

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection**

N116059692

FACILITY: Viking Energy of McBain		SRN / ID: N1160
LOCATION: 6751 W. Gerwoude Dr., MCBAIN		DISTRICT: Gaylord
CITY: MCBAIN		COUNTY: MISSAUKEE
CONTACT: Todd Tolkinen , Plant Manager		ACTIVITY DATE: 08/05/2021
STAFF: Rob Dickman	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled inspection of this major source.		
RESOLVED COMPLAINTS:		

Viking Energy of McBain, Inc. is a wood fired boiler electric utility plant located within the McBain city limits. Virgin wood, tire derived fuel, particleboard and plywood, construction and demolition wood, and creosote treated wood are used as fuels in the boiler. The fuel is delivered to the site by truck and stored on-site in piles that are managed to control fugitive dust. 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. Ash from the boiler is collected, treated with water, and transported to a landfill for disposal.

I visited the Viking Energy of McBain facility to perform an inspection. Accompanying me on the inspection was Todd Tolkenin, Plant Manager, Kieth Stackpoole, and Tammi VanTil of Madison Consulting. The purpose of the inspection was to determine the facility's compliance with Renewable Operating Permit (ROP) No. MI-ROP-N1160-2018. It should be noted that this ROP contains conditions pursuant to 40 CFR 63, Subpart JJJJJ. The Air Quality Division (AQD) has not taken delegation of authority on this Subpart. While there are some statements in this report that are related to this Subpart, it was not inspected specifically as part of this inspection event. Following are the findings of this inspection:

SOURCE-WIDE CONDITIONS

Emission Limits

There are no source wide emissions limits.

Material Limits

There are no source wide material limits.

Process or Operational Restrictions

The facility is required to have and implement a Fugitive Emissions Plan (FEP) for the plant yard, material storage piles and all material handling operations. This plan was last updated in November of 2016 and approved in December of 2016. This version of the plan was submitted with the facility ROP application in 2018. Housekeeping at the facility appeared good. No fugitive visible emissions were noted at the facility.

An approved Malfunction Abatement Plan is also required at this facility. The most recent version of this plan is dated September of 2013. No evidence of approval could be located. Review and approval of this plan will be performed post inspection. This version of the plan was submitted with the facility ROP application in 2018. Assessment of any deficiencies in the MAP will be made at that time.

Design or Equipment Parameters

There are no source wide design or equipment parameters.

Testing and Sampling Requirements

There are no source wide testing or sampling requirements.

Monitoring and/or Recordkeeping Requirements

There are records that are required to be kept per the FEP including washing and sweeping of, and dust suppressant application to plant roads, storage piles, and material handling operations. Plant roads at the time of the inspection were in good repair. Records regarding fugitive emissions observations and remedial actions, if taken, are recorded daily. A review of these records indicates this facility maintains the roads as needed.

Reporting

Annual certifications of compliance and semiannual deviation reports were previously reviewed and documented.

Stack/Vent Restrictions

There are no source wide stack or vent restrictions.

Other Requirements

There are no source wide other requirements.

EURMHANDLING

Raw material handling equipment, including primary and secondary screens, radial stacker, raw material pile, two hogs to chip raw material, and several conveyors. Raw material is conveyed to the feed hopper of the boiler. Regarding the creosote treated material, an outside contractor resides on site and uses a hogger to chip this material for fuel use. A recent complaint indicated that fugitive emissions were being generated and leaving this facility as a result of this activity. Facility records do not indicate any issues but, fugitive emissions are taken and recorded only once daily, and it is possible there were no issues at that time of those observations as hogging of this material is not continuous. As of the date of this inspection, the facility had addressed any issues associated with fugitive emissions from the fuel yard including treatment of haul roads, water sprays on the hogs, and the facility has begun installation of the new radial stacker capable of minimizing the drop point distance to the fuel pile and thus minimizing fugitive emissions. The facility has also reached out to the complainant to discuss these changes and establish a line of communication in the event of future issues. During the inspection, the creosote hogger was in operation and no fugitive emissions were noted. Also, no fugitive emissions were noted from the haul roads nor the fuel piles.

Emission Limits

Fugitive emissions from the wood fuel storage and handling are not to exceed 5% opacity. Compliance with this is through non-Method 9 certified emission observations that are to be performed at least once daily. Readings are taken once per day and recorded. The last 12 months of these records appeared readily available for review. No records were noted where the opacity was greater than 5%. No visible emissions from this area were noted during the inspection.

Material Limits

There are no material limits associated with this section.

Process or Operational Restrictions

Any visible emissions from the fuel piles must either cause a facility shutdown until repaired or repaired immediately. The facility had recently received a complaint regarding visible emissions in this yard. They immediately took action with application of dust suppression and procurement of a new radial stacker that would allow for the outlet of the stacker to remain in close contact with the fuel pile. At the time of the inspection, this yard appeared in relatively good repair with no visible emissions. The new stacker had not been installed yet but the footings for it had been poured.

Design or Equipment Parameters

There are no design or equipment parameters associated with this section.

Testing and Sampling Requirements

Non-certified readings are to be taken and recorded at least once per day.

Monitoring and/or Recordkeeping Requirements

Records of required daily observations are to be kept along with any repairs or remedial action as a result of them. These records are kept electronically, were reviewed, and appear complete. No records were noted where the opacity was greater than 5%. No corresponding records of repairs or remedial action concerning this equipment were noted.

Reporting

Annual certifications of compliance and semiannual deviation reports were previously reviewed and documented.

Stack/Vent Restrictions

There are no stack or vent restrictions associated with this section.

Other Requirements

There are no other requirements associated with this section.

EUBOILER

The boiler has a spreader-stoker design with a steam rating of 334,085 lb/hr at 1025 psig firing on wood fuel. The steam turbine/generator has a rated output of 39.6 Megawatts. Natural gas is used as a startup fuel. Stack testing for all pollutants not monitored continuously was performed in August of 2021 and the results of this testing are pending.

Emission Limits

Particulate Matter (PM) emissions are limited to 0.10 pounds per million BTU heat input (lb/MMBtu). Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated the PM emissions from the emission unit were 0.013 lb/MMBtu.

Particulate Matter less than 10 microns (PM-10) emissions are limited to 0.1 pounds per million BTU heat input (lb/MMBtu), 23.0 pounds per hour (pph), and 98.9 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated the PM-10 emissions from the emission unit were 0.013 pounds per million BTU heat input (lb/MMBtu), 3.1 pounds per hour (pph), and 12.04 tons per year based on a 12-month rolling time period.

Sulfur Dioxide (SO₂) emissions are limited to 0.25 pounds per million BTU heat input (lb/MMBtu), 57.5 pounds per hour (pph), and 247.2 tons per year based on a 12-month rolling time period. Compliance with this limit is through operation of a Continuous Emissions Monitoring System (CEMS). Records of excess emissions or monitoring system downtime are compiled and reported quarterly. These reports were previously reviewed, documented, and demonstrated compliance. An instant reading taken on site during the inspection indicated SO₂ emissions at 0.24 #/MMBtu and 52.48 pounds per hour.

Nitrogen Oxides (NO_x) emissions are limited to 0.25 pounds per million BTU heat input (lb/MMBtu), 57.5 pounds per hour (pph), and 247.2 tons per year based on a 12-month rolling time period. Compliance with this limit is through operation of a Continuous Emissions Monitoring System (CEMS). Records of excess emissions or monitoring system downtime are compiled and reported quarterly. These reports were previously reviewed, documented, and demonstrated compliance. An instant reading taken on site during the inspection indicated NO_x emissions at 0.21 #/MMBtu and 43 pounds per hour.

Carbon Monoxide (CO) emissions are limited to 0.25 pounds per million BTU heat input (lb/MMBtu), 57.5 pounds per hour (pph), and 247.2 tons per year based on a 12-month rolling time period. Compliance with this limit is through operation of a Continuous Emissions Monitoring System (CEMS). Records of excess emissions or monitoring system downtime are compiled and reported quarterly. These reports were previously reviewed, documented, and demonstrated compliance. An instant reading taken on site during the inspection indicated CO emissions at 0.06 #/MMBtu and 13 pounds per hour.

Volatile Organic Compound (VOC) emissions are limited to 0.02 pounds per million BTU heat input (lb/MMBtu), 4.6 pounds per hour (pph), and 19.1 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated VOC emissions from the emission unit stack were 0.00106 pounds per million BTU heat input (lb/MMBtu), 0.26 pounds per hour (pph), and 1.11 tons per year based on a 12-month rolling time period.

Lead emissions are limited to 5.0E-04 pounds per million BTU heat input (lb/MMBtu), 0.12 pounds per hour (pph), and 0.5 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated Lead emissions from the emission unit stack were 1.43E-05 pounds per million BTU heat input (lb/MMBtu), 0.0034 pounds per hour (pph), and 0.014 tons per year based on a 12-month rolling time period.

Dioxins and Furans (D/F) emissions are limited to 2.9E-05 microgram per standard cubic meter corrected to 7% oxygen, 6.5E-09 pounds per hour (pph), and 2.9E-08 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated D/F emissions from the emission unit

stack were 1.08E-05 microgram per standard cubic meter corrected to 7% oxygen, 2.46E-09 pounds per hour (pph), and 1.06E-08 tons per year based on a 12-month rolling time period.

Mercury emissions are limited to 1.4 microgram per standard cubic meter corrected to 7% oxygen, 3.2E-4 pounds per hour (pph), and 0.0014 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated mercury emissions from the emission unit stack were below the detection limit of the analytical method used.

Arsenic emissions are limited to 40 microgram per standard cubic meter corrected to 7% oxygen, 0.009 pounds per hour (pph), and 0.04 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated arsenic emissions from the emission unit stack were 2.9E-5 microgram per standard cubic meter corrected to 7% oxygen, 6.5E-9 pounds per hour (pph), and 2.9E-8 tons per year based on a 12-month rolling time period.

Total chromium emissions are limited to 23 microgram per standard cubic meter corrected to 7% oxygen, 0.0052 pounds per hour (pph), and 0.023 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated total chromium emissions from the emission unit stack were 7.33 microgram per standard cubic meter corrected to 7% oxygen, 0.00155 pounds per hour (pph), and 0.0067 tons per year based on a 12-month rolling time period.

Benzo-a-pyrene (BAP) emissions are limited to 0.008 microgram per standard cubic meter corrected to 7% oxygen, 1.9E-6 pounds per hour (pph), and 8.4E-6 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated BAP emissions from the emission unit stack were 0.0032 microgram per standard cubic meter corrected to 7% oxygen, 7.27E-07 pounds per hour (pph), and 3.13E-06 tons per year based on a 12-month rolling time period.

Sulfuric acid emissions are limited to 0.03 pounds per million BTU heat input (lb/MMBtu), 7.6 pounds per hour (pph), and 33.3 tons per year based on a 12-month rolling time period. Stack testing is the method used to demonstrate compliance with these emission limits. Stack testing performed in 2016 indicated sulfuric acid emissions from the emission unit stack were 0.0031 pounds per million BTU heat input (lb/MMBtu), 0.76 pounds per hour (pph), and 3.27 tons per year based on a 12-month rolling time period.

Opacity from the stack is limited to 20%. Compliance with this limit is through operation of a Continuous Opacity Monitoring System (COMS). Records of excess opacity or monitoring system downtime are compiled and reported quarterly. These reports were previously reviewed, documented, and demonstrated compliance. An instant reading taken on site during the inspection indicated opacity at 3.23%.

Material Limits

All material used for fuel at the facility is tracked by weight on a daily basis. These records were available for review. For the month of February 2021, the following total of fuel used were recorded:

Wood – 10,309 tons
TDF – 752 tons
Creosote – 4,589 tons

Natural gas usage at startup of the unit is limited to 490,200,000 standard cubic feet per year based on a 12-month rolling time period as determined at the end of each calendar month. Compliance with these limitations is demonstrated through daily recording of natural gas usage. A review of records demonstrated the total natural gas usage in as of August of 2021 was 5,986,000 standard cubic feet based on a 12-month rolling time period.

Construction and Demolition materials are limited to 268 tons per day and 96,336 tons per year based on a 12-month rolling time period. This material has not been used for fuel in the last 12 months and is not anticipated to be used in the future.

Creosote treated wood is limited to 528 tons per day and 189,300 tons per year based on a 12-month rolling time period. As of August of 2021, annual fuel usage was 59,471 tons based on a 12-month rolling time period.

Particle board and plywood is limited to 99 tons per day and 35,604 tons per year based on a 12-month rolling time period. This material has not been used for fuel in the last 12 months and is not anticipated to be used in the future.

Tire derived fuel (TDF) is limited to 44 tons per day and 16,060 tons per year based on a 12-month rolling time period. As of August of 2021 annual fuel usage was 8,604 tons based on a 12-month rolling time period.

Total Chromium in the fuel used at the facility is limited to 30 parts per million by weight, dry.

Mercury in the fuel used at the facility is limited to 0.5 parts per million by weight, dry. Following is the most recent fuel analysis for fuel used at the facility. It was dated June of 2021.

<u>Fuel</u>	<u>Mercury (ppm)</u>	<u>Chromium (ppm)</u>
Untreated wood	0.008	0.13
Creosote wood	0.024	0.87
Tire Derived Fuel	Non-detect	Non-detect

Process/Operational Restrictions

Boiler operation is limited to 8600 hours per 12-month calendar year. This works out to 51 weeks of 24/7 operation in a given calendar year. The facility has an annual outage that lasts at least one week annually. Records of plant operation were available for review.

Cyclone and Electrostatic Precipitator (ESP) must be in operation when the boiler is. At the time of the inspection, this equipment was in operation.

Per the Boiler MACT, this boiler must have the carbon monoxide (CO) concentrations optimized, measured, and recorded. This boiler is equipped with a CO CEMS that measures CO continuously and provides feedback to the facility such that CO emissions are reduced as much as possible.

Design or Equipment Parameters

The COMS and CEMS are to be installed, calibrated, and maintained in accordance with 40 CFR Part 60 requirements. These systems have been in place for several years and are configured per these requirements. The daily, quarterly, and annual QA/QC requirements for them have been performed, reviewed, and documented.

Testing and Sampling Requirements

Each fuel type burned at the facility must be sampled annually for Chromium and Mercury content, dry, by weight. The last date of this sampling and analysis was performed June of 2021 and demonstrated the following:

<u>Fuel</u>	<u>Mercury (ppm)</u>	<u>Chromium (ppm)</u>
Untreated wood	0.008	0.13
Creosote wood	0.024	0.87
Tire Derived Fuel	Non-detect	Non-detect

Stack testing for PM, PM-10, Sulfuric Acid, Lead, Arsenic, D/F, Total Chromium, Mercury, BAP, and VOC is required at least once every five years. As described in the emission limits section, this testing was performed in 2016 and demonstrated compliance with applicable emission limits. Required procedures involving timely submissions of testing protocols and testing reports were followed for this testing. This testing was performed again in August of 2021 and the results are pending.

A flow study on the stack is to be performed annually. The date of this last test was August 24, 2020 and demonstrated an average flow rate of 46,319 dry scfm. This testing was performed again in August of 2021 as part of the stack testing event and the results are pending.

Monitoring and/or Recordkeeping Requirements

For pollutants not monitored by CEMS (PM-10, VOCs, lead, dioxins and furans, mercury, arsenic, total chromium, benzo(a)pyrene, and sulfuric acid, the facility is required to develop emission factors based on most recent stack testing for these pollutants. These

factors have been developed and are utilized to calculate annual emissions for emissions inventory (MAERS) reporting. For the month of February of 2021, emissions were calculated as listed below. All values are in tons of emissions.

<u>Pollutant</u>	<u>Monthly</u>	<u>12-month Rolling</u>	<u>Permit Limit</u>
PM 10	1.31	14.65	98.9
Sulfuric Acid	0.27	3.33	33.3
VOC	0.1	1.2	19.1
Lead	1.33E-03	0.015	0.5
Mercury	4.25E-05	0.00047	0.0014
Arsenic	1.11E-04	0.0012	0.04
Chromium	6.19E-04	0.0074	0.023
Benzo A pyrene	2.85E-07	3.18E-06	8.40E-06
Dioxin/Furan	9.81E-10	1.09E-08	2.90E-08

Monitoring data collected by the CEMS and COMS (SO₂, NO_x, CO, and visible emissions) is required to be kept. This data is collected by the corresponding data collection system which automatically calculates emissions in units of the applicable standard for each pollutant. Excess emissions and monitoring system downtime are reported quarterly for each system. These reports have been previously received, reviewed, and documented.

Natural gas utilized at the facility is required to be monitored continuously. The facility is equipped with a gas meter. The quantity of natural gas used is recorded continuously.

Records of other types of fuel received and burned and being kept on a daily, monthly, and 12-month rolling time period basis. This information is tracked continuously through scale measurement and recorded. For the month of February 2021, the following total of fuel used were recorded:

Wood – 10,309 tons
 TDF – 752 tons
 Creosote – 4,589 tons

A log of hours of operation for the boiler is being kept continuously. This information was available for review upon request.

Compliance Assurance Monitoring (CAM) for the boiler utilized the opacity monitor as an indicator of Electrostatic Precipitator (ESP) performance. The facility ROP appears to have conflicting definitions of an excursion pursuant to CAM. The facility utilizes the stricter definition of one 6-minute average exceeding 15% causes an evaluation of the secondary ESP voltage. However, they would like to utilize the less strict condition of two one-hour averages over 15% for secondary voltage evaluation. I consulted with the AQD CAM Specialist on this issue who agreed that the definitions were conflicting. He suggested review of the facility CAM plan, and, if warranted, correct this conflict upon ROP renewal. This issue will be revisited and resolved post-inspection.

Secondary voltage for the ESP is required to be monitored. Upon inspection, this parameter is monitored. There are no specifications regarding any ranges or limits on this parameter except CAM as described above, only that it be monitored.

Reporting

Annual certifications of compliance and semiannual deviation reports were previously reviewed and documented.

Also, required reporting relating to stack testing, COMS and CERMS quality assurance testing, and Compliance Assurance Monitoring (CAM) has all been completed in a timely manner, has previously been reviewed, and the reviews have been documented.

Stack/Vent Restrictions

The stack on the outlet of the ESP is to have a maximum diameter of 72 inches and a minimum height of 150 feet. The stack has not been altered since construction of the facility and appears compliant with these parameters.

Other Requirements

A Fuel Procurement Plan (FPP) is required to be developed and implemented. The latest date on this plan is November of 2016 and it was approved in December of 2016.

If the CAM plan is found to be inadequate, the facility is to submit an amended version for review. No amendments to the CAM plan have been received and none of the CAM reporting from the facility would indicate the plan is inadequate.

The facility is also required to comply with certain provisions of 40 CFR 97 (Cross-State Air Pollution Rule (CASPR)). Specifically, Subparts AAAAA, BBBBB, and CCCCC of Part 97. The facility complies with AAAAA and BBBBB through the continuous monitoring of NOx and with CCCCC through the limited use of natural gas at startup.

Finally, the facility is to comply with the applicable requirements of 40 CFR 63 Subpart JJJJJ - National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters. The AQD is not delegated the regulatory authority for this area source MACT. The facility was not inspected against this MACT.

EUA-HDLG

The ash storage and handling emission unit consists of screw feeders and other equipment which collect and dispose of the ash generated in the electricity generation process. This process is controlled by an ash wetting system.

Emission Limits

Fugitive emissions from this equipment is not to exceed 5% opacity. Collected ash from this process is wetted and stored in an enclosed building. Compliance with this is through non-Method 9 certified emission observations that are to be performed at least once daily. Records of these observations are to be kept. No records were noted where the opacity was greater than 5%. During the inspection, no visible emissions were noted from the building housing the ash. Housekeeping around the building appeared very good.

Material Limits

There are no material limits associated with this section.

Process or Operational Restrictions

The ash handling system is not to be operated unless the wetting system is operating. At the time of the inspection, this system was in operation.

Design or Equipment Parameters

There are no design or equipment parameters associated with this section.

Testing and Sampling Requirements

There are no testing or sampling requirements associated with this section.

Monitoring and/or Recordkeeping Requirements

Fugitive emissions from this equipment is not to exceed 5% opacity. Collected ash from this process is wetted and stored in an enclosed building. Compliance with this is through non-Method 9 certified emission observations that are to be performed at least once daily. Records of these observations are to be kept. No records were noted where the opacity was greater than 5%.

Reporting

Annual certifications of compliance and semiannual deviation reports were previously reviewed and documented.

Stack/Vent Restrictions

There are no stack or vent restrictions associated with this section.

Other Requirements

There are no other requirements associated with this section.

EUGENERATOR

Standby diesel-fired reciprocating Detroit Diesel 415hp emergency generator to provide electricity to the facility on an emergency basis. This engine is subject to 40 CFR Part 63, Subpart ZZZZ.

Emission Limits

Sulfur Dioxide (SO₂) emissions from this unit are limited to 0.56 pounds per million BTU heat input. Compliance with this is through fuel testing. Sulfur content of the fuel used in the generator must be less than 0.5% with a higher heating value of at least 18,000 BTUs per pound of fuel. The last record for a fuel delivery was July 15, 2021 and demonstrated a sulfur content of less than 15 ppm (0.0015%) and a higher heating value of 18,564 BTUs per pound.

Material Limits

There are no material limits associated with this section.

Process or Operational Restrictions

Operation of this engine is limited to 100 hours per year for maintenance and readiness checks and 50 hours per year for non-emergency situations. Total run time for 2020 was 7.5 hours, total run time to date for 2021 was 1.0 hours. The unit has run a total of 349.5 hours since 1987, with an average of 10.3 hours per year.

Design or Equipment Parameters

This engine is equipped with a non-resettable hour meter as required.

Testing and Sampling Requirements

There are no testing or sampling requirements associated with this section.

Monitoring and/or Recordkeeping Requirements

Hours of operation for the calendar year 2020 for this unit was 7.5 hours.

The last record for a fuel delivery was July 15, 2021 and demonstrated a sulfur content of less than 15 ppm (0.0015%) and a higher heating value of 18,564 BTUs per pound.

Reporting

Annual certifications of compliance and semiannual deviation reports were previously reviewed and documented.

Stack/Vent Restrictions

There are no stack or vent restrictions associated with this section.

Other Requirements

By complying with the conditions of this section, the facility is in compliance with the MACT.

FGCOLDCLEANERS

There is one small solvent based parts washer on site in the maintenance building. It is serviced by an outside contractor. At the time of the inspection, this cleaner was not in use, the lid on it was closed, and it appeared in good condition. Instructions for its use were clearly posted on the unit.

At the time of this inspection, this facility was in compliance with their air permitting.

NAME *Paul Dickman*

DATE _____

SUPERVISOR _____