

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

N302228668

FACILITY: Eaton Rapids Gas Storage System		SRN / ID: N3022
LOCATION: 3349 S Waverly Rd, EATON RAPIDS		DISTRICT: Lansing
CITY: EATON RAPIDS		COUNTY: INGHAM
CONTACT: Bruce Bendes, R.S., CHMM, , Environmental Specialist		ACTIVITY DATE: 02/27/2015
STAFF: Brad Myott	COMPLIANCE STATUS: Compliance	
SUBJECT: Determine compliance with MI-ROP-N3022-2014		SOURCE CLASS: MAJOR
RESOLVED COMPLAINTS:		

Eaton Rapids Gas Storage System 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. Natural gas is re-injected into an underground gas reservoir for storage and is withdrawn as needed for pipeline transport and sale. The reservoir, a depleted natural field, is approximately 3,700 feet below the earth's surface. The processes are seasonal, with extraction occurring November through March. A network of pipe is used to transmit the natural gas from Louisiana to Canada, and throughout the Midwest.

Three identical natural gas fueled, spark ignited, four-cycle, lean burn, turbocharged, 2650 horsepower compressor engines are used to compress natural gas into the storage reservoir during injection, and into the pipeline during withdrawal. A glycol dehydration system removes water and impurities from natural gas withdrawn from the reservoir. Additional processes include a withdrawal gas bath heater, gas boiler, emergency generator, and liquid storage tanks.

Eaton Rapids Gas Storage System is a major source of NO_x, CO, and HAPs. It is subject to the conditions contained in renewable operational permit MI-ROP-N3022-2014. This ROP was recently issued on 12/23/2014 and included updated conditions for the various applicable MACTS as described below.

Eaton Rapids Gas Storage is also a major source of HAPs (PTE of formaldehyde > 10 tpy). The source is subject to three separate MACTs, Gas Transmission and Storage subpart HHH, Reciprocating Internal Combustion Engines subpart ZZZZ, and Industrial, Commercial, and Institutional Boilers subpart DDDDD. At present the facility is **not** subject to any NSPS requirements such as Storage Vessels for Petroleum Liquids subparts K, Ka, and Kb; Stationary Gas Turbines subpart GG; and Stationary Spark Ignition Internal Combustion Engines subpart JJJJ.

A MAERs emission report was reviewed on March 13, 2014. The source is considered a category I source and is fee subject. The report indicated the following facility wide emissions for 2013; 22.6 tpy CO, 7.7 tpy NO_x, 2.6 tpy PM₁₀, and 3.9 tpy VOC.

Annual and semi annual certifications and deviation reports are being received. No deviations were reported in 2014.

For safety and security reasons the property is fenced with warning signs, gated, and access is restricted by appointment only (required by permit condition). I arrived, at approximately 9:40 am. Several staff were on site today as Eaton Rapids was performing stack testing on the glycol dehydrator (see separate activity report for the stack test observation). I met with Bruce Bendes, the environmental contact and Keith, the facility contact. I provided Bruce with a copy of the Environmental Inspections brochure. This inspection completes a full compliance evaluation.

1. Three Compressors; FGRCMPRS

Three sixteen cylinder, 2,650 hp, 4-cycle turbocharged reciprocating internal combustion engines

(RICE) are used to drive the compressors. The engines run on natural gas and are considered to be four stroke lean burn (4SLB). The compressor engines were last modified in 1999 and are by definition existing stationary RICE.

Although subject to MACT subpart ZZZZ, and considered an affected source, existing 4SLB RICE have limited MACT requirements. The MACT requirements are:

1. No replacement or modification of the units
2. Maintain the 4SLB status.
3. No initial notification is required.

Engine emissions include oxides of nitrogen (NOx), carbon monoxide (CO), volatile organic compounds (VOC), and formaldaheyde. The engines do not have "add on" controls.

During my inspection, gas was being extracted from the reservoir. Injection occurs approx. April through October, while extraction occurs November through March. Units A & C were operating on this day. Unit B was idle. We went to the engine plant and witnessed the operation of the two engines. I recorded the following data:

Engine Data

Unit / install date	gas Pressure (psi)		%load
	in	out	
Unit A/ 1989	573	880	68
Unit B/ 1994	580	883	70

The required recordkeeping and calculations are being maintained as required. Data is collected electronically and stored by computers. B. Bendes provided a spreadsheet of operational hours, horsepower hours, and calculated emissions as required by the permit. Emission data for calendar year 2014 for Units A, B and C is included in the spreadsheet, see attached. Emissions were in compliance with permit limits.

2014 Emission Summary Data

	NOx		CO		VOC	
	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr
Actual for 2014	8.7	658	32.6	24.0	0.54	0.5
Limits	230.3	52.6	215	49.1	92.11	21.03

Engine testing is required once during the ROP cycle. Approved stack testing was last completed on 9/8/11. Testing was witnessed by T. Gasloli of TPU. Compliance with the limits was met. Results from the 2011 engine test are listed below. Stack testing for the most recent ROP cycle will need to be performed again prior to 12/23/2019 to satisfy the testing requirement in MI-ROP-N3022-2014.

Executive Test Summary of RICE on 9/8/2011

Pollutant	NOx		CO		VOC	
	g/BHP-hr	lbs/hr	g/BHP-hr	lbs/hr	g/BHP-hr	lbs/hr
Limit	3.0	52.6	2.8	49.1	1.2	21.03
Actual	0.6	3.1	1.6	9.2	0.13	0.72

The three stacks were of appropriate height.

2. Two Boilers

EUERBOILER: A 1.4 mmbtu Cleaver Brooks natural gas fired hot water boiler provides heat for the facility. The boiler is exempt from the AQD permit process by rule 282(b)(i) and exempt from the Boiler MACT.

EUERBATHEATER: A 10.0 mmbtu boiler identified as the "Withdrawal Gas Bath Heater", is used to heat water for process needs. The process is to heat the cold gas in the winter time to keep pipes and valves from freezing. The boiler is also exempt from the AQD permit process by rule 282(b)(i) but is now incorporated into the ROP because it is subject to the Boiler MACT subpart DDDDD. This unit is characterized as an existing Unit designed to burn Gas 1 fuels according to the Industrial, Commercial, and Institutional Boilers (ICI) MACT subpart DDDDD. Compliance date for this regulation is January 31, 2016. It appears that the main requirement is to conduct a tune-up of the affected unit once every 5 years. Initial notification was received 5/30/13.

3. Generator; EUERGEN; FGMACTEMERGENCY

A 500kW Waukesha generator supplies electricity for the facility during power outages. The generator is powered by a 600 HP natural gas fired 4SRB RICE. The engine is exempt from the AQD permit process by rule 282(b)(i) and is located in the same building as EUERBOILER.

The generator is subject to the RICE MACT ZZZZ and a notification was received on 7/3/2006. The notification indicated that the facility would switch to "line" electricity and the generator would be restricted to emergency use only. The MACT ZZZZ restricts non-emergency use of an "emergency generator" to a maximum of 50 hours per year and the use of a "limited use generator" to 100 hours per year. Applicable MACT requirements are now listed in the ROP under FGMACTEMERGENCY. Bruce indicated the unit is rarely used and the annual hours of operation are well below the 50 hr limit.

4. Glycol Dehydrator; EUERGLYDEH; FGMACTHHH

Volatile Organic Compounds (VOC) and Hazardous Air Pollutants (HAP) such as benzene, toluene, ethyl benzene, and mixed xylenes are emitted from the glycol dehydration system. In 1997 a permit to install was issued by the AQD 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 permit specifically limited benzene emissions to 0.99 tons per year. The conditions cited in the 1997 permit have been incorporated into the operating permit MI-ROP-N3022-2014 under EUERGLYDEH. The operating permit is federally enforceable.

Because Eaton Rapids Gas Storage is a major source of formaldehyde it is subject to the Gas Transmission and Storage MACT NESHAP, subpart HHH. The glycol dehydrator is the affected unit. Applicable MACT HHH conditions have been added to the ROP in the FGMACTHHH section. ~~The federally enforceable control devices installed on the glycol dehydrator in 1997 limit the extent of the MACT requirements.~~ According to 40CFR63.1274(d)(2) existing glycol dehydrators with federally enforceable controls are conditionally exempt from additional requirements for control, monitoring, recordkeeping, and reporting, as contained in the subpart, if the actual average benzene emissions remain below 0.992 tpy as determined by the methods contained in 40CFR63.1282(a)(2).

The Gri-GlyCalc software that is required by 40CFR63.1282(a)(2), is installed, and in use at Eaton Rapids Gas Storage. Records created by the software indicate that annual benzene emissions were 0.004 tpy ending July 2013, well below the 0.99 tpy permit limit. Eaton Rapids Gas Storage is currently in compliance with the requirements of MACT subpart HHH. Benzene emissions for the month of Feb. 2015 were 3.9 lbs or 0.002 tons. These emissions continue to decrease annually as the reservoir goes through injection and extraction cycles.

Records also indicated that the glycol dehydrator operations ended by May 2014, and started up again in November 2014. Operational hours and total gas flow in mmscf through the dehydrator system is

monitored.

Gas quality testing is ongoing at the Eaton Rapids facility and the data is used to generate benzene emission factors through the GRI-GLYCalc software as required by the operating permit. Gas testing is required each ROP cycle and was last performed on 2/26/10. It is scheduled again for 2015. The condenser, the least efficient control device, emits benzene at a current maximum emission factor of 0.042 #/mmscf. If the condenser were the only control device in operation, @8,614 mmscf/year, the benzene emission would be 0.18 tpy well below the permit limit. The quality of the gas continues to improve each season as more impurities are removed from the reservoir. VOC emissions for the past several years have been less than 0.1 ton. The limit is 9.5 tpy.

The glycol dehydrator was operating during my inspection (3.6 gpm glycol). The glycol dehydrator is only used from October through April when the facility is withdrawing gas that can contain moisture and impurities. The oxidizer and condenser were in operation on this day. The stack exhausting the condenser is at least 15.5 feet. The oxidizer stack was taller still. A minimum of 15.5 feet is required for both stacks.

The thermal oxidizer is still the primary control and was in use during the inspection. The thermal oxidizer is equipped with a device for monitoring temperature. The set point was 1450°F. At present the temperature is continuously being monitored. The actual oxidizer exhaust stack temperature during the inspection was around 1528°F, over the minimum 1400°F permit limit. Records for February 2015 indicate that the Oxidizer temp was over 1460F each day. (See attached).

When the condenser is the control device, 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 ROP restriction of 120°

5. Cold Cleaners

The cold cleaners have been replaced by aqueous cleaners.

6. Storage Tanks

A tank battery surrounded by secondary containment dike contained about 6 storage tanks. The tanks were of various sizes, all under 40,000 gallons. The tanks contain operational materials like oil, glycol (vapor pressure of 0.0012 psia @ 20°C), and waste water. The tanks are exempted by rule 284(i).

The facility was well operated and maintained and it appears to be in compliance with the requirements of MI-ROP-N3022-2014.

NAME



DATE

3/3/15

SUPERVISOR

