

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

N583129495

FACILITY: Breitburn Energy Company - Wilderness/Hayes 29		SRN / ID: N5831
LOCATION: 10875 Geronimo Trail, GAYLORD		DISTRICT: Cadillac
CITY: GAYLORD		COUNTY: OTSEGO
CONTACT: Carolann Knapp , EH&S Regional Rep (Breitburn)		ACTIVITY DATE: 04/21/2015
STAFF: Caryn Owens	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled Field Inspection and Records Review		
RESOLVED COMPLAINTS:		

On Thursday April 21, 2015 Caryn Owens of the DEQ-AQD completed a scheduled site inspection of the Breitburn Operating, LP (Breitburn) – Wilderness CO2 CPF and Linn Operating, Inc. (Linn) Hayes 29 CPF located at 10875 Geronimo's Trail in Gaylord, Otsego County, Michigan. The purpose of this inspection was to determine the stationary source's compliance with Renewable Operating Permit (ROP) MI-ROP-N5831-2014a. This facility is considered one stationary source, but has two companies operating at the site. Therefore, the ROP is in two Sections: Section 1 is Breitburn – Wilderness CO2 CPF; and Section 2 is Linn – Hayes 29 CPF. The stationary source is currently considered a major source for criteria pollutants; Nitrogen Oxides (NOx) and Carbon Monoxide (CO). Two emission units at the Breitburn – Wilderness CO2 facility (EUENGINE5 and EUENGINE6) are subject to the federal Compliance Assurance Monitoring (CAM) rule under 40 CFR, Part 64. These emission units have pre-control emissions of NOx and CO greater than the major source threshold levels. The stationary source uses catalytic converters to control emissions, from EUENGINE5 and EUENGINE6, below the major source threshold level. The stationary source is a synthetic minor, for hazardous air pollutants (HAPs) by limiting the potential to emit of any single HAP regulated by the federal Clean Air Act, Section 112, to less than 10 tons per year and the potential to emit of all HAPs combined to less than 25 tons per year. Additionally, the stationary source is considered a "synthetic minor" source for Prevention of Significant Deterioration (PSD) regulations of 40 CFR, Part 52.21 because the stationary source accepted permit conditions limiting the potential to emit of CO and NOx to less than 250 tons per year. The stationary source is considered an area source for National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63 Subpart HH, and NESHAP 40 CFR Part 63 Subpart ZZZZ. The State of Michigan does not have delegated authority of the area source NESHAPs, and thus these areas were not reviewed by the MDEQ at this time.

This stationary source is a Central Production Facility (CPF) that processes natural gas from production wells. The CPF collects natural gas from the production wells, removes water, brine, and oil condensate; then compresses the treated natural gas and sends it to a pipeline (Linn – Hayes 29 CPF portion, Section 2). A separate process at the same location removes carbon dioxide (CO2) prior to shipment to the pipeline (Breitburn – Wilderness CO2 CPF portion, Section 1). The source consists of seven reciprocating internal combustion engines (RICEs), two which are rich burn engines controlled by 3-way catalytic converters to reduce NOx, CO, and VOC emissions. However, one of the rich burn RICEs (EUENGINE5) is shut-in at this time due to low fuel demand. Four of the engines at the stationary source are lean burn engines with oxidation catalysts to control CO and formaldehyde emissions (EUENGINE2, EUENGINE3, EUENGINE4, and EUENGINEH29). One engine is a lean burn engine with no control (EUENGINE1). Additionally, the source contains a glycol dehydrator which removes water along with trace hydrocarbons from the gas stream. The water and hydrocarbons are controlled by a condenser. Exempt equipment at the source include: process heaters; heater treaters; and four 400 barrel of oil and sweet condensate/brine tanks.

DEQ was unaccompanied during the field inspection, and stack testing for EUENGINEH29 was being conducted during the field inspection. An inspection brochure was not given to anyone at the stationary source, but a brochure will be emailed to the Breitburn and Linn with this inspection report. At the time of the inspection, the weather was cloudy with intermittent snow and rain mix, and approximately 35 °F, with calm winds out of the west-southwest. The site is located approximately two miles south of Mancelona Road on Geronimo's Trail, and the east side of the road. The site is occupied by 14 buildings plus a few storage structures on the north side of the property. DEQ observed a steam plume from the glycol dehydrator, with a slight odor. At the time of the inspection only EUENGINE5 was not operating because it is temporarily shut-in. The stacks of each engine appeared to be the same height and appeared to be about 40 feet above ground surface. The engines operating appeared to be working properly.

During the field inspection, the engines were operating at the following conditions:

- EUENGINE1 – This engine is a 1,085 horsepower (hp) Caterpillar 3516 LE lean burn compressor engine with no control. The engine was operating at 1,104 RPM, 54 psi, and 185 °F. The engine block of this engine was labeled GCS 831.
- EUENGINE2 – This engine is a 1,085 hp Caterpillar LE lean burn compressor engine with an oxidation catalyst and an air/fuel ratio controller (AFRC). This engine was operating at 1,117 RPM, 59 psi, and 181 °F. The inlet of the oxidization catalyst was 853 °F and the outlet was 828 °F, which is typical for an oxidation catalyst to have a higher inlet temperature than an outlet temperature. The AFRC read Left bank 0.669 phi and Right bank 0.000 phi. The engine block of this engine was labeled GCS 856.
- EUENGINE3 – This engine is a 1,085 hp Caterpillar LE lean burn compressor engine with an oxidation catalyst and an AFRC. This engine was operating at 1,117 RPM, 59 psi, and 181 °F. The inlet of the oxidization catalyst was 806 °F and the outlet was 781 °F. The AFRC read Left bank 0.669 phi and Right bank 0.000 phi. The engine block of this engine was labeled GCS 885.
- EUENGINE4 – This engine is a 1,150 hp Caterpillar LE lean burn compressor engine with an oxidation catalyst and an AFRC. This engine was operating at 1,126 RPM, 65 psi, and 183 °F. The inlet of the oxidization catalyst was 826 °F and the outlet was 806 °F. The AFRC read Left bank 0.686 phi and Right bank 0.000 phi. The engine block of this engine was labeled GCS 907.
- EUENGINE5 – This engine is a 1,478 hp Waukesha rich burn compressor engine with catalytic converter and an AFRC. As previously stated, this engine is currently shut in until there is a higher demand for natural gas.
- EUENGINE6 – This engine is a 1,478 hp Waukesha rich burn compressor engine with catalytic converter and an AFRC. This engine was operating at 886 RPM, 60 psi, and 175 °F. The inlet of the catalytic converter was 935 °F and the outlet was 983 °F. The AFRC read Left bank 0.77v751 and Right bank 0.75v952.
- EUENGINEH29 – This engine is a 1,085 hp Caterpillar LE lean burn compressor engine with an oxidation catalyst and an AFRC. This engine was operating at 1,187 RPM, 60 psi, and 175 °F. The inlet of the oxidization catalyst was 848 °F and the outlet was 828 °F. The AFRC read Left bank 0.686 phi and Right bank 0.000 phi. The engine block of this engine was labeled GCS 907.

### SOURCEWIDE CONDITIONS

The source-wide emission limits apply to the entire stationary source.

- **Emission Limits:** The source-wide limits are 224 tons of NO<sub>x</sub> and CO each, for a 12-month rolling time period, less than 10 tons per year for each individual HAP based on a 12-month rolling time period, and less than 25 tons per year in total HAPs based on a 12-month rolling time period. Based on the records reviewed, the emissions reported were: 123 tons of NO<sub>x</sub> per 12-month rolling time period; 94 tons of CO based on a 12-month rolling time period; 7 tons of a single HAP (formaldehyde) based on a 12-month rolling time period; and 9 tons of total HAPs based on a 12-month rolling time period. The stationary source is within their emission limits.
- **Materials/Fuels:** No materials or fuel limits are applicable to the source-wide conditions of the stationary source.
- **Process/Operational Parameters:** According to Breitburn and Linn, only sweet natural gas is burned in the equipment at the stationary source.
- **Design/Equipment Parameters and Testing/Sampling Equipment:** No Design/Equipment Parameters and Testing/Sampling Equipment are applicable to the source-wide conditions of the stationary source.

- **Monitoring/Recordkeeping:** Breitburn and Linn records monthly and 12-month rolling time period emission calculations in an acceptable manner.
- **Reporting:** Reporting of any deviations, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ sufficiently and in a timely manner.

## **Section 1 – Breitburn Operating, LP – Wilderness CO2 CPF**

**FGCATENGINES:** Remote Caterpillar 3516 LE (low emission) RICEs. Three of the four RICEs are controlled by oxidation catalysts (EUENGINE2, EUENGINE3, and EUENGINE4). EUENGINE1 is uncontrolled.

- **Emission Limits:** EUENGINE1 is limited to 23.1 tons of NOx per 12-month rolling time period, and 20.8 tons of CO per 12-month rolling time period. Based on the records reviewed from March 2014 through March 2015, the highest emissions reported for NOx and CO were 18.0 tons of NOx per 12-month rolling time period and 16.2 tons of CO per 12-month rolling time period.  
EUENGINE2 is limited to 23.1 tons of NOx per 12-month rolling time period, and 4.5 tons of CO per 12-month rolling time period. Based on the records reviewed from March 2014 through March 2015, the highest emissions reported for NOx and CO were 18.4 tons of NOx per 12-month rolling time period and 3.3 tons of CO per 12-month rolling time period.  
EUENGINE3 is also limited to 23.1 tons of NOx per 12-month rolling time period, and 4.5 tons of CO per 12-month rolling time period. Based on the records reviewed from March 2014 through March 2015, the highest emissions reported for NOx and CO were 18.3 tons of NOx per 12-month rolling time period and 3.3 tons of CO per 12-month rolling time period.  
EUENGINE4 is limited to 24.4 tons of NOx per 12-month rolling time period, and 4.2 tons of CO per 12-month rolling time period. Based on the records reviewed from March 2014 through March 2015, the highest emissions reported for NOx and CO were 19.0 tons of NOx per 12-month rolling time period and 3.0 tons of CO per 12-month rolling time period.  
The emissions reported in FGCATENGINES are compliant with the emission limits.
- **Materials/Fuels:** No materials or fuel limits are applicable to FGCATENGINES.
- **Process/Operational Parameters:** According to the records submitted to the DEQ from March 2014 through March 2015, FGCATENGINES did not operate more than 200 hours without a catalyst per engine. The longest an engine operated without a catalyst during the reported time period was 1 hour. Breitburn submitted a MAP July 31, 2013, which contained a description of each engine and the appropriate operating conditions and proper cleaning and replacing of the air cleaning devices. According to the maintenance records for FGCATENGINES, engine parameters were recorded on a daily basis. The engines were shut-down to be serviced, for general repairs such as, but not limited to: replacing filters; valves; spark plugs; repair leaks; and cleaning and/or replacing the oxidation catalyst. The records did not show maintenance concerns with FGCATENGINES. Breitburn uses differential pressures and temperature gauges on the engines with the catalysts to monitor proper operations of FGCATENGINES and the catalysts.
- **Design/Equipment Parameters and Testing/Sampling Equipment:** Temperature gauges were installed on the inlet and outlet sides of the oxidation catalysts for EUENGINE2 through EUENGINE4, and they appeared to be installed and operating properly during the field inspection.
- **Testing:** Breitburn was stack testing during the field inspection. The previous stack test was complete in June 2009. Breitburn uses emission factors from stack testing to determine emission limits.
- **Monitoring/Recordkeeping:** The facility records monthly and 12-month rolling time period records for NOx and CO and were supplied to the DEQ for review. The 12-month rolling time period emissions are discussed above under emission limits. The recordkeeping was acceptable to the DEQ. Breitburn has maintained a log of all the maintenance activities which is discussed above. Attached are the monthly and 12-month rolling fuel usage data, emissions for NOx and CO, hours the engines operated without a catalyst, and the maintenance logs and reports.  
Based on the compressor maintenance log for EUENGINE4, it appears the engine was overhauled and replaced with a new engine. Based on DEQ records, the engine was replaced with another CAT 3516 LE, 1,150 hp engine. The engine is on the same engine block as the previous engine and Breitburn notified the DEQ of this change on May 22, 2014.

- **Reporting:** Reporting of any deviations, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ sufficiently and in a timely manner. The most recent stack testing took place April 21 through 23, 2015. Stack testing protocols and reporting were submitted and approved in a timely manner.
- **Stack/Vent Restrictions:** Based on visible observations during the field inspections, the stacks of the engines appeared to be in compliance with ROP specifications.
- **Other Requirements:** There are no other requirements applicable to FGCAENGINES.

**FGWAUKENGINES:** Two remote 1,478 hp Waukesha L-7042 GSI rich burn RICEs (EUENGINE5 and EUENGINE6). It should be noted that EUENGINE5 was in operation until November 10, 2014 and then the engine was shut in.

- **Emission Limits:** EUENGINE5 is limited to 24.6 tons of NOx per 12-month rolling time period, and 41.1 tons of CO per 12-month rolling time period. Based on the records reviewed from March 2014 through November 2014, the highest emissions reported for NOx and CO were 13.6 tons of NOx per 12-month rolling time period and 25.0 tons of CO per 12-month rolling time period. EUENGINE6 is also limited to 24.6 tons of NOx per 12-month rolling time period, and 41.1 tons of CO per 12-month rolling time period. Based on the records reviewed from March 2014 through March 2015, the highest emissions reported for NOx and CO were 13.7 tons of NOx per 12-month rolling time period and 25.3 tons of CO per 12-month rolling time period. The emissions reported in FGWAUKENGINES are compliant with the emission limits.
- **Materials/Fuels:** No materials or fuel limits are applicable to FGWAUKENGINES.
- **Process/Operational Parameters:** According to the records submitted to the DEQ from March 2014 through March 2015, FGWAUKENGINES did not operate without a catalyst on the engine. As stated above in FGCAENGINES, Breitburn submitted a MAP July 31, 2013, which contained a description of each engine and the appropriate operating conditions and proper cleaning, and replacing of the air cleaning devices. According to the maintenance records for FGWAUKENGINES, engine parameters were recorded on a daily basis. The engines were shut-down to be serviced, for general repairs such as, but not limited to: replacing filters; valves; spark plugs; repair leaks; and cleaning and/or replacing the catalytic converters. The records did not show maintenance concerns with FGWAUKENGINES. Breitburn uses differential pressures and temperature gauges on the engines with the catalysts to monitor proper operations of FGCAENGINES and the catalysts.
- **Design/Equipment Parameters and Testing/Sampling Equipment:** Temperature gauges were installed on the inlet and outlet sides of the catalytic converters of FGWAUKENGINES, and they appeared to be installed and operating properly during the field inspection.
- **Testing:** Breitburn was stack testing during the field inspection. The previous stack test was complete in June 2009. Breitburn uses emission factors from stack testing to determine emission limits. EUENGINE5 will complete a performance test within 90 after it starts back up.
- **Monitoring/Recordkeeping:** The facility records monthly and 12-month rolling time period records for NOx and CO and were supplied to the DEQ for review. The 12-month rolling time period emissions are discussed above under emission limits. The recordkeeping was acceptable to the DEQ. Breitburn has maintained a log for all the of all the maintenance activities which is discussed above. Attached are the monthly and 12-month rolling fuel usage data, emissions for NOx and CO, hours the engines operated without a catalyst, and the maintenance logs and reports. No engines from FGWAUKENGINES have been replaced during the time period of this compliance analysis.
- **Reporting:** Reporting of any deviations, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ sufficiently and in a timely manner. The most recent stack testing took place April 21 through 23, 2015. Stack testing protocols and reporting were submitted and approved in a timely manner. The semi-annual CAM excursion and monitor

downtime reports were submitted in a timely manner. There have been no excursions or exceedances during the compliance reporting period.

**Stack/Vent Restrictions:** Based on visible observations during the field inspections, the stacks of the engines appeared to be in compliance with ROP specifications.

**Other Requirements:** There are no other requirements applicable to FGWAUKENGINES.

**Evaluation Summary:** Based on the field inspection and records review, Breitburn is in compliance with MI-ROP-N5831-2014a.

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## **Section 2 – Linn Operating, LP – Hayes 29 CPF**

**EUGLYCOLDEHYDRATOR:** The glycol dehydrator at the facility removes water along with trace hydrocarbons from the gas stream prior to sales. The glycol dehydrator is subject to NESHAP (MACT) 40 CFR Part 63, Subpart HH, and the DEQ does not have delegated authority on this NESHAP, and therefore was not addressed during the field inspection.

**EUENGINEH29:** A remote 1,085 hp CAT G3516TALE (lean burn) RICE, controlled with an oxidation catalyst.

**Emission Limits:** EUENGINEH29 is limited to 24.6 tons of NOx per 12-month rolling time period, and 41.1 tons of CO per 12-month rolling time period. The emissions limits are high for EUENGINEH29 due to Linn Operating changing out the engine with a lower emitting engine, and since a new permit to install was not necessary, the emission limits for this engine stayed the same. EUENGINEH29 has an oxidation catalyst to control HAPs for the source-wide conditions for the stationary source. Based on the records reviewed from March 2014 through March 2015, the highest emissions reported for NOx and CO were 19.09 tons of NOx per 12-month rolling time period and 3.63 tons of CO per 12-month rolling time period. The emissions reported for EUENGINEH29 are compliant with the emission limits.

**Materials/Fuels:** No materials or fuel limits are applicable to EUENGINEH29.

**Process/Operational Parameters:** According to the records submitted to the DEQ from March 2014 through March 2015, EUENGINEH29 did not operate more than 200 hours without a catalyst. Linn submitted a MAP April 1, 2014, which contained a description of EUENGINEH29 and appropriate operating conditions, and proper cleaning and replacing of the air cleaning device. According to the maintenance records for EUENGINEH29, the engine operated without the oxidation catalyst for a ½ hour throughout the reporting period. The engine parameters are recorded on a daily basis. The engine was shut-down to be serviced for general repairs such as, but not limited to: replacing filters; valves; spark plugs; repair leaks; and cleaning and/or replacing the oxidation catalyst. The catalyst was last cleaned on September 3, 2014. The records did not show maintenance concerns with EUENGINEH29. Linn uses differential pressures and temperature gauges on the catalysts to monitor proper operations of EUENGINEH29 and the catalyst.

**Design/Equipment Parameters and Testing/Sampling Equipment:** Temperature gauges were installed on the inlet and outlet sides of the oxidation catalyst, and it appeared to be installed and operating properly during the field inspection.

**Testing:** Linn was stack testing during the field inspection. Linn will be using emission factors from stack testing to determine emission limits. Currently, Linn uses engine specific emission factors to determine emission limits.

**Monitoring/Recordkeeping:** The facility records monthly and 12-month rolling time period records for NOx and CO, and were supplied to the DEQ for review. The 12-month rolling time period emissions are discussed above under emission limits. The recordkeeping was acceptable to the DEQ. Linn has maintained logs for all the maintenance activities which are discussed above. Attached are the monthly and 12-month rolling fuel usage data, emissions for NOx and CO, hours the engines operated without a catalyst, and the maintenance logs and reports.

- **Reporting:** Reporting of any deviations, semi-annual reports, and annual compliance reports for ROP certification were submitted to the DEQ sufficiently and in a timely manner. The most recent stack testing took place on April 21, 2015. Stack testing protocols and reporting were submitted and approved in a timely manner.
- **Stack/Vent Restrictions:** Based on visible observations during the field inspections, the stack of EUENGINEH29 appeared to be in compliance with ROP specifications.
- **Other Requirements:** There are no other requirements applicable to EUENGINEH29.

**Evaluation Summary:** Based on the field inspection and records review, Linn is in compliance with MI-ROP-N5831-2014a.

NAME Caryn Owens

DATE 4/21/15

SUPERVISOR 