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

B663738509

FACILITY: Consumers Energy - St. Clair Compressor Station		**SRN / ID:** B6637
LOCATION: 10021 MARINE CITY HWY., IRA TWP		**DISTRICT:** Southeast Michigan
CITY: IRA TWP		**COUNTY:** SAINT CLAIR
CONTACT: Brian Mauzy , Gas Field Leader II, St. Clair Compressor Station		**ACTIVITY DATE:** 02/02/2017
STAFF: Sebastian Kallumkal	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Onsite Inspection		
RESOLVED COMPLAINTS:		

On February 2, 2017, Michigan Department of Environmental Quality-Air Quality Division Staff Sebastian Kallumkal 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, Renewable Operating Permit No.: MI-ROP-B6637-2015 and Permit to Install No. 106-14.

I arrived at the facility around 10:40 AM. I met Mr. Brian Mauzy, Gas Field Leader. I introduced myself and stated the purpose of my inspection. During pre-inspection meeting, we discussed the facility operations and the maintenance/modifications done to the turbines and RICEs. The facility started keeping electronic operating data for turbines, engines and Dehy system. The facility collects daily data manually and keeps electronically. He told me that the facility is currently under withdrawal mode. The facility is currently using both turbines to push gas in instead of the RICE engines.

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

The compliance tests for the RICE engines were completed on April 1, 2014. Annual compliance demonstrations are performed for the operating engines. No major overhaul of any engine has been conducted or is planned. None of the catalyst has been replaced.

Mr. Mauzy accompanied me for an inspection of the facility. Initially we inspected the emergency generators, and the three RICEs. They were not operating at the time of my inspection. The facility is monitoring the inlet temperature of the catalyst. During my inspection EUENGINE2-2 was down for exhaust manifold replacement, and EUENGINE2-3 was down because the power head valves needed to be replaced due to deterioration. EUENGINE2-4 was available if needed.

The compliance date for the emergency engines to comply with RICE MACT requirements was October 19, 2013. He told me that they test the emergency engines monthly for operational readiness.

Next, we visited the glycol dehydration system. It was operating at the time of the inspection. He explained the dehydrator operating procedure. I did not observe any visible emissions from that stack.

Next we visited the turbines. They were both operating. I did not observe any visible emissions from that stacks. We also inspected the part washer. Its lid was closed at the time of my inspection and the operating procedure was posted.

I also inspected the newly installed engines, heaters, dehydration systems, etc. for Permit to Install No. 106-14. The flash tanks for both dehy units are located inside building. They haven't started operating yet. Mr. Mauzy indicated that after the new engines and the dehy systems started operating, the existing units would be retired.

Inspection:

During the inspection, Mr. Mauzy explained to me 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, a part cleaner, and one glycol dehydrator. The facility has installed new RICE engines, emergency RICE engines, two glycol dehydrators, various heaters, etc. in Plant 3 per Permit to Install No. 106-14. He told me they haven't started the operation of the Plant 3. The proposed date for the turnover of the plant is June 2017.

PTI No.: 106-14

This PTI was issued for the installation of four 4835 HP (4SLB) SI RICEs with oxidation catalytic control, two glycol dehydration systems, one 2000 HP SI emergency engine, two 15 MMBTU/hr natural gas fired pipe heaters, two 5 MMBTU/hr natural gas fired pipe heaters, one 12.3 MMBTU/hr natural gas fired boiler, one 0.75 MMBTU/hr natural gas fired gas heater, 8,000 gal new oil storage tank, 5,000 gal used oil storage tank, 8,000 gallon ethylene glycol storage tank, 8,000 gallon new TEG storage tank, 5,000 gallon used TEG storage tank, and two 1,000 gallon distillate (water and hydrocarbons) storage tanks. Mr. Mauzy told me that these units have been installed, but have not been commissioned for operation. So the compliance was not verified.

MI-ROP-B6637-2015

Source-Wide Conditions:

The Source-Wide conditions table includes all process equipment at the facility including equipment covered by other permits, grand-fathered equipment and other equipment. The Source-Wide conditions limit 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 2015, was 3.94 Tons. Similarly, the annual total HAP emissions, as of December 2016, was 2.76 Tons. These emission rates are below the individual HAP limit. The highest monthly individual HAP (HCHO) emissions were 0.23 Tons in September 2016 and the 12-month rolling HCHO emissions as of December 2016, were 1.08 Tons. Therefore, the facility's HAP emissions comply with the annual emission limits for individual and aggregate HAP emissions.

EUGLYCDEHY

This facility has one glycol dehydration unit used to remove moisture from natural gas during withdrawal. Per Mr. Mauzy, 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 must 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 the inspection, the dehydrator was 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 in initially in the still column (heat exchange) and in a heat exchanger (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 as 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 boiled 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.

The 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 2015 emission calculations (Table 3-Monthly Glycol Dehydrator HAP Emission Rate Summary) show that the monthly VOC emission rate for January-December 2015 ranged from 36.18 pounds to 493.81 pounds per month (December) and the 12-month rolling VOC emissions were 0.73 tons as of December 2015. The monthly VOC emissions for 2016 ranged from 46.29 pounds to 350.23 pounds per month (December) and the 12-month rolling annual emission rate was 0.47 tons. These emission rates appear to comply with the daily and annual emission limits.

In January 2015, the facility had operated the dehy system for 696 hours and the total monthly emissions were 493.81pounds. In December 2016, the facility had operated the dehy system for 696 hours and the total monthly emissions were 350.23 pounds. Based on the low monthly emissions and GlyCalc calculations the facility appears to comply 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 0.9 hours in 2015 (in January) and 0.1 hours in 2016 (December) 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 2066 hours in 2015 and about 1877 hours in 2016 which comply with the 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. Mauzy 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: 2015 Month: March

VOC:	0.71 lb/hr	17.03 lb/day	0.90 ton/year
Total HAP emissions:	0.53 lb/hr	12.77 lb/day	0.68 ton/year
Total BTEX emissions	0.52 lb/hr	12.56 lb/day	0.67 ton/year

Year: 2016 Month: January

VOC:	0.50 lb/hr	12.08 lb/day	0.52 ton/year

Total HAP emissions:	0.39 lb/hr	9.51 lb/day	0..41 ton/year
Total BTEX emissions	0.39 lb/hr	9.42 lb/day	0.41 ton/year

The facility analyzes natural gas on an annual basis. Mr. Mauzy informed me that the facility has calculated VOC and HAP emissions using the emission factor developed from the 2015 and 2016 gas analyses (see attached GRI-GLYCal reports).

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 2015 were 3.94 Tons and the total HAP emissions for January –December 2016 were 2.76 Tons.

Facility is keeping records of total hours of operation of the glycol dehydrator during each calendar month, and the number of hours per month that natural gas is processed through the dehydrator while the pilot flame is extinguished. The facility also calculates the monthly VOC emissions and monthly HAP emissions, conducts and keeps records of the daily inspections, and 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 0.9 hours in 2015 and 0.1 hours in 2016, as noted earlier. The facility is keeping records of these 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 comply with the CAM requirements.

FGENGINES-P2

This flexible group Includes three existing, spark ignition (natural gas fired) lean burn, 4 stroke, 4000 HP (27 MMBTU/hr) reciprocating internal combustion engines (C2-2, C2-3 & C2-4) equipped with two way catalysts for hazardous air pollutant emissions (HAP) control and located at an area source of HAP emissions. 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 (RICE MACT). The compliance date for the engines was October 19, 2013.

RICE MACT limits the carbon monoxide emissions to a concentration of ≤47 ppmvd at 15% O2 or 93% reduction at 100% (±10%) load. The stack tests for all engines performed as below.

Test dates: March 31, and April 1, 2014
EUENGINE2-2 CO % Reduction: 98.7%
EUENGINE2-3 CO % Reduction: 97.8%
EUENGINE2-4 CO % Reduction: 96.2%
(MACT limit 93% reduction or 47 ppmvd @ 15% O2)
Report received on June 2, 2014

Test Date: September 9, 2015
EUENGINE 2-2 CO % Reduction: 97% CO Concentration: 4.8 ppmvd @ 15% O2
EUENGINE2-3 CO % Reduction: 90% CO Concentration: 12.60 ppmvd @ 15% O2
(MACT limit 93% reduction or 47 ppmvd @ 15% O2)
EUENGINE2-4- was out of commission
Report received on October 30, 2015

Test Date: May 27, 2016
EUENGINE2-4 CO %Reduction: 89% CO Concentration: 11 ppmvd @ 15% O2
(MACT limit 93% reduction of 47 ppmvd @ 15% O2)

Report Received on July 21, 2016

Test Date: September 21, 2016
EUENGINE2-3 CO %Reduction: 89.77 CO Concentration: 12.00 ppmvd @ 15% O2
EUENGINE2-4 CO %Reduction: 86.51 CO Concentration: 13.01 ppmvd @ 15% O2
(MACT limit 93% reduction or 47 ppmvd @ 15% O2)
Engine 2-2 was not operating.
Report Received on October 21, 2016

He informed me that each engine is equipped with catalytic control, the inlet temperatures (hourly and 4-hour average) of the catalysts are monitored and pipeline quality natural gas is burned in all engines. The records show that the inlet temperature is within the allowed range. The facility performs continuous compliance tests and submits the test plans and reports as required. He also stated that the facility is keeping records of the preventive maintenances for each engine and the facility submits compliance reports to EPA as required.

He also told me that the facility is keeping records of the fuel usage and hours of operation (Plant Daily Log [ROP-0051]) of these engines and pressure differential for the catalysts.

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. USEPA-Region 5 has the authority to implement and verify compliance with these requirements.

FGTURBINES (Turbine C1-1 and C1-2)

The facility has two permitted turbines (EUTURBINE C1-1 and EUTURBINEC1-2) (45 MMBTU/hr each). Mr. Mauzy told me that the grand fathered turbine (EUTURBINEC2-1, 44 MMBTU/hr) had been dismantled and removed offsite. The turbines were in use at the time of my inspection because two of the three RICEs were not operable. The turbines are fueled using natural gas only.

Operation Data on February 2, 2017 (from the control room)

Turbine C1-1 %NGP = 97.8; HP = 4675
Turbine C1-2 %NGP = 98.0; HP = 4638

No opacity observed from the stacks.

The turbines were tested for NOx and CO in September 14, 2010 in accordance with FGTURBINES, Section V, conditions1-4 to establish an acceptable range of gas producer speed. Based on this performance test, the NGP range was 90.7 to 99.1%.

Test Date: July 21, 2015
EUTURBINEC1-1 Range tested 93.03% to 97.44% NGP
EUTURBINEC1-2 Range tested 94.30% to 98.83% NGP
Report received Date: September 4, 2015

The turbines were tested again for NOx and CO on July 21, 2015 (pursuant to MI-ROP-B6637-2015) in accordance with FGTURBINES, Section V, conditions1-4 to establish an acceptable range of gas producer speed. Based on this performance test the NGP range was 93.03 to 98.83%. This range is used to assure compliance with the emission limits (SC I.1 and SC I.2) specified in the RO permit. The tests show that the turbine emissions were in compliance with the emission limits. The facility currently uses the emission factors established from this test to calculate the annual emission rates for NOx and CO.

The records show that daily average NGP on March 5 and March 6 2016 for Turbine C1-1 and Turbine C1-2 was 98.9 %NGP which is above daily average %NGP range (93.03 to 98.83 %NGP) established during 2015 tests. The tested maximum %NGP for Turbine C1-1 was 97.44% NGP and Turbine C1-2 was 98.83 % NGP. Based on the records reviewed (2015 and 2016) the turbines were operated within the gas producer speed ranges established in 2010 and 2015 except on March 5, 2016. A violation notice will not be issued because the turbines operated in compliance afterwards.

On couple of days (eg.: December 11, 2015, May 1, 2016) turbines were below minimum NGPs during

consecutive hours. When inquired about it, Brian informed me that each hourly NGP represented the average value for that hour. He also stated the records show that during both dates Unit 1-2 was down due to mechanical issues such as "failed to start on 12/11/2015" and an "oil cooler malfunction" on 05/01/16. The low NGP speed is due to failed start attempts and/or short run times at idle during the troubleshooting and repair of the unit.

The ROP requires the facility to verify compliance with maximum NGP based on daily average of hourly NGPs. On days when the turbines are operated less than 24 hours per day, the facility should calculate daily average NGP using the operating hourly NGPs excluding hourly NGPs during start up, shut down and malfunction and verify whether the daily average NGP is within the allowed %NGP range.

The facility has calculated the NOx, CO and VOC emissions from the turbines on an annual basis. The 2015 MAERS report show the following annual emissions:

Turbines C1-1 & C1-2 combined	(Tons)	ROP limit (TPY)
NOx	5.16	39.0
CO	0.70	90.6
VOC	0.11	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. Mauzy informed me that they burn 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 comply 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.

FGAUXGEN

This flexible group includes two existing, spark ignition, emergency use only, reciprocating internal combustion engines (RICE) with site rating or less than or equal to 500 HP, located at area sources.

Each emergency engine is limited to 100 hours per year to maintenance checks and readiness testing including 50 hours per year for operating for non-emergency situations. The 2015 records show that engines operated 15.1 hours including 1.2 hours emergency (EUAUXGEN1) hours and 23.9 hours including 10.4 hours emergency (EUAUXGEN2). The 2016 records show that engines operated 145.9 hours including 122.2 hours emergency (EUAUXGEN1) hours and 21.9 hours including 6.1 hours emergency (EUAUXGEN2). The engines were not used for non-emergency purposes.

He informed me that the facility is doing oil analysis program, spark plug inspections, and hoses and belts inspections as required by 40 CFR 63, Subpart ZZZZ requirements. The facility is keeping records of these inspection and the oil analysis reports.

He stated that the facility is monitoring and keeping records of the BHP of each engine, installation date, hours of operation (emergency and non-emergency), type of operations (lean burn/rich burn, 2-stroke/4 stroke, CI/SI, for FGAUXGENS, log of all maintenance activities, occurrences and durations of malfunctions, if any, and oil analyses results.

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. USEPA-Region 5 has the authority to implement and verify compliance with these 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 and the operating procedure for the cold cleaners developed by MDEQ was posted. He told me that the cold cleaners are well maintained, and the employees follow the procedures including closing the lids when not in use, as specified in the ROP.

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 (5/27 and 6/21) of natural gas releases in 2016.

Miscellaneous

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

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(2)(l)(VI)(B).

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 comply with the ROP requirements. Copies of natural gas analyses, oil analyses, sample catalyst temperature records, generator log, tariff, HAP emissions, and DEHY VOC emissions reports are attached for review.

NAME Sebastian Kallhoff DATE 3/7/2017 SUPERVISOR Joyce K