

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

B601329950

FACILITY: MERIT ENERGY CO. - Manistee Sulfur Plant		SRN / ID: B6013
LOCATION: 4000 Fisk Rd., MANISTEE		DISTRICT: Cadillac
CITY: MANISTEE		COUNTY: MANISTEE
CONTACT: Sean Craven , Regulatory Analyst		ACTIVITY DATE: 06/17/2015
STAFF: Caryn Owens	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled Inspection & Records Review		
RESOLVED COMPLAINTS:		

On Wednesday, June 17, 2015, Caryn Owens, Michelle Rogers, Mark Mitchell, and Mary Ann Dolehanty of the DEQ-AQD conducted a scheduled onsite inspection of the Merit Energy (Merit) – Manistee 23 facility located at 4000 Fisk Road in Manistee, Michigan. DEQ met Mr. Fred Holden, Mr. Bill Loney, and Mr. Sean Craven of Merit to tour the site. An inspection brochure was handed to Mr. Craven at the beginning of the field inspection. The inspection and records review were to determine compliance with permit MI-ROP-B6013-2012 and permit to install (PTI) 27-15. The site is an area source for National Emission Standards for Hazardous Air Pollutants (NESHAP) from Oil and Natural Gas Production facilities (40 CFR Part 63, Subpart HH), and NESHAP for Stationary Reciprocating Internal Combustion Engines (40 CFR, Part 63, Subpart ZZZZ (RICE MACT)). The State of Michigan does not have delegated authority of the area source NESHAPs, and thus these areas were not reviewed by the DEQ at this time.

During the field inspection the weather conditions were mostly sunny, approximately 75 degrees Fahrenheit and calm winds. Natural gas, crude oil, condensate, and brine enter the facility via pipeline on the western portion of the site. The facility has five in-line heaters, and during the field inspection only the northern most in-line heater was in use for crude oil. A heater treater was used in the southwestern portion of the site prior to the fuel entering the separator building, which was also located in the southwestern portion of the site. The separator building contained both vertical and horizontal separators; the vertical separators were used for oil and the horizontal separators were used for natural gas. The oil and water flow to the tank battery area where there were two approximately 1,000 barrel (bbl) above ground storage tanks, and two approximately 200 bbl storage tanks. The tanks in the tank battery area were connected to a vapor recovery unit (VRU) that collects the vapors from the tanks and routes them to the suction side of the compressor engine of the acid gas injection system. The natural gas separated from the oil and water was routed to an electric compressor engine that increases the pressure of the gas and sends the gas to the glycol dehydrator and amine process to dry and sweeten the gas. The amine process building and glycol dehydrator were located in the central portion of the site. The facility contains a glycol dehydrator system to remove water from the gas stream. The glycol dehydrator still was equipped with a VRU, creating a closed-loop system so no emissions were vented to the atmosphere. The amine process strips the hydrogen sulfide (H₂S or acid gas) out of the natural gas stream (sweetening the gas), and the acid gas is compressed by an electric compressor and injected into an underground formation. A natural gas fired reboiler was used for the glycol dehydrator in the northern portion of the property, which also contains a heat medium that keeps the gas lines warm when transporting the gas throughout the site. The heat medium was powered by electrical motors. No visible emissions or odors were present from the reboiler or heat medium stack during the inspection. Throughout the walkover, a slight petroleum-like odor was noticed. The buildings were equipped with red, yellow and green lighting for safety purposes.

There was a power generation building on the north-central portion of the property. This building contains four generator engines to power the buildings at the property. Three of the engines were used for power, but only one engine operates at a time. The fourth engine was a diesel powered emergency generator engine, which was tested at least once per year. The hour meter from the diesel generator read 566 hours, which was the amount of hours operated since 1978. The western-most generator engine (Generator 1) has been dismantled and taken offline. Generator engines (Generator 2 and Generator 3) have been equipped with 3-way catalytic converters and air/fuel ratio controllers (AFRC) for emission control for the facility to operate as an opt-out facility. Generator 2 was not operating during the inspection. The eastern most generator engine (Generator 3) was in operation. The engine was a 750 horsepower (hp) Waukesha 7042 running at 905 revolutions per minute (RPM) and 35 pounds per square inch (psi), and 200 degrees Fahrenheit. The inlet temperature of the catalyst was 1,057 degrees Fahrenheit and the outlet temperature was 1,076 degrees Fahrenheit. The AFRC read: right bank 0.731 v 1345 and left bank 0.750 v 1322. Generator 2 was the same make and model as the engine operating during the inspection. The engines were equipped with mufflers and vertical stacks approximately 12 feet above ground surface. Once the facility becomes an opt-out source, DEQ will receive a malfunction abatement plan (MAP) for the generating engines, and emission analysis and destruction efficiency completed on the engines when the 3-way catalysts were installed.

There is an emergency/pressure relief flare located on the southeastern portion of the site, which is a continuously burning pilot fueled by sweetened gas. During the field inspection, DEQ observed a little black smoke tailing from the flare. According to Mr. Holden, a third party comes routinely to the facility to clean the filters located between the slug catcher and inline heater to remove potential debris from the flow line, and the third party came to clean the filters the morning of the field inspection. While doing this, the filter case was depressurized, and the blowdown is routed to the onsite emergency/pressure relief flare. The residual condensate from this activity created the blackish colored smoke from the flare. The opacity from the smoke was between 5 to 10 percent. DEQ did not believe the opacity from the flare was a concern during the field inspection.

ROP Compliance Evaluation:

EUSOURGASPLANT: H₂S is removed from the gas and the residual (sweet) gas sent to sales. The acid gas is completely re-injected into geologic cavity below ground surface. It should be noted; that this section covers both EUSOURGASPLANT addressed in MI-ROP-B6013-2012 and PTI 27-15.

Emission Limits:

I There are no emission limits for EUSOURGASPLANT.

Materials/Fuels:

II There are no Material/Fuel limits for EUSOURGASPLANT.

Process/Operational Parameters:

III.1: As stated above, a flare is located on the southeast portion of the property for emergency/pressure relief use. During the field inspection the flare appeared to be working properly.

III.2 & 3: According to Mr. Holden and Mr. Craven, Merit has not vented acid (sour) gas to the flare since 2011, and no malfunctions or abnormal conditions have happened at the facility within the past year. The sour gas of the facility is

controlled in a closed loop system, and only in emergency situations would the acid gas be directed to the flare.

III.4: If the flame to the flare ever went out, the facility would be shut-in, and operation of the plant would not be started until corrective measures were taken to reignite the flame.

III.5 If the H₂S concentrations inside the building enclosing the sweetening plant reach 50 ppm, Merit would begin a safe and orderly shutdown of all processes and the facility would not operate until corrective measures were taken.

Design/Equipment Parameters:

IV.1: As previously stated, the emergency/pressure relief use flare is equipped with a continuously burning pilot flame and automatic igniters.

IV.2: According to Mr. Holden, the flare is equipped with an audible alarm that activates if the flame ever goes out.

Testing Sampling Equipment:

V.1: As previously stated, the last flaring event was in 2011. No non-certified visible emissions have been conducted on the emergency/pressure relief flare within the past year.

Monitoring/Recordkeeping:

VI.1: As previously stated, there has not been venting of acid gas to the flare since 2011.

VI.2: During the field inspection, DEQ observed visible alarms inside the buildings that are connected to the H₂S monitoring system inside the buildings. The lights will change to red if the concentrations of H₂S exceed 50 ppm inside the building.

VI.3: Merit monitors the volumetric flow rate of the gas entering the plant by individual meters from the sour gas wells feeding the plant. Gas samples are collected from the gas flow entering the plant on a 30-40 minute schedule by an auto sampler, and the resultant composite sample is submitted monthly for laboratory analysis of the hydrogen sulfide concentration to determine the mass flow rate of hydrogen sulfide entering the plant, which is an acceptable way to measure the H₂S concentration entering the plant.

VI.4 The facility has a malfunction abatement plan in place in case of emergencies or abnormal conditions. The DEQ has not received reports indicating abnormal conditions or malfunctions have occurred at the facility.

Reporting:

VII.1: (PTI 27-15) Merit submits mass flow rates of H₂S entering the facility on monthly basis and in a timely manner. There have been no incidences since 2011 where H₂S has been sent to the emergency/pressure relief flare.

VII.2 & 3: Semi-annual and annual reporting for ROP certification were submitted to the DEQ in a timely manner.

VII.4 & 5: These Special Conditions are not applicable since Merit has not vented acid gas to the flare since 2011.

Stack/Vent Restrictions:

VIII There are no stack restrictions for EUSOURGASPLANT.

Other Requirements:

IX.1: During the inspection the DEQ observed fencing around the Property and signs warning of poison gas.

IX.2 & 3: A malfunction abatement plan was submitted to the DEQ in November 10, 2010 and a H₂S Monitoring Plan was on file with the DEQ.

EUDEHY: A glycol dehydrator used to remove water from the natural gas stream using tri-ethylene glycol. This process is controlled with a VRU or an emergency/pressure relief flare.

Emission Limits:

I.1 & 2: Based on the GRI-Glycalc analysis, Volatile Organic Compounds (VOCs) emissions ranged between 4.45 to 4.71 tons per 12-month rolling time period, and VOCs are permitted for 7.72 tons per year based on a 12-month rolling time period. The VOC emissions ranged between 22.87 to 26.99 pounds per day (lbs/day), and VOCs are permitted for 42.3 lbs/day.

Materials/Fuels:

II There are no Material/Fuel limits for EUDEHY.

Process/Operational Parameters:

III.1 & 2: The glycol dehydrator is connected to a VRU in a closed loop system. The glycol dehydrator's emissions are captured and directed to the suction side of the compressor engine of the acid gas injection system. Emissions are not released from the glycol dehydrator; however, due to Michigan Air Emissions Reporting System (MAERS), vapor recovery is not a control option so 100% capture of emissions is not allowed to be reported. Therefore Merit uses flaring to report MAERS data which allows for 95% destruction efficiency, which is why the company reports the GRI-Glycalc emission limits. The emergency/pressure relief flare is on site and appeared to be working properly.

Design/Equipment Parameters:

IV There are no Design/Equipment Parameters for EUDEHY.

Testing Sampling Equipment:

V.1: Merit analyzed the inlet gas stream on August 12, 2014 in accordance with ASTM, UOP, and GPA guidelines for quality assurance. The analyses were used to determine VOC emission limits for the glycol dehydrator system.

Monitoring/Recordkeeping:

VI.1: As stated in the Emission Limits above, Merit calculated the VOC emission rates in lbs/day and tons per 12-month rolling time period using the wet gas analytical data and GRI-Glycalc Version 4.0 computer program.

VI.2: Merit recorded the wet gas temperature and pressure, ranging between 71 to 99 degrees Fahrenheit and 709 to 808 psi. The flash tank temperature and pressure ranged between 130 to 145 degrees Fahrenheit and 56 to 65 psi, respectively. The ambient air temperature ranged between 9 to 65 degrees Fahrenheit.

VI.3: Merit recorded the dry gas flow rate between 0.454 to 1.024 million standard cubic feet per day (MMscfd), stripping gas flow rate was 29 thousand standard cubic feet per day (mscfd), and the glycol flow rate between 3.3 and 3.4 gallons per minute (gpm).

• **Reporting:**

VII.1-3: Semi-annual and annual reporting for ROP certification were submitted to the DEQ in a timely manner.

• **Stack/Vent Restrictions:**

VIII There are no stack restrictions for EUDEHY.

• **Other Requirements:**

IX.1: EUDEHY is subject to the NESHAP from Oil and Natural Gas Production facilities for area sources promulgated in 40 CFR, Part 63, Subpart HH.

EUCIENGINE: A 450 hp compression ignition reciprocating internal combustion engine used during power outages to supply emergency electricity.

• **Emission Limits:**

I There are no applicable Emission Limits for EUCIENGINE.

• **Material Limits:**

II.1: Merit supplied Material Safety Data Sheets for the Diesel fuel used in EUCIENGINE, which indicated the No. 2 Fuel Oil had 0.0015 percent sulfur content. The diesel fuel is below the permitted limit of No. 2 diesel fuel oil with a maximum sulfur content of 0.5 percent.

• **Process Operational Restrictions:**

III.1: Merit operates EUCIENGINE at least once per year so they know it works properly in case it's needed for an emergency situation.

• **Design/Equipment Parameters:**

IV Design/Equipment Parameters are not applicable for EUCIENGINE

• **Testing/Sampling:**

V Testing/Sampling requirements are not applicable for EUCIENGINE.

• **Monitoring/Recordkeeping:**

VI.1: The last shipment of diesel fuel for EUCIENGINE was delivered October 15, 2010.

• **Reporting:**

VII.1-3: As stated in the previous EUs, semi-annual and annual reporting for ROP certification were submitted to the DEQ in a timely manner.

• **Stack/Vent Restrictions:**

VIII The stack to EUCIENGINE is located south of the building and is vertically upward.

• **Other Requirements:**

IX.1: EUCIENGINE is subject to the RICE MACT for area sources promulgated in 40 CFR, Part 63, Subpart ZZZZ.

FGTANKS: Two 1,000 bbl (42,500 gallons) fixed roof sour crude oil tanks equipped with a VRU or an emergency/pressure relief flare when necessary. The tanks are identified as EUTANK1 and EUTANK2.

- **Emission Limits, Material Limits, and Process/Operational Limits:**

- I Emission Limits, Material Limits, and Process/Operational Limits are not applicable for FGTANKS.

- **Design/Equipment Parameters:**

- IV.1 FGTANKS are equipped with a VRU where the emissions are captured and directed to the suction side of the compressor engine of the acid gas injection system.

- **Testing/Sampling:**

- I Testing/Sampling Requirements are not applicable for FGTANKS.

- **Monitoring/Recordkeeping:**

- VI.1 & 2: Merit records evidence of leaks on visual inspection logs that includes the date, equipment identification, leak status, action taken to repair leak, date repaired, and inspector's initials. The maintenance inspection logs are completed on a daily basis.

- **Reporting:**

- VII.1-3: As stated in the previous EUs, semi-annual and annual reporting for ROP certification were submitted to the DEQ in a timely manner.

- **Stack/Vent Restrictions and Other Requirements**

- I Stack/Vent Restrictions and Other Requirements were not applicable to FGTANKS.

FGSIENGINES: The site contains two natural gas fired rich burn (4SRB) reciprocating internal combustion engines (RICE) with more than 500 hp. The facility used to contain five RICEs, but one of the engines on the southern portion of the site has been converted to an electric engine. Another natural gas fired engine on the southern portion of the site has been taken out of service and the fuel source has been cut-off and capped and deemed inoperable. Additionally, one of the generator engines (EU-MN23GEN1) has been taken out of service and the fuel source cut-off. So the applicable emission units for FGSIENGINES are EU-MN23GEN2 and EU-MN23GEN3.

- **Emission Limits, Material Limits, Process/Operational Restrictions, Design/Equipment Parameters, Testing/Sampling, Monitoring/Recordkeeping, and Stack/Vent Restrictions** were not applicable for FGSIENGINES.

- **Reporting:** As stated in the previous EUs, semi-annual and annual reporting for ROP certification were submitted to the DEQ in a timely manner.

- **Other Requirements:** FGSIENGINES are subject to the RICE MACT for area sources promulgated in 40 CFR, Part 63, Subpart ZZZZ.

Summary:As a result of the field inspection and records review, Merit - Manistee 23 appears to be in compliance with MI-ROP-B6013-2012 and PTI 27-15, and no additional information is necessary at this time. This facility will be taking operating limits for the emergency generator engine, removing/dismantling (which has already been completed), and controlling emissions from the two rich burn generating engines to become a synthetic minor source. This change in facility status will happen at the end of June 2015. Merit will be submitting an updated MAP for the facility and emissions testing data to the DEQ when the new PTI is issued for the facility.

NAME Camp O'nealDATE 6/17/15SUPERVISOR 