

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

B663724816

FACILITY: ST. CLAIR COMPRESSOR STATION		SRN / ID: B6637
LOCATION: 10021 MARINE CITY HWY., IRA TWP		DISTRICT: Southeast Michigan
CITY: IRA TWP		COUNTY: SAINT CLAIR
CONTACT: Kenneth Gray , Gas Field Leader, St. Clair Compressor Station		ACTIVITY DATE: 04/02/2014
STAFF: Sebastian Kallumkal	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MAJOR
SUBJECT: Onsite Inspection		
RESOLVED COMPLAINTS:		

On April 2, 2014, Michigan Department of Environmental Quality-Air Quality Division Staff Sebastian Kallumkal and Samuel Liveson conducted an annual targeted inspection at the Consumers Energy –St. Clair Compressor Station located 10021 Marine City Highway, Ira Township, Michigan (SRN B6637). 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 and Renewable Operating Permit No.: MI-ROP-B6637-2010.

We arrived at the facility around 11:15 AM. We met Mr. Kenneth Gray, Gas Field Leader. We introduced ourselves and stated the purpose of our inspection. He told us that at that time none of the engines or turbines was being operated. They operated the engines in the morning, but shut down after few hours.

During pre-inspection meeting, we discussed the facility operations and the maintenance/modifications done to the turbines and RICEs. The facility is under storage/withdrawal mode based on the weather and market trends.

The RICEs Engine 2-2, Engine 2-3 and Engine 2-4 are equipped with catalysts to be in compliance with 40 CFR 63, Subpart ZZZZ. An existing stationary SI RICE located at an area source of HAP emissions is required to comply with the applicable emission limitations and operating limitations no later than October 19, 2013.

The compliance tests were completed on April 1, 2014. No major overhaul of any engine is planned. Turbine C1-1 is down for maintenance. Turbine C2-1 has been dismantled and removed from the facility.

Mr. Gray accompanied us for an inspection of the facility. Initially we inspected the three RICEs. They were not operating. The facility is monitoring the temperature of the catalyst. . —

Next, we visited the glycol dehydration system. It was not operating at the time of our inspection. He explained the dehydrator operating procedure. At this facility the reboiler and the surge tank appear to one long tank which is separated inside.

Next we visited the turbines. They were not operating. I requested Mr. Gray to contact AQD so that I can visit the facility when the RICEs or turbines are operated

We inspected both emergency generators. They were idle at the time of my inspection. The compliance date for these generators to comply with RICE MACT requirements was October 19, 2013. He told me that they test the engines monthly for operational readiness.

Inspection:

During the inspection Mr. Gray explained to us about the operations at the facility. Consumers Energy-St. Clair Compressor Station receives and stores natural gas (up to an original pressure of 1600 lb) in six storage fields (Lenox, Ira, Puttygutt, Swan Creek, Hessen, and Four Corners) and distributes the stored natural gas to pipeline. During the winter (cold) season the

stored gas is supplemented to keep the line pressure. Large, natural gas burning internal combustion engines and turbines drive compressors which pump natural gas in and out of underground storage field. During summer months (generally March through November) gas is stored in the underground rock formations and during cold months (generally December through February) gas is withdrawn from the storage field. If the pressure in the storage field is high, the gas is free flowed when valve is opened. But when the pressure is low, the gas needs to be pumped out. The facility has various storage tanks, process heaters, reciprocating internal combustion engines, turbines, part cleaners and a glycol dehydrator.

EUGLYCDEHY

This facility has one glycol dehydration unit used to remove moisture from natural gas during withdrawal. According to Mr. Gray, the dehydration unit (dehy) is mostly used in the early months of the year (January – April) when the pressure of the gas in the storage field is less than 400 psi and the gas has to be pumped out. The moisture of the gas is continuously monitored and when moisture is above acceptable level (State limit = 7 #/MMSCF), the gas is processed through the dehydrator. At the time of our inspection, the dehydrator was not operating. During malfunction of the dehydration unit, natural gas may bypass the unit if the moisture content is low.

In the dehydration process the wet natural gas is contacted with Triethylene Glycol (TEG) in an absorber (glycol contractor) to remove moisture. The dry gas is withdrawn to the customers. The water rich glycol from the glycol contact tower is heated by the heat exchanger in the glycol-glycol heat exchanger. The water rich glycol then goes to a flash tank (two phase separator or glycol skimmer). In the flash tank, the entrained liquid hydrocarbons and natural gas are separated from the water rich glycol. The vapor stream from the Flash tank is made up of natural gas. This vapor stream line is connected to natural gas fuel and is used for fuel in the reboiler combustion unit. The glycol is filtered through the fabric sock and charcoal filters where heavy hydrocarbons are removed.

The filtered glycol from the flash tank is reboiled in the reboiler. The overflow from the reboiler is collected in a surge tank. The “Dry” lean glycol from the surge tank is cooled in the glycol/glycol heat exchanger before going to the glycol pumps, where it is driven back to the glycol contactor (absorber).

The vapors from the reboiler are vented to still column. The condensed vapors from the still column are collected in a BTEX tank. The vapors from the still column are piped to the incinerator/flare where any remaining hydrocarbons are incinerated. The incinerator/flare has a continuous oxidizing flame fueled by natural gas. The flare stack is located within the reboiler fire tube flue stack with a dedicated combustion air supply. The flare is equipped with a flame indicator to signal the continuous presence of flame during dehy operation. This is part of the Compliance Assurance Monitoring (CAM) Plan. The flame detector has a local visual alarm (green light) and an audible alarm in the control room. The control room operators would also see a written message on their computer screens in case of flame out.

Facility is limited to 300 pounds per day and 25 tons per year based on a 12-month rolling time period calculated monthly, of VOC emissions from the Glycol dehydration system and associated equipment. The 2013 emission calculations (Table 3-Monthly Glycol Dehydrator HAP Emission Rate Summary) show that the monthly VOC emission rate for January-December 2013 ranged from 30.9 pounds to 716 pounds per month and Jan-Dec 2013, 12-month annual emission rate was 1.47 tons.

In January 2013, the facility had operated the dehy system for 661 hours and the total monthly emissions were 0.35 (703 pounds). In December 2013, the facility had operated the dehy system for 629 hours and the total monthly emissions were 0.35 Tons (695 pounds). Based on

the low monthly emissions and GlyCalc calculations the facility appears to be in compliance with the daily VOC emissions (See attached Monthly Dehydrator Stack Burner Report and Table 3-Monthly Glycol Dehydrator HAP Emission Rate Summary for review.)

The facility is not using any stripping gas in the Dehydration unit. The ROP limits the number of hours that the facility can process natural gas through the system while the flame is extinguished to 50 hours per 12-month rolling time period as determined at the end of each calendar month. The records show that facility processed natural gas through the system for about 5 hours in 2013 and 3.3 hours based on a 12-month rolling time period while the flame is extinguished. The facility is keeping monthly hours of Dehy Operation (AQD-140- Figure 1- Glycol Dehydrator- Monthly and 12-Month Rolling VOC Emission Rates) and hours operated during stack burner failure (Monthly Dehydrator Stack Burner Report). The records show that facility has operated the dehy system for about 2672 hours in 2013 which is in compliance with permit limit of 4800 hours. AQD has not requested verification VOC emission rates via stack test from the Dehy unit.

The dehydrator is equipped and operated with a flash tank, glycol regenerator and an incinerator/continuous flare. The flare is equipped with a flame detector as required in EUGLYCDEHY (Section IV 1, 2, & 3). Mr. Gray informed me that the dehydrator is operated in accordance with the requirements in EUGLYCDEHY.

Facility provided calculated VOC and HAP emissions from the dehydrator system (still column and flash tank) using GRI Gly-Calc. based on the recent gas analysis results.

Year: 2013	Month: April	Number of hours: 2672		
VOC:	0.622 lb/hr	14.93 lb/day	0.86 ton/year	
Total HAP emissions:	0.53 lb/hr	12.68 lb/day	0.73 ton/year	
Total BTEX emissions	0.52 lb/hr	12.55 lb/day	0.72 ton/year	

The facility analyzes natural gas on an annual basis. Mr. Gray informed me that the facility has calculated VOC and HAP emissions using the emission factor developed from the 2013 gas analysis (see attached GRI-GLYCal report).

Facility is keeping records of monthly HAP emissions (Table 3: Monthly Glycol Dehydrator HAP Emission Rate Summary) based on hours of operation. Condition VI-4 requires the facility to calculate HAP emissions from the Dehy system based on a 12-month rolling period determined at the end of each calendar month. The total HAP emissions from the Dehy system for January –December 2013 were 2172 lb.

Facility is keeping records of total hours of operation of the glycol dehydrator during each calendar month, number of hours per month that natural gas is processed through the dehydrator while the pilot flame is extinguished, calculates the VOC emission rates on a monthly basis and monthly HAP emissions, conducts and keeps records of the daily inspections, monitors and keeps records of glycol flow rate and wet gas temperature while dehy in operation (See St. Clair Dehydrator Checklist, Table 3-Glycol Dehydrator Monthly Operating Data). The Dehy had incinerator flame out for about 5 hours in 2013, as noted earlier. The facility is keeping records of those events.

Stack dimensions for the Dehy System was not verified. The exhaust gases from the dehy system are discharged unobstructed vertically upwards to the ambient air.

The dehy unit is subject to Compliance Assurance Monitoring (CAM) requirements pursuant to 40 CFR Part 64. Facility submitted a CAM plan during ROP renewal process. Adequate

requirements are included in the ROP. Facility appears to be in compliance with the CAM requirements.

FGCOLDCLEANERS

Currently the facility has two part cleaners (one in the maintenance room and the other in well service maintenance room across the street). We inspected the cold cleaner in the maintenance room. The lid was closed during my inspection. I provided him a printed operating procedure for the cold cleaners developed by MDEQ. He told me that the cold cleaners are well maintained, operating procedures are posted and the employees follows the procedures including closing the lids when not in use, as specified in the ROP.

FGTURBINES (Turbine C2-1 and C2-2)

Facility has two permitted turbines (EUTURBINE C1-1 and EUTURBINE C1-2) (45 MMBTU/hr each). Mr. Gray told me that the grand fathered turbine (EUTURBINE C2-1, 44 MMBTU/hr) has been dismantled and removed offsite. The turbines are in use. They were used last time in the second week of March. Mr. Gray told us that C1-1 was down for maintenance. At the time of my inspection turbines were not operating. The turbines are fueled using natural gas only.

The turbines were tested for NOx and CO in September 14, 2010 in accordance with FGTURBINES, Section V, conditions 1-4 to establish an acceptable range of gas producer speed. Based on this performance test the NGP range was 90.7 to 99.1%. This range is used to assure compliance with the emission limits contained in the RO permit. The facility currently uses the emission factors established from this test to calculate the annual emission rates for NOx and CO. Based on the September 12 and 13, 2005, stack test results, the allowed gas producer speed for the turbines C1-1 and C1-2 was 90.7 to 99.6%.

The records show that Turbine C1-1 operated above 99.1% NGP on several days in May-June 2013 and Turbine C1-2 operated above 91.1% on several days in May and August 2013. In the ROP Deviation Reports for the Semi-Annual Certifications for Jan-June, 2013 and July-Dec, 2013, the facility reported the exceedances as deviations. In 2014 the turbines were operated within the gas producer speed ranges established in 2010.

The facility has calculated the NOx, CO and VOC emissions from the turbines on an annual basis. The 2013 MAERS report show the following annual emissions:

Turbines C1-1 & C1-2 combined	(Tons)	ROP limit (TPY)
NOx	4.1	39.0
CO	8.1	90.6
VOC	0.09	1.0

Facility is keeping the records of hours of operation, accumulated horsepower hours, fuel consumption, unit in or out of service, etc. on an hourly, daily, and calendar month basis.

Facility's tariff sheets for the natural gas suppliers that supply gas to the Consumers Energy stipulates the natural gas shall not contain no more than 0.25 grain of hydrogen sulfide and no more than 0.5 grain of mercaptan sulfur in 100 CF, and 5 grains of total sulfur (including hydrogen sulfide and mercaptan sulfur) per 100 CF. Facility uses the tariff to show compliance with the sulfur content of the natural gas. Mr. Gray informed me that they are burning pipeline quality natural gas in the turbines.

Turbines C1-1 and C1-2 are also subject to the New Source Performance Standards for Natural Gas Turbines, 40 CFR 60, Subpart GG. The facility uses pipeline grade natural gas. Facility

requires that the natural gas they receive contains sulfur content less than 5.0 grains/100 scf and they are using this contract (Tariff) to show compliance with the ROP requirement (Condition 4 of Section VI). Based on the records review, these turbines are in compliance with the NSPS Subpart GG requirements.

Facility keeps preventive maintenance plan on file in accordance with Section IX, Condition 2 requirement. It maintains various inspection records and on-line turbine inspection check sheets for the turbines.

FGRICE-MACT

This flexible group includes two existing Caterpillar G398A natural gas fired auxiliary generators (300 KW= 402 HP, 375 KVA) and three existing, spark ignition, lean burn, 4 stroke, 4000 HP (27 MMBTU/hr) reciprocating internal combustion engines (C2-2, C2-3 & C2-4). These three grandfathered reciprocating internal combustion engines are used for pumping natural gas in and out of storage field. None of the three engines were operating at the time of my inspection.

These engines are subject to National Emission Standards for Hazardous Air Pollutants (NESHAP) for Reciprocating Emergency Engines, 40 CFR 63, subpart zzzz. The compliance date for the engines was October 19, 2013. The facility is keeping hours of operation and the fuel usage for these engines. Catalyst controls were installed for these engines and compliance tests were completed as of April 1, 2014. MDEQ-AQD does not have delegated authority to enforce and verify compliance with 40 CFR Part 63, Subpart ZZZZ for area sources. Therefore compliance with this area MACT was not verified. Facility needs to contact USEPA Region 5 for any compliance verification.

FGRULE285(mm)

These flexible group requirements require the facility to notify AQD if it has any emergency or planned natural gas releases of more than 1 Million cubic feet. Facility reported two incidents (9/13 and 10/22) of natural gas releases in 2013.

FGFACILITY:

This flexible group includes all process equipment at the facility including equipment covered by other permits, grand-fathered equipment and other equipment. This permit limits facility's individual HAP emissions to less than 9.9 TPY and total HAP emissions to less than 24.9 TPY. Facility calculates facility-wide monthly and 12-month rolling time period individual HAP and total HAP emissions. The calculations show that the annual total HAP emissions based on a 12-month rolling time period as determined at the end of each calendar month, as of December 2013, was 3.42 Tons. This is below the individual HAP limit. Therefore the facility is in compliance with the annual emission limits. The highest monthly individual HAP emissions were (HCHO) was 837.00 lb in February 2013. The facility is also in compliance with Individual HAP emissions limits.

Miscellaneous

Facility also has six pipeline heaters and two fuel gas heaters which are exempt from permit to install requirements. Other exempt equipment include various condensate, oil, glycol, and waste liquid storage tanks. The emissions from the heaters and tanks are included the annual emission report.

The facility also has a sandblaster in the maintenance room. The particulates in the exhaust are controlled using a cyclonic separator followed by HEPA filters. The exhaust gas is vented

inside the plant. The sandblaster equipment that has emissions released only into the general in-plant environment is exempt from permit to install requirements pursuant to Rule 285(I)(VI) (B).

On April 23, 2014, I conducted a follow up inspection at the facility observe the turbines operating. I met Mr. Ken Gray, Gas Field Leader. I explained to him about the purpose of my inspection. He acknowledged that one of turbines, C1-2 was operating. From the control room, the Turbine C1-2 was operating at 98.4% NGP and 75.4% Power Turbine. Next, he accompanied me to the field. Turbine C1-1 was idle, but he told me it is operational. Turbine C1-2 was operating to inject gas into the field. I did not observe any opacity. He told me that they are keeping the Glycol Dehy running in case they need to withdraw gas.

Conclusion:

The rebuilding/exchanges of the engines (turbines and RICEs) may subject these processes to Michigan Administrative Rule R336.1201 (permit to install), NSPS and/or NESHAP (MACT) standards. Facility shall verify applicability of and compliance with applicable requirements.

From the information collected during the inspection and records review, the facility appears to be in compliance with the ROP requirements.

NAME S. Kallumkal

DATE 4/24/14

SUPERVISOR CTE