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

N753865960

FACILITY: RIVERSIDE - HAYES 34 WILD WEST BOOSTER STATION		**SRN / ID:** N7538
LOCATION: SE4 NE4 SE4 SECTION 16 T30N R4W, HAYES TWP		**DISTRICT:** Gaylord
CITY: HAYES TWP		**COUNTY:** OTSEGO
CONTACT: Natalie Schrader , Compliance Coordinator		**ACTIVITY DATE:** 01/04/2023
STAFF: Sharon LeBlanc	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** SM OPT OUT
SUBJECT: FY 2023 Scheduled site inspection and data evaluation. sgl		
RESOLVED COMPLAINTS:		

On January 4, 2023, AQD District Staff mobilized to the Riverside Energy Michigan LLC (Riverside) – Wild West Booster (N7538), located in the SE1/4, NE 1/4, SE 1/4 Section 16, T30N, R4W, Hayes Township, Otsego County, Michigan to conduct an unannounced, scheduled, compliance inspection of the facility. The referenced facility presently operates under Permit to Install No. 264-05. A records request was made electronically on September 7, 2022. On January 4, 2023, it was realized that the records had been collected, but not received by the district, and the information sent on January 4, 2023. The information provided by Riverside has been incorporated into this document.

The most recent compliance inspections were conducted on November 9, 2018, and November 10, 2015. No compliance issues noted at that time.

At the time of the January 4, 2023, site visit, the skies were noted to be overcast with winds >5 mph from the east. Temperatures of 35 degrees Fahrenheit were reported. A steam plume was noted from the stack associated with the compressor engine.

FACILITY

The referenced facility is a gated (at the road) and unmanned booster station operated by Riverside. The station is reported to service Antrim Formation wells in the area boosting gas to the Loud 15 Facility. Activities onsite compression of Natural Gas (NG) to transport it down the pipeline.

To reach the Facility staff traveled west from the Gaylord Field Office on County Road C-42 (aka Alba Road), then turned left (south) on Hayes Tower Road and traveled approximately 2.5 miles to the intersection of Old Alba Road and Hayes Tower Road. Make a right on Old Alba Road, and travel 1 ¼ - mile west to Big Bowl Drive. Make a right-hand turn on Big Bowl Drive and travel under ½-mile to the north. The Facility drive is on the right-hand side (east) of the drive. Patience Path is just north of the drive and to the left.

A review of aerials appears to indicate that prior to December 2005, the Facility was merely a pumping station. Inactive at the time of the inspection the well known as Thomas Lake I C4-16) still exists onsite. The compressor building first showed up on site in an August 2006 aerial. Operators of record based on correspondence in District files include:

- Quicksilver Resources, (2005- 2007)
- Breitburn, (2007 - 2013)
- Linn (AKA Linn Energy, Linn Operating, Inc, Linn Operating LLC and Riverside Resources LLC) (2013 - 2019) and

- Riverside (2019 – present)

At the time of the January 4, 2023, site inspection, weather conditions consisted of completely overcast skies, temperatures of 35 degrees F. Winds were in general from the east at > 5 mph. Rains had occurred off and on over the course of the day for the area, but it was not raining at the time of the site visit.

REGULATORY

Permitting -The referenced facility operates under Permit to Install (PTI) No. 264-05, which was issued to Quicksilver Resources, Inc. in November 2005. The PTI was issued as an opt-out permit, At the time of permitting the facility consisted of one NG-fired compressor and was reported to be a true minor source of criteria pollutants. The referenced permit limits the total emissions to less than 90 tons per 12-month rolling time period for NOx and CO.

Though not identified in the permit, the facility may be subject to Federal Regulation. Subparts frequently associated with oil and gas facilities are identified below. Note however, that compliance with these subparts has not been determined as part of this inspection.

Federal Regulations - The referenced facility does not process or store petroleum liquids, nor store them onsite and is therefore appears to not be subject to 40 CFR Part 60 (New Source Performance Standards AKA NSPS) Subparts;

- K, Ka or Kb (Storage vessels for Petroleum Liquids);
- KKK (Equipment Leaks of VOC from onshore NG Processing Plants);
- VV (Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry);

40 CFR Part 60 Subpart OOOO - Standards of Performance for Crude Oil and Natural Gas Facilities for which construction, modification, or reconstruction commenced after August 23, 2011, and on or before September 18, 2015. Subpart OOOO as indicated would apply to onshore affected facilities that are constructed, modified or reconstructed after August 23, 2011. Based on available information it appears that the referenced subpart is not applicable at this time but that future changes may be subject to the referenced subpart.

In addition, the existing engine has a DOB date of 1997, which would make it exempt from NSPS Subparts IIII and JJJJ for Compression Ignition (CI) RICE and Spark Ignition (SI) RICE, respectively. AQD at this time has no delegated authority for the subparts.

With respect to 40 CFR Part 63 (Maximum Achievable Control Technology Standards) the following Subparts may apply:

- Subpart HH (HAPS from Oil and NG Production Facilities)
- Subpart ZZZZ (RICE)
- Subpart JJJJJJ (Boiler MACT)

With respect to Subpart HH, the affected unit is believed to be a dehy unit. However, the facility does not have a dehy unit and is not a production facility, so the subpart does not apply.

With respect to Subpart ZZZZ (RICE MACT), the facility engines are reported by the facility to be subject to the referenced subpart. Subpart ZZZZ submittals of record in the District Files included:

- December 20, 2010, Initial Notification Submittal,
- June 10, 2014, Semi Annual Compliance status report, and
- October 18, 2013, Renotification Submittal

The document(s) identified the Wild West Booster as an existing stationary Spark Ignition (SI) with a rating of less than 500 brake Hp located at an area source of HAPs. The Waukesha Rice at that time was subject to initial Subpart ZZZZ testing and further indicated that testing had been completed. Copies of the test report for the Waukesha RICE conducted on October 10, 2013, may be found in District files.

Required compliance reporting on file included:

- January 23, 2014, Semi Annual Compliance Status Report, and
- June 10, 2014, Semi Annual Compliance Status Report

The later of the two documents reported a catastrophic malfunction of the Waukesha Model 3521 RICE and replacement on January 25, 2014, with a Caterpillar 3408 HCTA SI 4SRB and less than 500 HP. It further reported that the Facility no longer is subject to annual stack testing or semi-annual compliance reports.

At the time of report preparation, AQD has been delegated authority to implement and enforce the subpart. However, at this time compliance determinations for Federal requirements under Subpart ZZZZ for Area Sources have not been made. Riverside has indicated that requirements under the subpart have been incorporated into the MAP for the Facility. Compliance with the MAP may indicate compliance with the referenced subpart.

NESHAP subparts JJJJJJ pertain to Industrial, Commercial and Institutional Boilers and Process Heaters for Area source of HAPS, respectively. Facilities such as this often have a dehydration unit, the reboiler of which would be a process heater. At the time of the site inspection, it appears that the Facility is not subject to this subpart.

EQUIPMENT

Consistent with previous site visits one compressor was identified onsite. The November 10, 2015, site visit documented a change in RICE from the permitted Waukesha to a Cat 3408 HTCA with a three-way catalyst. Records for the Facility also indicated line heaters to be present onsite.

Heavily overcast conditions were documented at the time of the January 4, 2023, site inspection, a steam plume was noted from exhaust stack onsite.

Review of District Files and annual emissions reports submitted indicate that at the time of permitting, one 773 Hp Waukesha engine was being permitted onsite. Documentation prepared by a former operator (Linn) indicates that the Waukesha the HP had been reported incorrectly, and that instead of 773 HP it as actually 534 HP.

Electronic correspondence dated February 13, 2014, documented a rod being blown on the Waukesha engine onsite. The document also indicated that the existing waukesha though permitted without pollution controls, had an added catalyst to meet Subpart ZZZZ emission requirements for engines > 500 Hp in non-remote areas. Instead of replacing the engine like for like, the operator at that time proposed replacing the Waukesha with a smaller Cat 3408 with catalyst, which would not result in an increase in emissions. The replacement was approved by the District Supervisor at that time.

The following table summarizes engine history of record:

ENGINE ID*	ENGINE TYPE	INSTALLATION DATE	REMOVAL DATE	COMPANY OPERATING EU
EUENGINE	Waukesha 3521 GU 773 HP 4 Stroke Rich Burn No Catalyst	11/9/2005	October 2013	Quicksilver Resources Inc. later Linn
EUENGINE*	Waukesha 3521 GU 534 HP 4 Stroke Rich Burn Catalyst	October 2013	1/25/2014	Linn
EU-Engine 3408**	Cat 3408 HCTA Rich Burn 405 HP with 3-way catalyst	3/12/2014	6/15/2017 Engine Swing	Linn (Operating Unit 303595)
EUENGINE	CAT 3408 HCTA with 3-way	6/15/2017	11/6/2019 Engine Swing	Riverside

	catalyst SN 6NB01708 DOB 1/7/1998			
EUENGINE	CAT 3408 HCTA with 3 -way catalyst SN 6NB01664 DOB 11/6/1997	11/6/2019	NA	Riverside

*** these IDs reflect MAERS ID's for Engines reported for Facility.**

**** The original ID plate for the CAT was not visible, however, a newer ArchRock plate was visible (November 9, 2018), and indicated a S/N of 6NB01803 and rebuild date of 7/5/2016. Note that this serial number is identified for the engine on the emission testing date of the CAT 3408TA of June 11, 2020, and December 14, 2021**

Operational parameters at the time of the January 4, 2023, site inspection consisted of the following:

Parameter	Value
RPMS	1650
Engine Oil Pressure	36 psi
O2	1.18 (rich fuel warning on)
Inlet Catalyst Temp	723 degrees
Outlet Catalyst Temp	712 degrees

A review of catalyst data provided by Riverside for the Facility appears to indicate that pre and post catalyst temperatures have flip-flopped over the 2022 calendar year. Differential pressures have been consistent for the previous 9-months.

COMPLIANCE

Since the November 8, 2018, site inspection there have been no complaints, violation notices or consent orders or other compliance issues identified for the Facility. Annual emissions are reported by Riverside for the Facility as part of the MAERS reporting system. Annual submittals are received in a timely manner.

Compliance status for the facility had been based on information provided during the January 4, 2023, site inspection, as well as on supplemental data and reports submitted upon request or to meet permit requirements identified under PTI 264-05.

MAERS- The Facility reports annual emissions as part of the MAERS. Review of the most recent MAERS submittal for the facility (received on January 25, 2022, for emissions associated with the calendar year 2021) included emissions for a single RICE onsite.

Total emissions reported for the calendar years 2020 and 2021 for MAERS as well as 2022 to date are summarized below:

CALENDAR YEAR	NOX (tpy)	CO (tpy)
2020	3.16	6.72
2021	3.09	6.56
2022 to date*	1.37	2.32
EMISSION LIMITs	< 90 (SC 1.1a)	<90 (SC 1.1b)

***to date is September 2022.**

Permit Conditions -Special conditions (SC) associated with Permit No. 264-05 are limited to those associated with one RICE referred to as EUENGINE in the referenced permit.

Emission limits for EUENGINE are defined in SC 1.1a and 1.1b and limit CO and NOx emissions to less than 90 tons/year based on a 12-month rolling time period for each referenced parameter. In compliance with the permit, calculation of actual emissions on a monthly and 12-month rolling total for CO and NOx are required under SC 1.10 and 1.11. These two conditions also specify that emissions will be determined using emission factors from Appendix A.

Reported emissions above, the Facility is below permit limits for CO and NOx, and review of the submittal as well as records provided as part of those requested from the facility indicates that they are calculated per Appendix A.

With respect to material limits EUENGINE is limited to use of sweet natural gas for fuel (SC 1.2). Verification of H2S and/or sulfur content of the fuel may be requested by the AQD District

Supervisor under SC 1.5. H2S content data provided by Riverside for March 2022 indicated 1 -3 ppm and shows compliance with the sweet NG usage requirement.

SC 1.6 and SC 1.9 requires monitoring of natural gas usage and maintenance of monthly fuel use records, respectively. No limit to volume of gas burned for fuel is specified in the permit. Records indicate that they are being collected and maintained in compliance with permit conditions. Fuel usage is summarized below:

Time Period	Total NG used (MMcf)
December 2021	1.984
December 2022	2.120
September 2022	1.554

12-month rolling time period ending (MMcf)	Total NG used for time period (MMcf)
December 2020	23.70
December 2021	24.28
September 2022	21.321

The permittee under permit 264-05 is required to submit a Preventative Maintenance/Malfunction Abatement Plan (PM/MAP) for EUENGINE (SC 1.3) and keep a log of all significant maintenance activities conducted and repairs made (SC 1.8). District Files contain copies of the following PM/MAP documents:

- April 3, 2007, PM/MAP (received April 4, 2007 and approved July 26, 2007),
- June 6, 2014, PM/MAP (received June 12, 2014 and approved July 2, 2014),
    - April 24, 2018, PM/MAP (received April 27, 2018 and approved May 14, 2018),
    - January 24, 2020, PM/MAP (received January 28, 2020 and approved February 3, 2020).

The most recent PM/MAP indicates that the following activities (also referred to as "service" in maintenance records) will be conducted approximately every 2,160 hours of operation or annually (whichever comes first) to meet maintenance requirements under Subpart ZZZZ:

- Oil and oil filter change,
- Inspect spark plugs and replace as necessary, and
- Inspect all hoses and belts and replace as necessary.

A review of records provided by Riverside indicated that the subpart ZZZZ activities are being conducted as a general practice in compliance with their PM/MAP.

In addition to Subpart ZZZZ maintenance activities the PM/MAP indicates that pre and post catalyst temperatures will be monitored daily, and differential pressure across the catalyst will be recorded monthly. The PM/MAP identifies a temperature operational range of >750 and <1350. In addition, three-phase catalysts should report temperatures higher than the inlet catalyst temperature. As previously reported, it appears that the pre and post catalyst temperatures have flip-flopped multiple times over the 2022 calendar year, and have been consistent in temperature ranges for the previous 9-months.

A review of maintenance records provided by Riverside, indicated that the Facility has contracted staff conducting monthly catalyst inspections, verification testing, AFRC adjustments (or replacements when necessary). It also appears that catalyst cleanings are also routinely conducted on 12-18 months. Most recent dates for the catalyst maintenance and verification testing are summarized below. Note that emissions verification testing is contracted through arch rock.

Date	Activity	NOx Control Efficiency	CO Control Efficiency
6/24/2020	Cleaning-inspection	NA	NA
6/11/2020	Emissions testing	92.6%	84.9%
12/7/ 2021	Cleaning-inspection	NA	NA
12/14/2021	Emissions testing	97.8%	97.6%

NOx and CO control efficiency information reported as a result of verification testing for the catalyst confirm the effectiveness of the catalyst above the generally accepted control efficiencies of 90% and 80% for NOx and CO, respectively. The Facility uses the results of testing for emissions determinations for the RICE.

A review of catalyst testing data indicated that for both the June 11, 2020 and the December 14, 2021 event, that the catalyst inlet and outlet temps were off by approximately 100-120 degrees, the outlet being higher than the inlet. During the Jan 4, 2023, site visit, temperature data recorded on the Riverside log sheets indicated that the temperatures were lower for the post catalyst measurements. The Facility has been contacted regarding the data and as previously reported have indicated that the higher of the pre and post catalyst temperatures have flip-flopped over the 2022 calendar year.

Date	Pre-Catalyst	Post-Catalyst	Differential Pressure
June 11, 2020	766	869	5.2
December 14, 2021	773	896	3.8
Operational Range	>750 degrees	>750 to < 1350* degrees	0-4-inches WC from Baseline

***The Facility reports an auto shutdown at 1200 degrees F. PM/MAP indicates that for 3-way catalysts the outlet temperature must be greater than or equal to catalyst inlet temperature.**

Catalyst cleaning is conducted every 12-18 months.

Engine maintenance activities appeared to be conducted on a regular maintenance schedule, and general compliance with the permit condition with the PM/MAP.

Note that in addition to maintaining a log of all significant maintenance activities, SC 1.8 requires that if EUENGINE is replaced, the permittee shall notify the AQD District Supervisor of such a changeout and submit acceptable emissions data to show that the new EU is equivalent or less emitting from the engine replaced. Electronic correspondence dated February 13, 2014 and November 6, 2019, indicates that information was provided to the District Supervisor, and that the replacement engine was approved, in compliance with permit conditions.

SC 1.12a restrict the maximum diameter of the stack for EUENGINE to 16-inches, and a minimum height of 40 ft above land surface. The previous operator verified that the existing stack is a 6-inch diameter with a total height of 40 ft above land surface. In conjunction with the January 4, 2023, site visit, District Staff collected approximate stack heights with a Nikon Range Finder to confirm stack heights. Stack heights of 38.5-41.7 ft above land surface were reported at that time.

SUMMARY

On January 4, 2023, AQD District Staff mobilized to the Riverside Energy Michigan LLC – Wild West Booster (N7538), located in the SE1/4, NE 1/4, SE 1/4 Section 16, T30N, R4W, Hayes Township, Otsego County, Michigan to conduct an unannounced, scheduled, compliance inspection of the facility.

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At the time of the January 4, 2023, site visit, the skies were noted to be overcast with winds >5 mph from the east. Temperatures of 35 degrees Fahrenheit were reported. A steam plume was noted from the stack associated with the compressor engine.

No compliance issues were noted at the time of the January 4, 2023, site inspections, nor in the data provided as part of the compliance evaluation.

NAME Sharon G LeBlanc DATE 2-8-23 SUPERVISOR Shane Nixon