

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

N302266513

FACILITY: Eaton Rapids Gas Storage System		SRN / ID: N3022
LOCATION: 3349 S Waverly Rd, EATON RAPIDS		DISTRICT: Lansing
CITY: EATON RAPIDS		COUNTY: INGHAM
CONTACT: Lisa Fishbeck , Environmental Analyst		ACTIVITY DATE: 02/22/2023
STAFF: Matthew Karl	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled site inspection as part of a full compliance evaluation (FCE) of the facility to determine compliance with permit MI-ROP-N3022-2020b.		
RESOLVED COMPLAINTS:		

On Wednesday, February 22, 2023, I (Matt Karl) conducted a scheduled site inspection of the ANR Eaton Rapids Gas Storage System (N3022) located at 3349 S. Waverly Road, Eaton Rapids, Michigan 48827. This inspection was part of a full compliance evaluation (FCE) of the facility to determine compliance with permit MI-ROP-N3022-2020b.

Contacts:

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Facility Contact: Lisa Fishbeck, Environmental Analyst (Specialist)
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Facility Contact: Dustin Holden, Site Engineer

Responsible Official: Nicholas Rudolph, Area Manager, St. Clair – Great Lakes Region
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Facility Description:

The ANR Pipeline Company (ANR) – Eaton Rapids Gas Storage System (ERGSS) is a natural gas transmission and storage facility located in Section 7 of Onondaga Township, Ingham County, on the Ingham/Eaton County line, adjacent to the Grand River, and approximately one quarter mile northeast of the National VFW Home. ANR is owned by TransCanada Corporation (TC). ERGSS stores natural gas by re-injecting it into an underground gas reservoir and withdraws it for pipeline transport and sale. The reservoir is a depleted natural gas field which is approximately three (3) miles in length and 3,700 feet below ground level. The facility operations are seasonal with extraction occurring November through March. The natural gas is coming from western Canada, is stored in the reservoir, and is transported throughout the Midwest for use. A network of pipelines is used to transport the natural gas.

Three (3) identical natural gas-fired, spark ignition (SI) reciprocating internal combustion engines (RICE) are used to compress natural gas into the storage reservoir during injection, and push gas into the pipeline during withdrawal. A glycol dehydration system removes water and impurities from natural gas withdrawn from the reservoir. Additional processes include a natural gas-fired withdrawal natural gas bath process heater, natural gas-fired boiler for fuel temperature regulation, a natural gas-fired boiler for water heating, an emergency generator, and eight (8) liquid storage tanks.

Regulatory Overview:

The facility was built in 1989. ERGSS is an existing major Prevention of Significant Deterioration (PSD) source for emissions of nitrogen oxides (NOx) and carbon monoxide (CO).

The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR) Part 70, because the potential to emit (PTE) of carbon monoxide (CO) and nitrogen oxides (NOx) exceeds 100 tons per year (TPY). Additionally, the PTE of any single hazardous air pollutant (HAP) regulated by Section 112 of the federal Clean Air Act, is equal to or more than 10 tons per year and/or the potential to emit of all HAPs combined is equal to or more than 25 tons per year.

EUERBATHEATER at the stationary source is subject to the Standards of Performance (NSPS) for Small Industrial-Commercial-Institutional Steam Generating Units promulgated in 40 CFR Part 60, Subparts A and Dc.

FGERGLYDEH at the stationary source is subject to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Natural Gas Transmission and Storage Facilities promulgated in 40 CFR Part 63, Subparts A and HHH. The glycol dehydrator is the affected source. According to definitions in 40 CFR 63.1270(b)(2) and 40 CFR 63.1271, FGERGLYDEH is classified as an existing small glycol dehydrator.

EUERCOMP-A, EUERCOMP-B, EUERCOMP-C and EUERENG at the stationary source are subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE) promulgated in 40 CFR Part 63, Subparts A and ZZZZ. EUERCOMP-A, EUERCOMP-B, EUERCOMP-C are existing RICE that have no emission or operating limitations under 40 CFR 63, Subpart ZZZZ. If the engines are not reconstructed or replaced with a newer model engine the Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE) promulgated in 40 CFR 63, Subpart JJJ do not apply. EUERENG is an existing RICE subject to the operating requirements in 40 CFR 63.6640(f)(1)-(3).

EUERBATHEATER, EUERBOILER and EUREBOILER at the stationary source are subject to the NESHAP for Industrial, Commercial and Institutional Boilers and Process Heaters promulgated in 40 CFR Part, Subparts A and DDDDD. EUERBATHHEATER is an existing (constructed in 2003) process heater designed to burn Gas 1 fuels. EUERBOILER is an existing (constructed in 1989) boiler designed to burn Gas 1 fuels. EUREBOILER is an existing (constructed in 1989) boiler designed to burn Gas 1 fuels.

Michigan Air Emissions Reporting System (MAERS) 2021 Report:

Criteria Pollutant	Amount (pounds per year)	Amount (tons per year)
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CO	47,360.64	23.68
NOx	69,188.56	34.59
PM10, PRIMARY	344.57	0.17
PM2.5, PRIMARY	344.57	0.17
SO2	86.39	0.04
VOC	14,719.54	7.36

Inspection of ANR Eaton Rapids Storage System:

I (Matt Karl) arrived on site at approximately 09:00. I announced myself at the gate, entered and parked in front of the facility office. I met with Nick Rudolph, Lisa Fishbeck and Dustin Holden in the office break room. We discussed the inspection and Dustin walked me through the site safety plan.

We performed a walkthrough of the facility. We started in the Aux Building, which houses the emergency generator (EUGEN) and the boiler (EUBOILER). The emergency generator was not operating during my inspection. I noted that the emergency generator had a plaque with serial no. 81533 and a rated capacity of 500 kW/hr. The boiler was operating, and I noted the boiler had a plaque with serial no. L-86586, install date 10/26/1989 and heat input capacity of 2092000 Btu/hr. There was also a control room present in this building, and Dustin was able to bring up the monitoring system information for the glycol dehydrator system thermal oxidizer (TO) control. The TO combustion temperature was 1602.9 °F.

We then proceeded to the Comp Building, which houses the three (3) compressor engines. At the time of my inspection, none of the compressor engines were operating.

We then proceeded to the Dehydrator Building, which houses the glycol dehydrator system equipment. I noted the equipment was operating, and that the equipment that was in a gravel floored building with a lined secondary containment below the system equipment. The glycol dehydrator system process equipment is electronically monitored with sensors. We then proceed to the thermal oxidizer control, which is located behind the Dehydrator Building. It was operating at the time of my inspection. I noted no visible emissions. The stack exterior appeared rusted, but the integrity of the stack and ductwork appeared to be intact.

We returned to the facility office. Lisa and Nick informed me that there had been no recent venting occurrences, and that there had been no recent malfunctions on any of the equipment or monitoring system. They explained that this was a “newer” facility which began operations in 1989, and the equipment was performing and functioning as designed and intended. The facility

does not intend to make any operational or equipment changes currently. I signed out and departed the facility around approximately 09:30.

EUERCOMP-A, EUERCOMP-B, EUERCOMP-C (FGERCMPRS) – Three Compressor Engines

Three (3) identical Superior Model 16-cylinder (16SGTB), 2650 HP (18.82 MMBtu/hr) natural gas fired, 4 stroke lean-burn, SI RICE. The compressor engines are used to compress natural gas for injection into or withdrawal from the natural gas storage field. The engines operate in single stage or double stage compression. Units A and B were installed in 1989 and Unit C was installed in 1994. The compressor engines permit conditions were modified in 1999 with permit to install (PTI) No. 81-94A which increased the emission limits for NOx, CO and VOC. The emission rate increases were allowed to better reflect the fluctuation of emissions at varying torque and speed. The engines do not have add-on emission control devices. The engine stacks vent vertically at a height of 35 feet.

1. Gas being injected or withdrawn from the storage field?

Nick and Dustin informed me that gas was being passively withdrawn from the storage field at the time of the inspection.

2. Which units are operating?

None of the above emission units were operating at the time of the inspection.

3. Last major overhaul? (Every 50,000 hours)

There are no scheduled major overhauls for the engines. Nick informed me that routine maintenance inspections were expected to occur for the next two years. The maintenance inspections are performed after a set number of operating hours on the engine (every 8,000 hours).

The last stack test for NOx, CO and VOC emissions was conducted on unit EUERCOMP-B on July 29, 2021. I have included the summary of the test results below:

Measured Unit	Rated Power (HP)	Permit Limit	Results	Pass/Fail (% limit)
NOx (pph)	2,650	52.6	8.15	Pass (16%)
NOx (g/hp-hr)		3.0	1.66	Pass (55%)
CO (pph)		49.1	6.15	Pass (13%)
CO (g/hp-hr)		2.8	1.25	Pass (45%)
VOC (pph)		21.03	1.15	Pass (6%)

VOC (g/hp-hr)	1.2	0.89	Pass (74%)
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The next stack test is required within 5 years of the last test, so by July 29, 2026.

FGERGLYDEH and FGMACTHHH – Glycol Dehydrator System

The glycol dehydrator (EUERGLYDEH) with reboiler (EUREBOILER) strips liquids out of the natural gas. The liquids go to a condensate tank. VOC and HAP emissions such as benzene, toluene, ethyl benzene and mixed xylenes (BTEX) are potentially emitted from glycol dehydration system. In 1997, PTI 76-97 was issued for the system. The permit required the installation and use of a thermal oxidizer, a condenser or an equivalent control device for VOC and HAP emissions.

The thermal oxidizer is the primary control device. The thermal oxidizer is equipped with a continuous temperature monitor. The set point is 1475 °F which is monitored when operating. The condenser is the backup control device and glycol use is reduced as necessary to assure that the condenser exhaust temperature is in compliance with the permit restriction. The condenser has a heat exchanger to help maintain the temperature of the condenser exhaust gas below the permit restriction of 120 °F.

1. Seasonal operations November through March. Operating? Operating.
2. Thermal oxidizer temperature? 1602.9 °F
3. Condenser exhaust temperature? -
4. Maintenance/Repairs?

Lisa informed me that the facility uses an electronic maintenance log system. I inquired about how often the thermal oxidizer control thermocouple sensor was calibrated. Nick informed me that those checks are performed as specified in their facility maintenance plan.

5. Malfunctions/monitoring system malfunctions?

There have been no recent malfunctions of the glycol dehydrator system or the thermal oxidizer control, and there have been no monitoring system malfunctions.

6. Quarterly visible emissions?

No recent visible emissions observed. I noted no visible emissions during my time on site.

EUERBATHEATER and EUERBOILER and EUREBOILER (FGMACTDDDDD and FGMACTDDDDD<10) – Process Heater and Boilers

EUERBATHEATER is an indirect natural gas-fired 10.0 MMBtu/hr process heater identified as the “Withdrawal Gas Bath Heater” used to heat cold natural gas. It has a heated glycol jacket and two (2) arrester vertical vents. The process heats the cold gas in the wintertime to keep pipes and valves from freezing. The process heater is exempt per Rule 282(2)(b)(i) but is subject to federal requirements in 40 CFR Part 63, Subpart DDDDD (Boiler MACT).

EUERBOILER is a natural gas-fired 2.092 MMBtu/hr boiler used for fuel temperature regulation. The boiler is exempt per Rule 282(2)(b)(i) but is subject to the federal requirements in 40 CFR Part 63, Subpart DDDDD (Boiler MACT).

EUREBOILER is a 0.65 MMBtu/hr reboiler on the glycol dehydration system. This boiler is subject to the federal requirements in 40 CFR Part 63, Subpart DDDDD (Boiler MACT).

EUERGEN (FGMACTEMERGENCY) – Emergency Generator

A Waukesha generator model F2895-GSIU rated at 500 kW/hr supplies electricity for the facility during power outages. The engine on the generator is 670 HP natural gas-fired, 4-stroke rich-burn (4SRB) RICE. The engine is exempt per Rule 285(2)(g) but is subject to the federal requirements in 40 CFR Part 63, Subpart ZZZZ (RICE MACT). The engine is restricted to non-emergency use at a maximum of 50 hours per year and to a total of 100 hours per year for maintenance checks and readiness testing.

FGRULE285(2)(mm) – Venting

Routine and emergency venting of natural gas from transmission and distribution systems or field gas from gathering lines.

1. Have there been any venting events?

Lisa informed me that there have not been any recent venting events at the facility.

Records Review:

The following records below were requested to be reviewed as part of the inspection. Christopher McFarlane provided electronic copies of the records, which are now available on content manager.

- 2019 Eaton Rapids Dehy Emission Factor Update
- Eaton Rapids Monthly VOC Emissions
- Eaton Rapids Dehy BTEX Emission Limit Calculations_2021-22
- Eaton Rapids Engine Emissions_2021-22
- Eaton Rapids Engine Hp-Hrs Monthly Summary Report_2021-22
- Eaton Rapids Gas Analysis 2019-02-18
- Eaton Rapids Gas Storage System APU Record Keeping Log_2021
- Eaton Rapids Gas Storage System APU Record Keeping Log_2022
- Eaton Rapids Monthly Dehy Reports_2021-22
- ERConDEF_CY2019
- ERTheoxEF_CY2019
- Eaton Rapids Engine Emissions_NOx_22
- Eaton Rapids Engine Emissions_VOC_22
- Eaton Rapids Engine Emissions_CO_22

1. Records and calculations for compressor engines FGRCMPRS for 2021 and 2022
 - a. Hours of operation during the month for each engine
 - b. Horsepower-hours (hp-hr) per month for each engine
 - c. The monthly average pounds/hour, and tons/12-month rolling NOx emissions
 - d. The monthly average pounds/hour, and tons/12-month rolling CO emissions
 - e. The monthly average pounds/hour, and tons/12-month rolling VOC emissions

- f. Applicability demonstration (reconstruction/not reconstruction) for any engine overhauls (overhaul cost vs. cost of new replacement)

2021 Engine Operating Data

Engine EU	Op Hours	hp-hr	NOx (tpy)	CO (tpy)	VOC (tpy)
EUERCOMP-A	2417.51	4,030,921	10.03	6.87	1.94
EUERCOMP-B	3965.66	6,881,234	16.4	11.13	3.13
EUERCOMP-C	1295.92	2,152,440	5.89	3.74	1.03
Total			32.32	21.74	6.10
Permit Limit			230.3	215.0	92.1

2022 Engine Operating Data

Engine EU	Op Hours	hp-hr	NOx (tpy)	CO (tpy)	VOC (tpy)
EUERCOMP-A	1447.76	2,513,734	5.19	3.91	1.14
EUERCOMP-B	2907.83	5,531,907	11.29	8.49	2.46
EUERCOMP-C	3610.16	6,563,717	14.08	10.61	3.06
Total			30.56	23.01	6.66
Permit Limit			230.3	215.0	92.1

The emission factors used for the compressor engines were 122.4 lb/mmscf for VOC. The emission factor was 764.63 lb/mmscf for NOx before 7/1/21 and 560.846 lb/mmscf for NOx after 7/1/21. The emission factor was 453.44 lb/mmscf for CO before 7/1/21 and 422.1 lb/mmscf for CO after 7/1/21. This corresponded to the stack test in July 2021.

The record "Eaton Rapids Engine Emissions_2021-22" contained the monthly average pounds/hour and tons per 12-month rolling NOx, CO, and VOC emissions for 2021. I summarized the ton/year (tpy) NOx, CO, and VOC emissions in the table "2021 Engine Operating Data" above, which reports emissions well below the permitted emission limits.

The records “Eaton Rapids Engine Emissions_[NOx, CO, VOC]_22” contained the monthly average pounds/hour and tons per 12-month rolling NOx, CO, and VOC emissions for 2022. I summarized the ton/year (tpy) NOx, CO, and VOC emissions in the table “2022 Engine Operating Data” above, which reports emissions well below the permitted emission limits.

There have been no recent engine overhauls on the compressor engines, so no applicability demonstration was necessary.

2. Records for glycol dehydration system FGERGLYDEH and FGMACTHHH for 2021 and 2022
 - a. Operational hours and natural gas throughput on a daily and monthly basis
 - b. One month of records of the operating temperature of the thermal oxidizer and condenser exhaust daily average temperature for each operating day
 - c. Monthly records of VOC emissions in pounds per day and tons per year
 - d. Copy of the last natural gas composition testing results including VOC content
 - e. VOC emission factor using GRI-GLYCalc
 - f. The Appendix 7 BTEX emission limit calculation

The record “Eaton Rapids Monthly VOC emissions” contained the operational hours and natural gas throughput on a monthly basis, as well as the VOC and Benzene emissions in lbs/month and tons/month.

In 2021, the thermal oxidizer operated for a total of 701.9 hours and had a total natural gas throughput of 1069.7 mmscf. The condenser operated for a total of 2342.3 hours and had a total natural gas throughput of 6,082.3 mmscf. In 2021 the dehydration system emitted 0.909 tons of VOC and 0.115 tons of Benzene. The VOC emissions were well below the permitted limit of 9.5 TPY.

In 2022, the thermal oxidizer operated for a total of 2708.1 hours and had a total natural gas throughput of 7441.5 mmscf. The condenser operated for a total of 3.6 hours and had a total natural gas throughput of 8.0 mmscf. In 2022 the dehydration system emitted 0.066 tons of VOC and 0.008 tons of Benzene. The VOC emissions were well below the permitted limit of 9.5 TPY.

The record “Eaton Rapids Monthly Dehy Reports_2021-22” contained daily records for the thermal oxidizer operating temperature and condenser exhaust temperature. This record also contained VOC and Benzene emissions in lbs/day.

In 2021, the thermal oxidizer operating temperature was maintained above 1400°F as required. The condenser exhaust temperature was maintained below 120°F as required. The highest VOC lb/day emission was 32.0 lb/day VOC, which was well below the permitted limit of 51.9 lb/day VOC.

In 2022, the thermal oxidizer operating temperature was maintained above 1400°F as required. The condenser exhaust temperature was maintained below 120°F as required. The highest VOC lb/day emission was 2.6 lb/day VOC, which was well below the permitted limit of 51.9 lb/day VOC.

The record "Eaton Rapids Gas Analysis 2019-02-18" contains the last natural gas composition testing.

The records "2019 Eaton Rapids Dehy Emission Factor Update", "ERTheoxEF_CY2019", "ERCondEF_CY2019" contain the information about the VOC emission factor GRI-GLYCalc Version 4.0. I have summarized the emission factors in the table below:

Emission Factor- EU	Amount	Units
Benzene-Oxidizer	0.00188	lb/mmscf
VOC-Oxidizer	0.01768	lb/mmscf
Benzene-Condenser	0.0371	lb/mmscf
VOC-Condenser	0.295889	lb/mmscf

The record "Eaton Rapids Dehy BTEX Emission Limit Calculations_2021-22" contains the required BTEX calculations. In 2021 the BTEX emission limit was 13.73 Mg/year, and the 2021 BTEX emissions were 0.7362 Mg. In 2022 the BTEX emission limit was 16.06 Mg/year and the 2022 BTEX emissions were 0.0431 Mg.

3. Records for emergency engine FGMACTEMERGENCY for 2021 and 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

The records "Eaton Rapids Gas Storage System APU Record Keeping Log 2021" and "2022" contain the RICE MACT emergency engine log for EUERGEN- Waukesha F2895GSIU generator engine, 670 hp. The record contains the start date, hour meter reading at start and stop of event, the total running time, use category and the reason for running. In 2021 the emergency engine operated for 12.3 hours for maintenance purposes, as part of monthly readiness testing. In 2022 the emergency engine operated for 2.6 hours for emergency purposes due to power outages and for 13.3 hours for maintenance purposes, as part of monthly readiness testing.

Semi-Annual and Annual Reports:

The facility appears to be submitting semi-annual and annual ROP compliance certifications. The facility also submits semi-annual reports for MACT HHH, and Boiler MACT Notification of Compliance Status. The facility did not report any deviations in 2022.

Summary:

At the time of the site inspection, it appeared that the facility was in compliance with the applicable rules and regulations and permit MI-ROP-N3022-2020b.

NAME Matthew R. Karl

DATE 3/6/23

SUPERVISOR AB