

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

N583138247

FACILITY: Breitburn Energy Company - Wilderness/Hayes 29		SRN / ID: N5831
LOCATION: 10875 Geronimo Trail, GAYLORD		DISTRICT: Gaylord
CITY: GAYLORD		COUNTY: OTSEGO
CONTACT: Carolann Knapp, EH&S Regional Rep (Breitburn)		ACTIVITY DATE: 01/06/2017
STAFF: Bill Rogers	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled inspection and record review for FCE		
RESOLVED COMPLAINTS:		

On January 6, 2016, I inspected the Breitburn Wilderness CO2 removal plant and Linn Hayes 29 CPF, combined SRN N5831. In addition, prior to my inspection Carolann Knapp of BreitBurn and Diane Lundin of Linn Energy had provided me with records required by the joint Renewable Operating Permit (ROP) for this facility, Number MI-ROP-N5831-2014a. This activity report covers my inspection of the facility and my review of the records provided.

The facility is located off Geronimo Trail, south off from Mancelona Road near the Antrim-Otsego County Line. MI-ROP-N5831-2014a is a sectioned ROP. Section 1 applies to Breitburn's CO2 removal facility. Section 2 applies to Linn's Central Production Facility.

WILDERNESS CO2 REMOVAL FACILITY, BREITBURN:

Source-Wide Conditions, Condition I.1 and I.2, set source wide NOx and CO emissions limits of 224 tons each per 12 month rolling time period. Summary emission information, attached, claims that for the period ending October 2016 NOx emissions were 10.33 tons per month and 111 tons per 12 month period. CO was 5.51 tons per month and 59 tons per 12 month period. This complies with the permit conditions.

Condition 1.3 and 1.4 set source wide Hazardous Air Pollutant (HAP) limits of less than 10 tons per 12 month rolling time period for each individual HAP and 25 tons per 12 month rolling time period for combined HAPs. HAP information, attached, claims 8.9 tons total HAP for the 12 month period ending October 2016. Total HAP is less than 25 tons per 12 month period, in compliance with Condition 1.4. As total HAP is less than 10 tons per 12 months, and each separate HAP must necessarily be less than total HAP, each individual HAP is also less than 10 tons per 12 months. This complies with Condition 1.3.

Note that the facility wide totals provided by BreitBurn also include contributions from the Linn Hayes CPF.

Condition III.1 requires burning only sweet natural gas in the facility. I did not see or smell any evidence of sour gas at the facility.

Conditions VI.1, 2, and 3 require keeping and providing acceptable monthly and 12 month rolling time period records for CO, NOx, and HAP emissions. The records supplied, attached, comply with these permit conditions.

Table FGCATENGINES: Four Caterpillar engines, model 3516LE. EUENGINE2, EUENGINE3, and EUENGINE4 equipped with catalytic oxidizers.

During my inspection I found four Caterpillar engines, as permitted. I noted information on them as follows.

The Caterpillar engines are distributed in three engine sheds, in a line east to west; all of them are west of the shed which contains the two Waukesha engines.

1. The easternmost engine, in its own shed, has a data collection sheet labeled "Breitburn CO2." It is a Caterpillar engine labeled in metal characters welded to the engine mount. These characters read GCS 831, labeling the engine as Unit 831 of Gas Compression Services.

The engine was operating, but I couldn't find a tachometer readout. Engine water temperature was 170 degrees f. Compressor oil pressure was 55 PSI and engine oil pressure was 65 PSI.

The engine had what appeared to be thermocouple wires running to the stack, but I couldn't see any catalytic oxidizer.

2, 3. Two Caterpillar engines share the center of three sheds. They are labeled as GCS 856, to the east, and GCS 885, to the west. Both were equipped with oxidation catalysts.

Unit 856 had a digital readout which provided the following information: Hours of operation 87,742, 1123 RPM, coolant 183 degrees f, oil pressure 50 PSI, electrical system 25 volts. Catalyst temperatures were 835 degrees f inlet, 810 degrees f outlet.

There were two 300 gallon drum on stilt tanks near Unit 856. One was labeled ISO 150 oil and the other Low Ash Gas Engine Oil.

Unit 885 had a digital readout which provided the following information: Hours of operation 37,906, 1127 RPM, 26 volts, oil 56 PSI, coolant 184 degrees f. Catalyst inlet 860 degrees f, outlet 833 degrees f.

There were two 300 gallon drum on stilt tanks near Unit 885. One was labeled ISO 150 oil and the other Low Ash Gas Engine Oil. There was a larger tank labeled Waste Oil on the floor nearby.

4. The westernmost engine has its own shed. It is labeled GCS 907. It has a catalytic oxidizer. Its digital readout gave the following information: Hours of operation 76,115, 1107 RPM, 27 volts, oil 62 PSI, coolant 182 degrees f. Catalyst inlet 839 degrees f, outlet 827 degrees f.

The individual engine stacks all appeared to meet the dimensions specified in the permit. There was no opacity. I didn't notice any odors in or near the engine shed. I didn't see any evidence of leaks. Maintenance appeared good.

The conditions in section I of this table set NOx and CO limits for individual engines as follows:

Condition	Engine	Limit per 12 month period	Actual emissions 12 mo. ending Oct. 2016
I.1	EUENGINE1	23.1 tons NOx	17.3 tons NOx
I.2	EUENGINE1	20.8 tons CO	15.6 tons CO
I.3	EUENGINE2	23.1 tons NOx	17.1 tons NOx
I.4	EUENGINE2	4.5 tons CO	3.1 tons CO
I.5	EUENGINE3	23.1 tons NOx	18.7 tons NOx
I.6	EUENGINE3	4.5 tons CO	3.4 tons CO
I.7	EUENGINE4	24.4 tons NOx	17.6 tons NOx
I.8	EUENGINE4	4.2 tons CO	2.8 tons CO

A printout containing this emission information is attached. These results comply with the permit conditions.

Condition III.1 prohibits operating engines without the applicable control device more than 200 hours per year. A printout of this information is attached. Breitburn claims the equipment did not operate at all without control devices, as applicable, during the year. This complies with the permit condition.

Condition III.2 requires a Malfunction Abatement Plan (MAP) for these engines. The company provided a MAP. AQD approved the MAP on July 31, 2013. This complies with the permit condition.

Condition III.3 prohibits operating without any applicable control device except as allowed under Condition III.1. During my inspection I noted that control devices, specifically oxidation catalysts, are installed on EUENGINE2, EUENGINE3, and EUENGINE4. They appeared to be installed and operating properly. This complies with the permit condition.

Condition III.4 requires monitoring the oxidation catalyst with a manometer or pressure drop meter. The acceptable pressure drop range must be included in the MAP. Documents provided by BreitBurn, attached, include the acceptable pressure drop and the pressure drop as recorded on site. This complies with the permit condition.

Condition III.5 requires thermocouples to monitor temperature across the oxidation catalyst. I observed thermocouples on each oxidation catalyst. There were temperature readouts visible and the data which operators were writing on the data collection clipboards was consistent with what I saw on the readouts. This complies with the permit condition.

Condition IV.1 requires thermocouples be installed and operating properly. The thermocouples appeared to be installed and operating properly in compliance with this permit condition.

Condition VI.1 requires monitoring each engine's fuel usage. This information is included in the records attached. Therefore it appears the facility is in compliance with this permit condition.

Condition VI.2 requires monitoring pressure drop across the catalyst on a monthly basis. This information is included in the records attached. Therefore it appears the facility is in compliance with this permit condition.

Condition VI.3 requires recording inlet and outlet temperatures for the catalysts daily. I saw data collection clipboards with forms on them upon which this information is being recorded, in compliance with the permit condition. Example data sheets are attached.

Condition VI.4 requires logging maintenance. Example maintenance log information is attached. BreitBurn provided more of it but I printed only example sheets to include here.

Condition VI.5 requires logging hours each engine operated without its control device, if applicable. This information is included in the attached data sheets.

Condition VI.6 requires logging fuel use. This information is included in the attached data sheets.

Condition VI.7 requires monthly and 12-month NOx and CO emissions calculations. This information is included in the attached data sheets.

Condition VIII.1, 2, 3, and 4 require exhaust stacks with maximum diameter of 16 inches and a minimum height of 37.5 feet, one stack for each engine. The engine stacks on site appeared to comply with these permit conditions.

Table FGWAUKENGINES: Two Waukesha 1478 HP engines. These are located in an engine shed toward the east side of the facility.

According to discussions with AQD EUENGINE5 is not to be operated unless the company has an emission test conducted upon it. Only one of these two engines, the one I believe to be EUENGINE6, was operating at the time of my inspection.

The operating engine was labeled CO2 #1. It was operating at 909 RPM. Compressor oil temperature was 130 degrees f at 57 PSI, engine oil 170 degrees f at 55 PSI, coolant 180 degrees f at 15 PSI, auxiliary water pressure 20 PSI.

The engine had a catalytic oxidizer installed. The catalytic oxidizer had thermocouple wires attached. A two-position temperature readout said catalyst inlet temperature was 946 degrees f. (Reading outlet temperature would have required operating the controls so of course I did not collect that information.) The engine was definitely one of the Waukesha engines, as it said Waukesha on the side of the engine.

A second engine, labeled CO2 #2, was not operating.

There were several small tanks in the shed with the two Waukesha engines. Near CO2 #2 there were two drum on stilt style tanks, one labeled Low Ash Gas Engine Oil and one labeled R&O ISO 150 Oil. The ISO 150 tank was labeled "Do Not Refill." The concrete floor for a wide area around this tank was oily; perhaps the tank leaks.

Near CO2 #1 there are three drum on stilt style tanks, apparently the standard 300 gallon size. One is labeled Chevron Regal 150 ISO oil, one HDAX low ash gas engine oil, and the last Citgo Pacemaker GEO 1730.

The engine stacks exhaust unobstructed vertically upward and appear to match permit requirements for diameter and height, judging by eye. There was no opacity. I did not notice any odors in or around the engine shed. Maintenance appeared to be good.

Table FGWAUKENGINES, Conditions I.3 and I.4, set a NOx emission limit of 24.6 tons per 12 month rolling time period and a CO emission limit of 41.1 tons per 12 month time period for EUENGINE6. (Conditions I.1 and I.2 set identical limits for EUENGINE5, but EUENGINE5 is not operating.) Data supplied by BreitBurn, attached, claims EUENGINE6 had NOx emissions of 13.5 tons per 12 month time period and CO emissions of 24.8 tons per 12 month time period. This complies with the permit conditions.

Condition III.2 requires burning only sweet natural gas. I did not find any evidence of sour gas being used on site.

Condition III.2 allows operating EUENGINE6 no more than 200 hours per year without its oxidation catalyst. Data sheets, attached, claim the engine did not operate at all without its oxidation catalyst in the year. This complies with the permit condition.

Condition III.3 requires a MAP. The company sent AQD a MAP. AQD approved the MAP on July 31, 2013. This complies with the permit condition.

Condition III.4 requires operating the oxidation catalyst properly. During my inspection the catalyst appeared to be installed and operating properly, in compliance with the permit condition.

Condition III.5 requires monitoring pressure drop across the catalyst. Data for pressure drop is included in the attached data sheets. Therefore it appears the facility is in compliance with this permit condition.

Condition III.6 requires thermocouples to measure temperature across the catalyst. The thermocouples are in place and appear to be operating properly. This complies with the permit condition.

Condition VI.1 requires monitoring natural gas usage in the engine. This data is included in the attached data sheet. Therefore it appears the facility is in compliance with this permit condition.

Condition VI.2 requires including differential pressure across the catalytic oxidizer in the MAP. It is included, as required.

Condition VI.3 requires recording this pressure drop on a monthly basis. This information is included in the attached data sheets. Therefore it appears the facility is in compliance with this permit condition.

Condition VI.5 requires including temperature across the catalytic oxidizer in the MAP. It is included, as required.

Condition VI.6 requires monitoring and recording inlet and outlet temperatures for the catalytic oxidizer on a daily basis. This is included in the facility engine logs, in compliance with this permit condition.

Condition VI.8 requires a maintenance log. The company provided example printouts of data log pages. They comply with the permit condition.

Condition VI.9 requires logging hours of operation without the catalytic oxidizer. This information is included in the attached data sheets. This complies with the permit condition.

Condition VI.10 requires keeping monthly fuel use records for the engine. This information is included in the attached data sheets, in compliance with the permit condition.

Condition VI.11 requires monthly and 12 month NOx and CO emission calculations. These are included in the attached data sheets. They appear to comply with the permit condition.

Condition VIII.1 and 2 specify engine exhaust stacks, one per engine, with a maximum exhaust diameter of 16 inches and a minimum height of 40 feet. The engine stacks appear to meet these requirements.

Comments:

The facility includes several other pieces of equipment. One building north of the Caterpillar engine sheds contained much equipment consisting of pipes and tanks, labeled several places as "Sempex Membrane

Systems;" I believe this is the CO2 removal system. It was equipped with three process heaters. According to the builder's plates, the east and west process heaters were rated at 1,000,000 btu/hr and the center one at 375,000 BTU/hr. Stacks were about 22 feet high and all unobstructed vertically upward. The two larger heaters' stacks appeared to be about 18 inches diameter, the smaller heater's 12 inches diameter. I didn't notice any opacity or odors associated with this equipment.

I noticed three process heaters outside of any shed. They might have been in line gas heaters or heater-treaters. One had a burner labeled as 1,000,000 BTU/hr capacity. I didn't find the builder's plates for the others, but they were smaller in size than the 1,000,000 unit.

Linn Energy Hayes 29 CPF

Source-Wide Conditions

The same source-wide conditions apply to the Hayes 29 CPF section of the ROP as apply to the Wilderness CO2 Removal section, above. Source-Wide Conditions are discussed there.

EUGLYCOLDEHYDRATOR

The facility includes one glycol dehydrator. It appeared not to be operating. It had a burner exhaust of about 6 inches diameter to a T-shaped fitting at perhaps 12 feet above ground level. The still vent was about 1.5 inches diameter at 12 feet, also ending in a T shaped fitting. I did not notice any opacity or any odors from the dehydrator.

It is equipped with a B&W - brand heater rated at 200,000 btu/hr, according to its builder's plate.

The conditions in Section VI, Monitoring and Recordkeeping, of the ROP require the operator to prove their exemption from the more stringent air pollution control provisions of NSPS HH. One allowed method for proving exemption is to follow the requirements of NSPS HH, 40 CFR 63.764(e)(1)(i) by demonstrating an actual annual average flow rate of natural gas less than 85,000 cubic meters per day. Linn Energy has chosen this method.

An analysis of NSPS HH applicability for Linn facilities is attached. Gas processing totals for the Hayes 29 CPF, demonstrating actual annual average flow less than 85,000 cubic meters per day, are attached. This complies with the permit conditions.

EUENGINEH29

The Linn engine is in a shed north-east of most of the Breitburn equipment. The shed has a sign identifying it as the Linn Hayes 29 CPF.

The engine is a Caterpillar natural gas fired engine with catalytic oxidizer. I did not note any temperatures from the oxidizer. The digital display on the engine indicated 93,604 hours of operation, 1129 RPM, 27 volts, oil 57 PSI, coolant 184 degrees f.

The stack was unobstructed vertically upward. There are no permit requirements on dimensions for this stack. I didn't notice any opacity or odors near the engine. Maintenance appeared to be good.

Table EUENGINEH29, Conditions I.1 and I.2, set emission limits of 24.6 tons NOx and 41.1 tons CO per 12 month rolling time period. A summary of stack test results for tests reported June 5, 2015, is attached. It shows controlled emissions during the test which, if continued for the entire year, would add up to 3.8 tons per year NOx and less than 0.1 tons CO. These results comply with the permit conditions.

Condition III.1 prohibits operating the engine without its oxidation catalyst for more than 200 hours per year. The catalyst monthly operating report, example attached, claims the engine hasn't operated without the oxidation catalyst during the reporting period. This complies with the permit condition.

Condition III.2 requires a Malfunction Abatement Plan. Linn Energy submitted a MAP. AQD approved it December 3, 2015. This complies with the permit condition.

Condition III.3 requires the oxidation catalyst be installed and operating properly except as allowed in Condition III.1. During my inspection I saw the oxidation catalyst. It appeared to be installed and operating properly, in compliance with the permit condition.

Conditions III.4 and 5 require monitoring oxidation catalyst pressure drop and temperature change. During my inspection I saw the thermocouples to measure temperature on the catalyst and observed a temperature readout is installed and operating. The Catalyst Monthly Operating Report includes measured pressure drop and catalyst temperatures. This complies with the permit conditions.

Condition IV.1 requires thermocouples to measure catalyst temperature. As noted above, the thermocouples are installed and operating in compliance with the permit condition.

Condition V.1 requires periodic NOx and CO testing. Summary results of such testing are attached.

Condition VI.1 requires monitoring natural gas usage. Natural gas usage is included in the attached example data sheets. This complies with the permit condition.

Conditions VI.2 and VI.3 require recording pressure drop across the catalyst on a monthly basis and temperatures on a daily basis. Attached example data sheets include this information. This complies with the permit conditions.

Condition VI.4 requires a maintenance log. Example maintenance log sheets are attached. This complies with the permit condition.

Condition VI.5 requires a log of hours operating without the oxidation catalyst. This information is included in the attached example data sheets. This complies with the permit condition.

Condition VI.6 requires fuel use records for the engine. This information is included in the attached data sheets. This complies with the permit condition.

Condition VI.7 requires monthly and 12 month CO emission calculations. This information is included in an attached monthly emission estimate sheet. This complies with the permit condition.

COMMENTS

The Linn facility has other equipment. There were five standard 400 barrel-sized storage tanks inside a berm. I also saw two process heaters, perhaps heater-treaters. Snow covered the builder's plates so I was not able to read them. However, one of these had a burner which seemed to be the same design as the 1,000,000 btu/hour burners I had just seen in the Breitburn side of the facility. The other was smaller.

NAME William J Rogers Jr.

DATE 1/10/2017

SUPERVISOR 