four (4) Compressor Engines

The four (4) natural gas fired compressor engines are used to place pipeline natural gas into the underground oil field / reservoir. The 4-stroke lean burn (4SLB) engines do not have emission limits associated with the 40 CFR Part 63, Subpart ZZZZ per 63.6600(c). All the engines have electronic data collection systems which record the fuel usage and hours of operation. When filled, the natural gas reservoir field is pressurized at approximately 1000 pounds per square inch (psi). Therefore, the withdrawal of natural gas during the winter months rarely requires engine operation, as the natural gas can be passively withdrawn. Annual maintenance includes replacing the spark plugs. The stacks are approximately 40-50 feet tall, and exhaust unobstructed vertically. There is one stack for each 1000 HP engine, and 2 stacks per 2000 HP engine.

Ian and I performed a walkthrough of the engine building. None of the engines were operating during my site inspection. Ian informed me that unit 1601 had its annual maintenance check performed, and that unit 1602 was being looked at currently. Units 1601 and 1602 are the 6-cylinder, 1000 HP engines, while units 1603 and 1604 are the 12-cylinder 2000 HP engines. The engines operate sporadically during the summer injection season, based on when the pipeline informs the facility there is gas being routed to be injected into the storage field. The engines have not operated since the end of October 2022. The facility is required to keep records on the natural gas consumption for each engine for each calendar month. I have included the 2022 annual summary in the table below.

Engine Records: From January 2022-December 2022

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Engine	Recorded engine hours	Calculated HP-Hours	Calculated Fuel Use (mcf)
1601	2725	2,725,400	15,719
1602	2424	2,424,000	13,258
1603	1949	3,898,800	23,746
1604	2618	5,236,800	33,107
Total		14,285,000	85,829

EUDEHY (FGMACTHHHSMALL, FGMACTDDDDDDSMALL)- Glycol Dehydration System

The glycol dehydration system (dehy) consists of a 1.5 MMBTU/hr natural gas-fired burner and a 1000-gallon TEG storage tank. The pollution control equipment consists of the process heater (reboiler)

I reviewed the record for the annual wet gas stream composition report from the SPL Traverse City Laboratory. The sample was collected on 02/15/2022 upstream of the separator. The gas composition was 84.6 wt % methane, 12 wt % ethane, 1.2 wt % nitrogen, and trace amounts of the other analyzed components. There was no sulfur detected in the gas sample.

The most recent tune up of the reboiler was performed on 12/06/22 and consisted of inspecting the burner, the flame pattern, the air-to-fuel ratio, checking the CO emission reduction and the CO and O2 levels in the exhaust.

During the site visit, no field gas was flowing through the dehydration system. The dehydration system was set up to process small amounts of gas from tanks (pigs). Ian and I stopped by the dehy shed, which houses the dehy operating parameter panels. There was a daily checklist by the door used to check proper operation of the system.

Ian informed me to expect a PTI application for the glycol dehydration system to modify the equipment present to improve it's cold-weather capabilities. Ian told me parts of the glycol dehydration system were designed for operation in warmer temperatures (Texas) and they have had issues with freezing during the winter. The facility has added cold weather shielding and a portable heater to the affected portion of the equipment as a temporary solution.

EUWB-HTR1, EUWB-HTR2, EUWB-HTR3 (FGMACTDDDDDD)- Three (3) Heaters

Three (3) 10 MMBTU/hr capacity, natural gas fired water bath heaters for heating withdrawal gas.

I observed that only heater #3 (EUWB-HTR3) was operating at the time of my site inspection. I noted no visible emissions from the heater #3 stack. We stopped by the heaters shed which houses the heater operating parameter panels, which display the flame signal and heater bath

temperature. Heater #3 was operating, with a flame signal between 3-4 volts and a heater bath temperature of 114°F.

I reviewed the records for the most recent tune up of the heaters to comply with the boiler MACT. The most recent tune up was performed on 12/06/2022 for all three heaters. The tune up included inspecting the burner, the flame pattern, the air-to-fuel ratio, checking the CO emission reduction and the CO and O2 levels in the exhaust.

EUPLANT-HTR-1 (FGMACTDDDDD<10)- Process Heater

A 4.0 MMBTU/hr capacity process heater.

This emission unit is located next to the engine building.

EUGEN-1626 (FGMACTZZZZ)- Emergency Generator

A 465 HP (1.2 MMBTU/hr, 300 kW) capacity, diesel fired compression ignition emergency engine/generator set.

I reviewed the record for the Generator Maintenance Service Report performed by Oakley Services, Inc. on September 12, 2022. During this service event the contractor replaced batteries, replaced radiator bypass hose and clamps, checked and tightened hose clamps.

Ian informed me that the emergency generator operated approximately 20 hours in 2022, with about 1 hour for emergency power outages, and the rest of the operating time for maintenance monthly readiness testing.

EURULE285(2)(mm)- Venting

Any occurrence of venting of natural gas in amounts greater than 1,000,000 standard cubic feet (scf).

Ian informed me that there has been no recent venting of natural gas at the facility.

Records Review:

1. Records for glycol dehydration system EUDEHY (FGMACTHHHSMALL, FGMACTDDDDDDSMALL) for 2022
 - a. EUDEHY monthly operating hours (hours/month) and 12-month rolling hours (hours/12-month) for 2022
 - b. EUDEHY BTEX emission limit calculation and emissions (kg/hr) for 2022
 - c. EUDEHY Benzene emission limit (Mg/yr) for 2022
 - d. EUDEHY total natural gas throughput for 2022

I reviewed the record "2022 Dehydration Rolling Hours.pdf". The glycol dehydration system has a seasonal schedule, with most of its operating hours in the winter, and much more limited use during the summer. The highest 12-month rolling hours occurred in January 2022 and was 3,683.7 hours, which is well below the process/operational restriction EUDEHY III.1 of 7,000 hours. The 12-month rolling for 2022 (in December 2022) was 2,363.2 hours.

I reviewed the record "2022 Howell Emissions Summary.pdf" and "Howell 2022 Dehydration Plant.pdf". The BTEX permit limit was calculated as 85.53 Mg/yr, which is 9.76 kg/hr. The raw BTEX emissions were calculated as 6.4245 lb/hr, which is 2.91 kg/hr. The condenser has a 98% control efficiency, so actual emissions are 0.01603 Mg/yr, which is 0.0018 kg/hr.

The EUDEHY Benzene emission limit was calculated as 0.9 Mg/yr, and actual emissions were reported as 0.016 Mg/yr, which is 0.017 ton/yr, which is ~34 lb/yr.

I reviewed the record "2022 Hours and Gas Throughput.pdf". The total 2022 natural gas volume was 6,240,706.0 MMSCF, the total withdrawal volume was 5,240,984.0 MMSCF and the total injection volume was 8,816,186.0 MMSCF.

2. Records for four (4) compressor engines EUKVS6ICENGINE-1601, EUKVS6ICENGINE-1602, EUKVS12ICENGINE-1603, EUKVS12ICENGINE-1604 (FGENGINES) for 2022
 - a. FGENGINES natural gas consumption, monthly for 2022

I reviewed the record "PEPL Howell Monthly Engine Fuel Use 2022.pdf" and confirmed that the source is keeping monthly natural gas consumption records for each of the engines. Engine "E01604" consumed the most fuel in 2022, with 33,107 MCF and "E01602" the least with 13,258 MCF. The differences in fuel consumption correspond with differences in size and operating time. The engines consumed a total of 85,829 MCF in 2022.

3. Records for three (3) heaters EUWB-HTR-1, EUWB-HTR-2, EUWB-HTR-3 (FGMACTDDDDD)
 - a. Annual tune-up report for these process heaters for 2022

I reviewed the record "2022 Heater Maintenance.pdf". All three of the process heaters had their respective annual tune-up performed on December 6, 2022. The tune-up consisted of inspecting the burner, inspecting the flame pattern, inspecting the air-to-fuel ratio control system, optimizing emissions of CO and measuring the CO and O2 levels in the exhaust, before and after tune-up.

4. Records for emergency engine EUGEN-1626 (FGMACTZZZZ) for 2022
 - a. Beginning and ending dates for each use event
 - b. Total number of operational hours (elapsed hours)
 - c. Use category: emergency, readiness testing, maintenance.
 - d. Comment/description of each use event

I reviewed the record "2022 Generator Hours.pdf". The diesel generator "E01626" was operated for 21.85 hours for maintenance purposes and 0.75 hours in July 2022 for emergency purposes.

Semi-Annual and Annual Reports:

The facility appears to be submitting semiannual and annual certification reports as required. There have been no deviations or non-compliance events recently.

Summary:

The Howell Compressor Station appears to be in compliance with the requirements of MI-ROP-N5572-2021.

NAME Mattew R. Kaul

DATE 4/13/23

SUPERVISOR MB