

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

N116047429

FACILITY: Viking Energy of McBain		SRN / ID: N1160
LOCATION: 6751 W. Gerwoude Dr., MCBAIN		DISTRICT: Gaylord
CITY: MCBAIN		COUNTY: MISSAUKEE
CONTACT: Thomas Vine, Plant Manager		ACTIVITY DATE: 12/13/2018
STAFF: Caryn Owens	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled Inspection and Records Review		
RESOLVED COMPLAINTS:		

On December 13, 2018, Caryn Owens of the DEQ-AQD conducted a scheduled inspection of Viking Energy of McBain (Viking Energy) (SRN: N1160) located at 6751 West Gerwoude Drive, McBain, Missaukee County, Michigan. The field inspection and records review were to determine compliance with the Renewable Operating Permit (ROP) MI-ROP-N1160-2018. The facility is currently an area source of hazardous air pollutants (HAPs). The boiler at the facility is subject to the New Source Performance Standards (NSPS) for Industrial-Commercial-Institutional Steam Generating (Unit 40 CFR Part 60 Subpart Db), and National Emission Standard for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers (40 CFR Part 63 Subpart JJJJJJ – Boiler MACT). Additionally, the boiler at the facility is subject to Compliance Assurance Monitoring (40 CFR Part 64 - CAM). An on-site emergency generator is subject to the NESHAP for Stationary Reciprocating Internal Combustion Engines (40 CFR Part 63 Subpart ZZZZ – RICE MACT). Since the facility is an area source of HAPs, the State of Michigan does not have delegated authority of the area source NESHAPs (the Boiler MACT and RICE MACT), and thus these areas were not reviewed by the DEQ at this time.

#### **Evaluation Summary**

Based on the activities covered during this field inspection and records review, the AQD finds the facility in compliance with ROP No. MI-ROP-N1160-2018 and associated plans for the facility. No further actions are necessary at this time. Specific permit conditions that were reviewed are discussed below.

#### **On-Site Inspection:**

DEQ was escorted by Mr. Tom Vine, the Plant Manager of Viking Energy. The weather conditions were cloudy with calm winds from the southwest, and approximately 31 degrees Fahrenheit. The facility is a wood fired boiler electric utility plant located within the McBain city limits in the Industrial Park. Virgin wood, tire derived fuel, particleboard and plywood, construction and demolition wood, and creosote treated wood are used as fuels in the boiler. Majority of the fuel is delivered to the site by truck and stored on-site in piles that are managed to control fugitive dust. Additionally, the creosote treated wood is delivered to the site by truck and rail system and is grinded on site and stored in covered fuel piles. The fuels are fed through handling systems to the boiler which uses the heat from combustion to produce steam. The steam is used to drive a generator that produces approximately 17 megawatts of electricity at full capacity. Air emissions from the boiler are controlled by a multiple cyclonic collector and an electrostatic precipitator (ESP). Ash from the boiler is collected, treated with water, and transported to a landfill for disposal.

At the time of the inspection Viking Energy was burning a mixture of creosote wood, untreated wood chips and tire derived fuel chips (TDF). A portable low speed grinder to cut the creosote lumber into chunks and a portable hammer mill grinder to reduce the chunks into chips. The grinders were operating at the time of the inspection, and I observed no visible emissions from the grinding operations. The wood fuel is filtered over a screening system to knock out the fine particles which help with fugitive dust from the fuel storage piles, and help reduce slag in the boiler system. Measured amounts of the creosote wood chips and untreated wood chips are layered in a fuel storage pile that enters the pit to the plant. A sweeping arm and auger under the wood chip storage pile (the pit area) are used to take the wood chips to the belt conveyors to feed them to the boiler system. The storage pile can only hold a maximum 4 days of wood chip fuel (both untreated and creosote), so the plant records a 7-day rolling average on how much creosote wood chips and untreated wood chips are added to the storage pile prior being fed to the boiler. Additionally, a tractor scoop fills a hopper connected to a conveyor to load the TDF into the boiler. The amount of wood fuel and TDF are tracked and controlled by the control room operator.

The boiler was operating at full capacity (17MW) and opacity from the continuous opacity monitoring system (COMS) was averaging 6.6 percent. The boiler has three soot blows per day and one water wash per day to control slag buildup in the boiler. As previously stated, the boiler system is controlled by a multi-cyclonic

collector and ESP to remove pollutants. The ESP was operating all three sections at the time of the inspection. The spark rates were monitored and controlled by the control room operator depending on the opacity readings from the COMS. The ESP sections were operating at:

Field	1	2	3
Sparks per Minute	150	150	150
Secondary Voltage	30	34	32

The bottom ash is conveyed to a water tank (pug mill) that is scooped and discharged into a dumper outside. Additionally, the multi-cyclone and ESP fly ash is collected and conditioned with water and loaded into a wagon where it is brought to the ash building on the southeastern portion of the site. The doors to the wagon area and ash building are kept closed at all times, except when collected for disposal. According to Mr. Vine, the ash is collected approximately four times per week and is used as landfill cover and spill control during emergency situations.

During the inspection, DEQ observed no visible emissions at the drop point of the wood conveyor. No wood chips or saw dust were visible off site. No visible emissions were observed from the stack of the boiler during the inspection. DEQ observed slight wood and creosote odors during the inspection of the wood yard, but the odors were not present off site and were not considered objectionable.

### **Records Review**

#### **Source-Wide Conditions:**

No Emission Limits, Material Limits, Design/Equipment Parameters, Testing/Sampling, Stack/Vent Restrictions, or Other Requirements are applicable under Source-Wide Conditions.

#### **Process/Operational Restrictions:**

The facility has a Fugitive Dust Control Plan and Malfunction Abatement Plan (MAP) on file with the DEQ. The Plans were received in February 2017. DEQ reviewed these plans and they are representative of on-site conditions and operations.

#### **Monitoring/Recordkeeping:**

The facility maintains records in accordance with their Fugitive Dust Emissions Control Plan.

#### **Reporting:**

Reporting of any deviations, quarterly reports, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ in timely manner.

### **EURMHANDLING:**

A raw material handling area that includes primary and secondary screens, a radial stacker, raw material piles, hoppers to chip the raw material, and several conveyors. The Raw material is conveyed by the feed hopper to the boiler.

No Material Limits, Design/Equipment Parameters, Stack/Vent Restrictions, and Other Requirements are applicable under EURMHANDLING.

#### **Emission Limits and Process/Operational Restrictions:**

As previously stated, no opacity was observed from the drop point onto the fuel storage piles or in the fuel handling areas of the facility.

#### **Testing/Sampling**

Based on the records reviewed, the ash handling and storage areas are inspected on a daily basis. If visible emissions are observed, appropriate procedures are conducted to minimize the emissions.

#### **Monitoring/Recordkeeping:**

Based on the records reviewed, the fuel yard and handling operations are inspected on a daily basis when operating. If visible emissions are observed, appropriate procedures (like adding more water to the chips) are conducted to minimize the emissions.

Reporting:

Reporting of any deviations, quarterly reports, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ in timely manner.

**EUBOILER:**

A 230 MMBtu/hr wood chip and TDF fired spreader-stoker boiler that generates heat to produce steam that is used to power an electrical generator with a nameplate capacity 18 MW of electricity. Natural gas is fired during start-up of the boiler. As previously stated, the boiler uses a multiple cyclonic collector and an ESP for control.

Emission Limits:

DEQ received records of CO, NOx, and SO<sub>2</sub> in pound per MMBTU. The records indicate the actual emissions are below the permitted limits. CO is based on a 24-hour average and NOx and SO<sub>2</sub> are based on a 30-day rolling average, as permitted. DEQ reviewed the records for CO, Lead, NOx, PM-10, SO<sub>2</sub>, VOCs, Arsenic, Mercury, Chromium, and Benzo(a)pyrene and the constituents were below the permitted limits in tons per year. Additionally, DEQ reviewed the most recent relative accuracy test audit (RATA) completed August 23, 2018 and the flow rate to determine emissions in pounds per hour. The flow rate was based on the air flow study conducted August 29, 2017, and was 51,477 dry standard cubic feet per minute. The CEMS passed the RATA.

During the inspection, the CEMS and records indicated the following:

Pollutant	Limit 1 (lb/MMBtu)	Actual	Limit 2 (lb/hr)	Actual	Result
SOx	0.25 lb/mmbtu 30-day rolling avg	0.22 lb/MMBtu	57.5 lb/hr	46.4 lb/hr	pass
NOx	0.25 lb/mmbtu 30-day rolling avg	0.21 lb/MMBtu	57.5 lb/hr	43.5 lb/hr	Pass
CO	0.25 lb/mmbtu 24-hr rolling avg	0.06 lb/MMBtu	57.5 lb/hr	12.5 lb/hr	Pass

Based on the most recent stack test completed for the facility, on August 18, 2016, the facility was below the permitted emission limits as indicated below.

Pollutant	Limit 1	Actual	Limit 2 (lb/hr)	Actual	Result
PM (for PM10)	0.10 lb/mmbtu	0.01 lb/mmbtu	23 lb/hr	3.10 lb/hr	pass
VOC	0.020 lb/mmbtu	0.001 lb/mmbtu	4.6 lb/hr	0.26 lb/hr	pass
Pb	5.0E-04 lb/mmbtu	1.4E-05 lb/mmbtu	0.12 lb/hr	0.003lb/hr	pass
Hg	1.4 ug/cu. M	ND	3.2E-04 lb/hr	ND	pass
As	40 ug/cu. M	1.27 ug/cu. M	0.009 lb/hr	0.0002 lb/hr	pass
Cr	23.0 ug/ cu M	7.33 ug/cu. M	0.0052 lb/hr	0.0015 lb/hr	pass
Dioxin/Furan	2.9E-05 ug/ cu M	1.8E-05 ug/ cu M	6.5E-09 lb/hr	2.4E-09 lb/hr	pass
BAP	0.008 ug/ cu M	0.003 ug/ cu M	1.9E-06 lb/hr	7.2E-07 lb/hr	pass

<b>H2SO4</b>	<b>0.3 lb/mmbtu</b>	<b>0.003 lb/MMBtu</b>	<b>7.6 lb/hr</b>	<b>0.76 lb/hr</b>	<b>pass</b>
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Based on the records reviewed, the facility was in compliance with the annual emissions in tons per year based on a 12-month rolling time period.

<b>Pollutant</b>	<b>Limit 3</b>	<b>Actual (tpy)</b>	<b>Result</b>
<b>PM (for PM10)</b>	<b>98.9 tpy</b>	<b>13.34 tpy</b>	<b>pass</b>
<b>VOC</b>	<b>19.1 tpy</b>	<b>1.11 tpy</b>	<b>pass</b>
<b>Pb</b>	<b>0.5 tpy</b>	<b>0.01 tpy</b>	<b>pass</b>
<b>Hg</b>	<b>0.0014 tpy</b>	<b>ND</b>	<b>pass</b>
<b>As</b>	<b>0.04 tpy</b>	<b>0.001 tpy</b>	<b>pass</b>
<b>Cr</b>	<b>0.023 tpy</b>	<b>0.006 tpy</b>	<b>pass</b>
<b>Dioxin/Furan</b>	<b>2.9E-08 tpy</b>	<b>1.06E-08 tpy</b>	<b>pass</b>
<b>BAP</b>	<b>8.4E-06 tpy</b>	<b>3.1E-06 tpy</b>	<b>pass</b>
<b>H2SO4</b>	<b>33.3 tpy</b>	<b>3.27 tpy</b>	<b>pass</b>
<b>SOx</b>	<b>247.2 tpy</b>	<b>214.5 tpy</b>	<b>pass</b>
<b>NOx</b>	<b>247.2 tpy</b>	<b>172.3 tpy</b>	<b>pass</b>
<b>CO</b>	<b>247.2 tpy</b>	<b>83.7 tpy</b>	<b>pass</b>

#### Material Limits:

Based on the records reviewed, the most amount of natural gas used since October 2017 was 69,690 cubic feet (ccf) per 12-month rolling time period, which is below the 490,200 ccf per 12-month rolling time period permitted for the facility.

Based on the records reviewed, no construction and demolition wood, or particle board/plywood was received or burned at the facility between October 2017 through November 2018. The records indicated the highest amount of creosote wood received 45,978 tons based on a 12-month rolling time period, and the highest amount of creosote wood burned was 214 tons per 24-hour period in January 2018, which is below the 528 tons per day permitted for the facility. The records indicated the highest amount of TDF received at the facility was 11,625 tons of TDF based on a 12-month rolling time period since October 2017, and the highest amount of TDF burned was 41 tons per 24-hour period since October 2017, which is below the 44 tons per day permitted for the facility.

The following table indicates the Total Chromium and Mercury content of the fuels that were analyzed on January 11, 2017:

<b>Pollutant</b>	<b>Limit 1</b>	<b>Virgin wood</b>	<b>Creosote Treated Wood</b>	<b>TDF</b>	<b>Result</b>
<b>Total Chromium</b>	<b>30 ppm dry</b>	<b>5.2 ppm</b>	<b>7.3 ppm</b>	<b>0.3 ppm</b>	<b>pass</b>
<b>Mercury</b>	<b>0.5 ppm dry</b>	<b>0.01 ppm</b>	<b>0.02 ppm</b>	<b>0.01 ppm</b>	<b>pass</b>

#### Process/Operational Restrictions:

Based on the records reviewed, the facility has operated 8,272 hours for the year of 2018. The facility is still under the permitted limit of 8,600 hours per year of operation.

During the walkover, the multiple cyclonic collector and ESP appeared to be operating properly.

Design/Equipment Parameters:

An annual RATA is performed to verify the CEM and COM systems are operating and monitoring the data properly. As previously stated above, the most recent RATA was completed August 23, 2018.

Testing/Sampling

DEQ reviewed the most recent analysis of each type of fuel burned at the facility, the results are discussed above under the Emission Limits. As previously stated, the most recent stack test was performed August 18, 2016. DEQ reviewed the most recent RATA completed August 23, 2018, and the air flow study conducted August 29, 2017. The test protocols and test reports were submitted to the DEQ in timely manner.

Monitoring/Recordkeeping

The facility has calculated hourly and annual emission rates for PM10, VOCs, lead, dioxins and furans, mercury, arsenic, total chromium, benzo(a)pyrene, and sulfuric acid using the most recent stack test data. The facility uses the most recent flow data and CEMS to calculate pound per hour emission rates. The CEMS monitors SO<sub>2</sub>, CO, NO<sub>x</sub>, and oxygen. Additionally, the facility uses a COM to monitor opacity from the stack, which is used as an indicator of proper functioning of the ESP. The ESP is subject to CAM, and is used to control PM from EUBOILER. The facility conducts quarterly quality assurance procedures of the CEMS and COMS.

The facility continuously monitors and records the total usage of natural gas, which is used for start-up for the boiler. Records show that monthly and 12-month rolling time period natural gas records are kept accordingly.

The facility records the amount of fuel received and burned in the boiler system. The facility also keeps track of daily and 12-month rolling time period of the fuel received and burned in the boiler. The facility's records are well kept and keep daily boiler operating information in accordance with the ROP.

According to Mr. Vine, the facility does not have the capability of generating electricity on Natural Gas alone. The capacity factor for Natural Gas by this measure is therefore 0. Natural Gas is used as a start-up fuel and for flame stabilization during times when high wood fuel moistures or other transient conditions are experienced. The relative contribution of Natural Gas to the output of the plant can be approximated; however, since the BTU value of wood varies greatly with moisture content and other factors, an exact assessment of the contribution of Natural Gas to the capacity factor cannot be performed. The average contribution to heat input into the boiler, which is related to the capacity factor but varies with changes in plant heat rate, is calculated annually. The percentage of heat input from Natural Gas into the boiler in 2017 0.3% which is only slightly greater than 0.

Reporting:

Reporting of any deviations, excursions, excess emissions, monitor downtime for the CEMS and COMS, quarterly reports, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ in timely manner.

The facility completes annual RATAs of the CEMS and COMS for quality assurance monitoring. The facility completes stack testing every five years. The stack testing and RATAs have been completed in accordance with appropriate testing procedures, and the results were submitted accurately to the DEQ in a timely manner.

Stack/Vent Restrictions:

Based on observations and DEQ's estimation during the field inspection, the stack (SVBOILER) appeared to be at least 150 feet tall and 72 inches in diameter. No visible emissions were observed from the stack during the inspection.

Other Requirements:

A Fuel Procurement and Handling Plan was submitted to the DEQ November 16, 2016 and approved by the DEQ December 14, 2016. The plan is implemented at the facility.

The facility is currently burning clean wood chips mixed with creosote wood chips and then combined with

TDF. Based on the previous stack tests, Viking is within their permitted limits co-firing the fuels together. The facility appears to be in compliance with the on-site Emergency Response Program and CAM conditions outlined in the ROP.

The State of Michigan does not have delegation of the Boiler MACT, 40 CFR Part 63 Subpart JJJJJJ, so these areas of the ROP were not reviewed by the DEQ at this time.

#### **EUASHHANDLING:**

Fly ash and bottom ash are conveyed to a wet rotary unloader where water is added to control fugitive dust. The ash is then transported to an enclosed ash building where it is stored until the ash is trucked off-site.

No Material Limits, Design/Equipment Parameters, Stack/Vent Restrictions, and Other requirements are applicable for EUASHHANDLING.

#### **Emission Limits:**

No opacity was observed outside of the ash collection areas. The bottom ash is collected in a water pug mill, and disposed into a dumpster. The fly ash is collected in an enclosed building where the fly ash is conditioned with water and disposed of in a wagon that is brought to the ash building when full. The door to the enclosed building where the wagon is stored and the ash building remain closed until it is necessary to remove the ash from that location. Inside the building there was approximately 5 percent opacity inside, but no opacity was observed outside of the ash handling buildings.

#### **Process/Operational Restrictions**

During the inspection, the ash handling areas were wet, so the wetting system appeared to be operating properly.

#### **Testing/Sampling:**

Based on the records reviewed, the ash handling and storage areas are inspected on a daily basis. If visible emissions are observed, appropriate procedures (like adding more water to the ash) are conducted to minimize the emissions.

#### **Monitoring/Recordkeeping.**

Based on the records reviewed, the ash handling areas are inspected on a daily basis when operating. The records of the ash handling areas are kept appropriately.

#### **Reporting:**

Reporting of any deviations, quarterly reports, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ in timely manner.

#### **EUGENERTOR :**

A stand-by, diesel-fired, 415 hp emergency generator which is used to provide electricity to the facility during an emergency situation.

#### **Emission Limits:**

According to Mr. Vine, the sulfur dioxide emission rate does not exceed 0.56 pounds per MMBTU heat input, based on a 24-hour period (which is equivalent to using oil with 0.5 percent sulfur content and a heat value of 18,000 BTU's per pound. Based on the 2017 MAERS Report, the oil for the emergency generator had a heat value of 18,545 BTU per pound, and the sulfur content was 0.0015 percent. Records indicated the sulfur content of the fuel is 15 ppm sulfur.

No Material Limits, Testing/Sampling, and Stack/Vent Restrictions are applicable for EUGENERATOR.

#### **Process/Operational Restrictions:**

According to Mr. Vine, the emergency generator is tested approximately once per year, and has not operated more than 100 hours within a year.

#### **Design/Equipment Parameters:**

The emergency generator is equipped with a non-resettable hour meter. The generator has operated for 315 hours in the last 26 years at the time of the inspection.

#### **Monitoring/Recordkeeping:**

As previously stated, the emergency generator is tested once per year.

Reporting:

Reporting of any deviations, quarterly reports, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ in timely manner.

Other Requirements:

The DEQ has not been given delegation for the RICE MACT, therefore this area was not reviewed during the field inspection and records review.

**FGOLDCLEANERS:**

Viking has one small cold cleaner located at the facility. It is serviced and maintained by Safety-Kleen and utilizes a mineral spirit solvent.

NAME

Caryn Owens

DATE

12/13/18

SUPERVISOR

[Signature]