

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

N583132343

FACILITY: Breitburn Energy Company - Wilderness/Hayes 29		SRN / ID: N5831
LOCATION: 10875 Geronimo Trail, GAYLORD		DISTRICT: Cadillac
CITY: GAYLORD		COUNTY: OTSEGO
CONTACT: Diane Lundin , Sr. EHS Representative (Linn Energy)		ACTIVITY DATE: 11/10/2015
STAFF: Gloria Torello	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: FCE 2016.		
RESOLVED COMPLAINTS:		

Name: Breitburn Operating-Wilderness CO2 CPF, & LINN Operating-Hayes 29 CPF.

Directions: The facility is located in Otsego County, at 10875 Geronimo's Trail, Gaylord. From Old State Road, turn west onto Mancelona Road, travel 6.5 miles, turn south onto Geronimo's Trail, travel 2 miles (the last 0.2 mile is unpaved), the facility is on the left/east side.

Permit. On August 4, 2014 the AQD issued sectioned permit MI-ROP-N5831-2014.

On April 2, 2015 the AQD issued revised MI-ROP-N5831-2014a. The revision included a minor modification to consider Breitburn's EUENGINE5 shut-in. If EUENGINE5 goes back on-line in the future, the permittee will test EUENGINE5 within 90 days. EUENGINE5 was shut down and placed in stand-by mode effective November 10, 2014.

ROP MI-ROP-N5831-2014a expires on August 4, 2019. An administratively complete ROP renewal application is due to AQD between February 4, 2018 and February 4, 2019.

Section 1 relates to the following six Breitburn engines used in Antrim gas production, including:

Emission Unit ID (Alternate Name)	Emission Unit Description & Control	CAM Subject	Flexible Group ID
EUENGINE1 (C5, 831)	1,085 hp Caterpillar 3516 LE reciprocating internal combustion engine (RICE) with no control, AFRC	No	FGCATENGINES
EUENGINE2 (C7, 856)	1,085 hp Caterpillar 3516 LE RICE with oxidation catalyst, AFRC	No	FGCATENGINES
EUENGINE3 (C8, 885)	1,085 hp Caterpillar 3516 LE RICE with oxidation catalyst, AFRC	No	FGCATENGINES
EUENGINE4 (C10, 907)	1,150 hp Caterpillar 3516 LE RICE with oxidation catalyst, AFRC	No	FGCATENGINES
EUENGINE5 (C2, CO2-2)	1,478 hp Waukesha L-7042 GSI (rich burn) RICE, with 3-way catalytic converter, AFRC The engine is currently shut-in.	Yes	FGWAUKENGINES
EUENGINE6 (C3, CO2-1)	1,478 hp Waukesha L-7042 GSI (rich burn) RICE, with 3-way catalytic converter, AFRC	Yes	FGWAUKENGINES

Section 2 relates to the following LINN equipment used in Antrim gas production.

Emission Unit ID (Alternate Name)	Emission Unit Description & Control	CAM Subject	Flexible Group ID
EUENGINEH29	1,085 hp Caterpillar G 3516 TALE RICE with oxidation catalyst and AFRC. This engine is used to compress gas and send gas to a transmission pipeline.	No	NA
EUGLYCOLDEHYDRATOR	Glycol dehydrator with	NA	NA

	condenser.		
EUMACTZZZZ (EUENGINEH29)	Non-emergency spark ignition 4-stroke lean burn RICE Caterpillar 3516TALE, oxidation catalyst	No	NA

Malfunction Abatement Plan (MAP):
In the MAP file are MAPs from Breitburn and LINN.

LINN has an oxidation catalyst on their lean burn engine and the MAP discusses destruction efficiencies for CO of 90%, and NOx of 0%.

Breitburn has oxidation catalysts on lean burn engines EUENGINE1, 2, and 3. Breitburn has 3-way catalysts on EUENGINE5, and 6.

There is no discussion of oxidation catalyst outlet temperatures. In the past AQD has accepted oxidation catalyst outlet temperatures below the inlet temperature. The MAP includes on page 5, Emission Reduction Testing, for CO and NOx Breitburn will do in/outlet testing and estimate destruction efficiency.

There is not an AQD approval letter in the MAP file. Torello will prepare a MAP approval letter.

2015 MAERS (for reporting year 2014): The most recent MAERS includes these source reported emissions:

Pollutant	MAERS, as reported by permittees	ROP, Source Wide Limit
CO	68.9 tons	244 tons
NOx	108.4 tons	244 tons
VOC/HAPs	22.6 tons VOC	25 tons HAPs

Records:

Breitburn submitted records for Section 1 including:
The ROP "VI. Monitoring/Recordkeeping":

- Source-Wide Conditions,
- FGCATENGINES,
- FGWAUKENGINES,
- FGRURALSIRICEMACT.

The MAP:

- Catalysts Preventative Maintenance,
- Operating Variables and Remedial Actions,
- Appendix B.

LINN submitted records for Section 2 including:
The ROP "VI. Monitoring/Recordkeeping":

- Source-Wide Conditions,
- EUGLYCOLDEHYDRATOR,
- EUENGINEH29,
- EUMACTZZZZ.

The MAP:

- Oxidation Catalyst Operating Variables to be Monitored,
- Attachment 1a,
- Attachment 1B,
- Attachment 2.

Breitburn and LINN demonstrate ongoing compliance with the permit record keeping requirements. The permittees consistently maintain their records, and make records available to AQD upon request.

A review of records shows the reported emissions are below the permitted emission limits.

MACTS: The stationary source is a synthetic minor source in regards to HAP emissions because the stationary

source accepted legally enforceable permit conditions limiting the potential to emit of HAPs.

EUENGINES 1, 2, 3, 4, 5, 6, and H29 at the stationary source are subject to NESHAP RICE, 40 CFR, Part 63, Subparts A and ZZZZ, the RICE Area Source MACT. The ROP contains special conditions in Section 1 and Section 2 for applicable requirements from 40 CFR, Part 63, Subparts A and ZZZZ. The AQD is not delegated the regulatory authority for the Rice Area Source MACT; therefore, the special conditions for the RICE Area Source MACT contained in FGRURALSIRICEMACT in Section 1 and EUMACTZZZZ in Section 2 were not reviewed by the AQD.

EUGLYCOLDEHYDRATOR in Section 2 at the stationary source is subject to the NESHAP for Oil and Natural Gas Production Facilities (Area Source) promulgated in 40 CFR, Part 63, Subparts A and HH. The EPA has not delegated these Subparts to MI AQD and the Subparts A and HH were not reviewed.

MACES: Facility Information was reviewed and no change was made. Regulatory Info was reviewed. In Regulatory Summary, HAPs was changed to Synthetic Minor, and CO Major was added.

Brochure: The inspection brochure will be forwarded to the permittee with the site inspection notes via email.

Compliance: A review of AQD files, and MACES report generator, show no outstanding violation.

Inspection: Gloria Torello made an unannounced site visit on November 10, 2015. Jesse and Ernie of Breitburn staff were on site. Ear plugs are needed at this facility.

Via visual assessment, FGCATENGINES' six stacks meet the permit limits of a maximum 16 inches diameter and minimum 37.5 feet height. Via visual assessment, EUENGINEH29's stack meets the permit limits of a maximum 16 inches diameter and minimum 40 feet height. The engine mufflers are located outside of the buildings.

The ROP and the Breitburn's MAP allow the oxidation catalysts to have an outlet temperature less than the inlet temperature.

Heat shimmers were present on various stacks. No visible emissions were noted.

Other equipment on site includes process heaters, heater treaters, and four 400 barrel oil and sweet condensate/brine tanks. The site was tidy; no oil stained soils were noted. The tank batteries were lined and had standing water. See the attached aerial photo for the location of the buildings/engines onsite. Below is a summary of observations.

Section 1 Breitburn.

EUENGINE4. Operating. No visible emissions. Catalyst on engine, temperature readings were taken: Inlet 840.0 F, Outlet 825.1 F. Clipboard present with sheets documenting engine parameters including RPM, Oil Level. Torello did not see a clipboard documenting catalyst inlet and outlet temperatures. Engine identifying mark: GSS907.

EUENGINE3. Operating. No visible emissions. Catalyst on engine, temperature readings were taken: Inlet 864.9 F, Outlet 842.6 F. Clipboard present with sheets documenting engine parameters including RPM, Oil Level. Torello did not see a clipboard documenting catalyst inlet and outlet temperatures.

EUENGINE2. Operating. No visible emissions. Catalyst on engine, temperature readings were taken: Inlet 840.0 F, Outlet 826.3 F. Clipboard present with sheets documenting engine parameters including RPM, Oil Level. Torello did not see a clipboard documenting catalyst inlet and outlet temperatures.

EU Engine 2 and EU Engine 3 are in the same building.

Next in line is Plant 1. The building houses the "Separex Membrane System." A Brietburn employee said Plant 1 is used to separate CO2 and methane. The CO2 is released to atmosphere, and the methane is sold.

EUENGINE1. Operating. No visible emissions. No catalyst on engine. Clipboard present with sheets documenting engine parameters including RPM, Oil Level.

EUENGINE5. Not operating.

EUENGINE6. Operating. No visible emissions. The catalyst on the engine was not obvious to Torello. Clipboard present with sheets documenting engine parameters including RPM, Oil Level.

EU Engine 5 and EU Engine 6 are in the same building.

Section 2 LINN.

EUENGINEH29. Operating. No visible emissions. Catalyst on engine. Clipboard present with record of catalyst inlet and outlet temperatures. Torello took these catalyst temperatures: Inlet 840.6 F, Outlet 819.9 F. The Breitburn employee said the H29 is now a Caterpillar engine.

Permit Conditions:

There are no Material Limits in the ROP.

The annual certification and semiannual reports are submitted in the permitted timeframes.

Source-Wide Conditions.

Sections 1 and 2 of the ROP include Source-Wide emission limits in tons, based on a 12-month rolling time. Source-Wide means emissions from both Sections 1 and 2 combined. Records provided included these emissions:

Pollutant	Records	ROP Limit
NOx	100.5 tons	224 tons
CO	56.9 tons	224 tons
HAPs		10 tons individual
HAPs	8.5 tons	25 tons total

This is an Antrim facility which burns sweet natural gas. As demonstrated by the records provided, the permittees complete required calculations of the monthly and 12-month rolling emissions of CO, NOx, and HAPs.

Section 1

FGCATENGINES

I. **Emission Limits.** A review of the records demonstrates compliance with the NOx and CO limits, emission limits are in tons, based on a 12-month rolling time. For example, in August 2015 EUENGINE4 recorded:

Pollutant	Records	ROP Limit
NOx	16.8 tons	24.4 tons
CO	1.4 tons	4.2 tons

II. There are no Material Limits in the ROP.

III. **Process/Operational Restrictions**

Records from June, July, and August 2015 show the engines had zero hours of operation without add on control, it is noted EUENGINE2 had 0.5 hour of operation without control during the 12-month rolling time period.

Review of the MAP requirements is incorporated into these comments.

An example of catalyst maintenance includes for example: EUENGINE4 on August 20, 2015 pulled element, inspected, vacuumed housing and element, put back in with new gaskets.

The records include "CAT DP." On August 20, 2015 the differential pressure/ DP on the catalyst had high differential pressure. Maintenance was performed. This demonstrates the permittee utilizes the differential pressure gauge as an indicator of proper operation of the catalyst.

IV. **Design/Equipment Parameters**

EUENGINES 2, 3, and 4 have oxidation catalysts. AQD staff observed and recorded the catalyst readings.

V. **Testing**

The last test was completed in April 2015. Test results included emissions in pounds per hour, and calculated emissions in tons per year. The calculated tons per year emissions are below the permitted NOx and CO permit limits. Retesting is due by April 2020.

VI. **Monitoring/Recording**

The permittee monitors and records gas usage from each engine, differential pressure on the oxidation catalysts, oxidation catalyst inlet and outlet temperatures, and logs of MAP required maintenance. The permittee keeps monthly and 12-month rolling emissions records of NOx and CO in tons. There is nothing in the file indicating engine replacement. It is noted EUENGINE5 is shut in.

VII. **Reporting.**

A review of the files show the permittee submitted the test protocol and test results within the timeframes in the ROP.

FGWAUKENGINES

I. **Emission Limits.** A review of the records demonstrate compliance with the NOx and CO limits, emission limits are in tons, based on a 12-month rolling time. For example, in August 2015 EUENGINE6 recorded:

Pollutant	Records	ROP Limit
NOx	12.4 tons	24.6 tons
CO	22.9 tons	41.1 tons

II. There are no Material Limits in the ROP.

III. Process/Operational Restrictions

Records from June, July, and August 2015 show the EUENGINE6 had zero hours of operation without add on control.

The MAP requirements are incorporated into these comments.

Records from June – September 2015 show no specific maintenance of the catalyst on EUENGINE6.

EUENGINE6’s catalyst pressure and temperature are monitored and recorded. The MAP includes catalyst temperature ranges. The catalyst pressure is established when the catalyst is installed or cleaned. The MAP includes catalyst pressure ranges allowed outside of the established pressure. See VI. below.

IV. Design/Equipment Parameters

EUENGINE6 has a thermocouple gauge.

V. Testing

EUENGINE5 is not operating, but if it goes back online then testing is required.

EUENGINE6 was tested in April 2015. Test results included emissions in pounds per hour, and calculated emissions in tons per year. The calculated tons per year emissions are below the permitted NOx and CO permit limits. Retesting is due by April 2020.

VI. Monitoring/Recording

The permittee monitors and records gas usage from EUENGINE6, there is no permit limit on gas usage.

EUENGINE6 is CAM subject. Included in EUENGINE6’s demonstration of compliance with CAM, EUENGINE6’s differential pressure on the oxidation catalyst is monitored and recorded. Since July 27, 2015, EUENGINE6’s compliant baseline delta pressure is 3 inches w.c. Records show EUENGINE6 “CAT DP” from June-September 2015 ranged from 2.8 to 3.5 inches which is within the 1.5 inch range allowed from baseline in the ROP, page 24, condition VI. 4.

CAM compliance includes monitoring temperature on EUENGINE6 catalyst inlet and outlet. The ROP page 24 condition VI. 6. includes, “An excursion for NOx and CO shall be a temperature ...reading less than 900 F at the inlet ... and greater than 1250 F at the outlet.” The June –September 2015 records show compliance.

The permittee keeps monthly and 12-month rolling emissions records of NOx and CO in tons, and records show compliance with the emission limits. There is nothing in the file indicating engine replacement. It is noted EUENGINE5 is shut in.

The EUENGINE6 records for Cat In/Out temps are in compliance with the permitted temp range of In 900 F and Out 1250 F.

VII. Reporting.

A review of the files show the permittee submitted the test protocol and test results within the timeframes of the ROP.

Section 2

EUENGINEH29

I. Emission Limits. A review of the records demonstrate compliance with the NOx and CO limits, emission limits are in tons, based on a 12-month rolling time. For example, in August 2015 EUENGINEH29 recorded:

Pollutant	Records	ROP Limit
NOx	19.6 tons	24.6 tons
CO	3.7 tons	41.1 tons

VIII. There are no Material Limits in the ROP.

IX. Process/Operational Restrictions

Records from June, July, and August 2015 show the EUENGINEH29 had zero hours of operation without add on

control.

Review of the MAP requirements is incorporated into these comments.

Records from June – September 2015 show no specific maintenance of the catalyst on EUENGINEH29 beyond “checked catalyst pressures.”

EUENGINEH29’s catalyst pressures are monitored and recorded. Records from LINN include: Differential Pressure Baseline 5.4” w.c.; and recorded Differential Pressure in w.c. 5.5.

EUENGINEH29’s catalyst In/Out temperatures are monitored and recorded. The MAP allows for Inlet temp greater than 750 F and outlet temp greater than 750 F and less than 1350 F. Records include temperatures within the range. Their MAP also has a footnote: The analyzer will be utilized to verify the CO reduction is at least 80%. Records show 96.7% CO reduction.

X. Design/Equipment Parameters
EUENGINEH29 has a thermocouple gauge.

XI. Testing
EUENGINEH29 was tested in April 2015. Test results included emissions in pounds per hour, and calculated emissions in tons per year. The calculated tons per year emissions are below the permitted NOx and CO permit limits. Retesting is due by April 2020.

XII. Monitoring/Recording
The permittee monitors and records gas usage from EUENGINEH29, differential pressure on the oxidation catalysts, oxidation catalyst inlet and outlet temperatures, and keeps logs of MAP required maintenance.

The permittee keeps monthly and 12-month rolling emissions records of NOx and CO in tons. There is nothing in the file indicating engine replacement.

Records show in June, July, and August 2015 EUENGINEH29 had zero hours of operation without catalyst in service.

The permittee keeps fuel usage records for EUENGINEH29, there is not a permit limit on fuel use.

XIII. Reporting.
A review of the files show the permittee submitted the test protocol and test results within the timeframe of the ROP.

Conclusions:
Torello will prepare a MAP approval letter.

Via onsite inspection, review of records, and discussion with permittee staff, the permittees demonstrate compliance with the conditions of MI-ROP-N5831-2014a.

NAME Gloria Torello DATE 12-2-15 SUPERVISOR 