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

B722071791

FACILITY: ANR Pipeline Co - Woolfolk Compressor Station		**SRN / ID:** B7220
LOCATION: 11039 150th Ave., BIG RAPIDS		**DISTRICT:** Grand Rapids
CITY: BIG RAPIDS		**COUNTY:** MECOSTA
CONTACT: Ben Samuelkutty , Analyst		**ACTIVITY DATE:** 04/15/2024
STAFF: Laura Martin	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: FY '23 on-site inspection to determine the facility's compliance status with MI-ROP-B7220-2017.		
RESOLVED COMPLAINTS:		

On April 15, 2024, AQD staff Laura Martin (LM) and Chris Robinson (CR) conducted a scheduled, unannounced on-site inspection of the ANR Pipeline Company Woolfolk Compressor Station (Woolfolk, SRN B7220) to determine the facility's compliance status with respect to Renewable Operating Permit (ROP) MI-ROP-B7220-2017a and other applicable air rules and regulations. It should be noted that this inspection was done on the same day as ANR Winfield Dehy Station which is unmanned and required notification for someone to be on-site. Both inspections were announced, via email, one business day in advance in order to ensure that the proper personnel were on-site for the inspections.

Woolfolk is located at 11039 150th Avenue, in Big Rapids, Michigan. AQD staff met with Mr. Kyle Briham, mechanic for the site, and Mr. Ben Samuelkutty, environmental analyst for TC Energy. LM stated the intent of the visit and proper identification was provided. Mr. Briham and Mr. Samuelkutty provided a safety briefing followed by a walkthrough of the facility as well as all pertinent information requested. Engine 4 was operating during this inspection and no visible emissions or significant odors were observed.

Prior to the inspection, observations were made in the surrounding area and no visible emissions or odors were detected. Weather conditions were approximately 60°F and sunny with ESE winds at 3 mph (www.weatherunderground.com).

Facility Description

The ANR Pipeline Company owns and operates facilities throughout Michigan for natural gas transmission and storage. Woolfolk is located near Big Rapids in Austin Township, Mecosta County, in a remote rural area. This facility consists of a compressor station and a naturally occurring underground reservoir. The reservoir is comprised of natural porous rock, ideal for storing natural gas. The reservoir is located in the Austin Field (Austin formation), which was discovered in the 1930's.

Woolfolk is used to maintain pipeline pressure to allow for the temporary storage of natural gas and for transporting natural gas, via pipelines, to storage and distribution facilities located throughout Michigan. The compressor station consists of seventeen natural gas-fired Reciprocating Internal Combustion Engines (RICE), a sorbead gas-liquid separator/dehydrator and auxiliary equipment. During periods of natural gas withdrawal, natural gas flows freely from the Austin Formation into the pipeline, slowly reducing the pressure in the reservoir. When the

reservoir pressure drops too low gas cannot move freely requiring one or more of the seventeen engines to compress the natural gas for transport.

The facility operates six (6) two-stroke engines and eleven (11) four-stroke engines. These engines are further characterized as rich burn or lean burn. Rich-burn engines operate near the stoichiometric air-to-fuel ratio (16:1) with exhaust excess oxygen levels less than 4%. Lean-burn engines may operate up to the lean flame extinction limit, with exhaust oxygen levels of 12% or greater. The air to fuel ratios of lean-burn engines ranges from 20:1 to 50:1 and are typically higher than 24:1.

Table 1 below summarizes all engines at the facility including boilers and emergency generators.

Table 1: Emission Unit Summary

Emission Unit ID	Description	Type (Natural gas-fired)	Installation Date
EUWL001 - EUWL005	Ingersoll-Rand (IR) Compressor Engine Model KVG-103, 1000 hp	4-stroke, rich burn	1949
EUWL006 - EUWL009	IR Compressor Engine Model KVG-123, 1320 hp		EUWL006-8 1950 EUWL009 1951
EUWL010 - EUWL013	Cooper-Bessemer (CB) Compressor Engine Model GMW-10, 2500 hp	2-stroke lean burn	EUWL010-12 1951 EUWL013 1952
EUWL014 - EUWL015	IR Compressor Engines Model 616-KVH, 4500 hp	4-stroke, lean burn	1962
EUWL016	CB Compressor Engine Model 16Z-330, 11,000 hp	2-stroke, lean burn	1973
EUWL017	CB Compressor Engine Model 12Q145H, 4000 hp	2-stroke, lean burn	1980
EUWLGEN003	Waukesha emergency generator 871 hp	4-stroke, rich burn	2005
EUWLGEN004	Waukesha emergency generator, Model P48GL, 1,174 hp	4-stroke, lean burn	2017

EUWLBOILER001	Cleaver Brooks boiler, 5.82 MMBtu/hr.	--	1986
EUWLBOILER002	Cleaver Brooks boiler, 2.93 MMBtu/hr.	--	1986
EUWLBOILER003	Kewanee boiler, 3.35 MMBtu/hr.	--	1986
EUWLBOILER004	Kewanee boiler, 0.004 MMBtu/hr.	--	Manufactured on 12/18/1979
EUWLFURN002	Broch Furnace (Austin Dehydrator), 5.00 MMBtu/hr.	Dry bed dehydration furnace	12/14/2017

Regulatory Requirements

Mecosta County is currently designated by the USEPA as attainment/unclassified for all criteria pollutants. Woolfolk is subject to Title 40 CFR Part 70, because the potential to emit (PTE) of Nitrogen Oxides (NOx), Carbon Monoxide (CO, and Volatile Organic Compounds (VOCs) exceed 100 tons per year (tpy) each and the potential to emit of any single HAP (formaldehyde and Acetaldehyde) regulated by Section 112 of the federal Clean Air Act, is equal to or more than 10 tons per year and/or the potential to emit of all HAPs combined is equal to or more than 25 tons per year.

Compressor engines EUWL001, EUWL002, EUWL003, EUWL004, EUWL005, EUWL006, EUWL007, EUWL008 and EUWL009 at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) promulgated in 40 CFR Part 63, Subparts A and ZZZZ. The facility must maintain the catalyst so that the pressure drop across the catalyst does not change by more than 2 inches of water at 100 percent load plus or minus 10 percent from the pressure drop across the catalyst measured during the initial performance test and maintain an exhaust temperature so that the catalyst inlet temperature is greater than or equal to 750°F and less than or equal to 1250°F as required by 40 CFR Part 63.6600. The facility maintains a Continuous Parameter Monitoring System (CPMS) Monitoring Plan as required by 40 CFR 63.6625(b). Emission units EUWL010, EUWL011, EUWL012, EUWL013, EUWL014, EUWL015, EUWL016, and EUWL017 are not subject to the RICE MACT because they were installed prior to 2002 and are lean burn engines.

Compressor engines EUWL001, EUWL002, EUWL003, EUWL004, EUWL005, EUWL006, EUWL007, EUWL008, EUWL009, EUWL010, EUWL011, EUWL012, EUWL13, EUWL014, and EUWL015 were installed prior to August 15, 1967. As a result, this equipment is considered "grandfathered" and is not subject to New Source Review (NSR) permitting requirements. However, future modifications of this equipment may be subject to NSR.

Although compressor engine EUWL016 was installed after August 15, 1967 (1973), this engine was exempt from New Source Review (NSR) permitting requirements at the time it was installed. However, future modifications of this equipment may be subject to NSR.

The source is considered a "synthetic minor" source regarding the Prevention of Deterioration regulations of 40 CFR 52.21 because the stationary source accepted legally enforceable permit conditions limiting the potential to emit of nitrogen oxides to less than 250 typ (85.7 tpy) for compressor engine Model 12Q145H (EGWL017), which was installed in 1980. All remaining processes at the facility are currently not subject to the PSD regulations because the process equipment was either constructed/installed prior to June 19, 1978, the promulgation date of the PSD regulations or because the potential to emit of criteria pollutants was less than 250 tons per year.

ANR Woolfolk was previously subject to Rule 818 nitrogen oxide limits for stationary internal combustion engines. As allowed by Rule 818(3)(a), ANR submitted a compliance plan on April 25, 2006, to establish emission reductions at the Woolfolk Compressor Station and the ANR Bridgman Compressor Station in Bridgman, Michigan. Engine EUBG009 at ANR's Bridgman Compressor Station was subject to Rule 818 because it was considered a Large NOx SIP call engine under the rule. A Large NOx SIP call engine is an engine that emits more than 1 ton of oxides of nitrogen per average ozone control period day in 1995. The required NOx limitation for Bridgeman was addressed by proposing NOx limitations for units EUWL001, EUWL002, EUWL003, EUWL004, EUWL005, EUWL006, EUWL007, EUWL008, EUWL009 at ANR Woolfolk and ANR Bridgman's unit EUBG009. ANR notified AQD of this proposal in a letter dated April 25, 2006, also noting that a Compliance Plan would be used, as allowed by Rule 818(3)(a) instead of the NOx limitations specified in Rule 818(3)(b). This compliance Plan established the 20.50 g/bh-hr emission limit for ANR Woolfolk which was approved by the AQD in a letter dated January 23, 2007. During the ROP renewal process it was determined that Woolfolk is no longer subject to Rule 818 and the renewed ROP does not contain these limits.

The sorbead dehydrator equipment was initially installed prior to August 15, 1967. It consists of six (6) dry bed adsorption towers and a Broch furnace for drying the sorbeads. Any water evaporated out of the sorbeads is later condensed and stored in an onsite storage tank. The Broch furnace was replaced in 2017 under exemption Rule 282(b)(i) for boilers rated at no more than 50,000,000 Btu/hr. and burns only sweet natural gas. Since the towers can operate completely independently of the Broch furnace, they remain grandfathered from Rule 201 permitting requirements.

EUWLBOILER001, EUWLBOILER002, EUWLBOILER003, EUWLBOILER004, and EUWLFURN002 at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters promulgated in 40 CFR Part 63, Subparts A and DDDDD.

Emergency generators EUWLGEN003 and EUWLGEN004 at the stationary source are also subject to the National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) promulgated in 40 CFR Part 63, Subparts A and ZZZZ. However, since EUWLGEN004 was installed after June 12, 2006, and is subject to NSPS 40 CFR Part 60, Subpart JJJJ, compliance with this NESHAP is demonstrated by complying with 40 CFR

Part 60, Subpart JJJJ. Emission unit EUWLGEN003 was installed prior to June 12, 2006, therefore it is not subject to 40 CFR Part 60, Subpart JJJJ.

The emission limitation(s) or standard(s) for Formaldehyde at the stationary source under 40 CFR PART 63, Subpart ZZZZ, for EUWL001, EUWL002, EUWL003, EUWL004, EUWL005, EUWL006, EUWL007, EUWL008 and EUWL009 are exempt from the federal Compliance Assurance Monitoring (CAM) regulation pursuant to 40 CFR 64.2(b)(1)(i) because the requirement for formaldehyde reduction of ≥ 76% and/or a formaldehyde concentration of ≤ 350 ppbvd @ 15% O2 (40 CFR 63.6600(1) Table 1a) meet the CAM exemption for NSPS or MACT proposed after November 15, 1990.

Regulatory Analysis

MI-ROP-B7220-2017a

All engines are equipped with continuous monitoring systems (CMS) and are monitored and operated from the control room. Monitoring data and records are kept in the control room for a minimum of 5 years. All emission units on-site and discussed further below are natural gas-fired only. The facility continuously monitors and records fuel consumption and operating hours for every engine. Engine 4 was the only engine observed in operation during the inspection.

During this inspection, stack heights and diameters were not explicitly measured. However, visual inspections appeared to reflect the measurements specified in the ROP.

The 2023 ROP annual and semi-annual certification reports were initially received on March 3, 2024, properly certified and on time.

The inspection began with a safety overview for the facility and moved into the facility walk through starting with building one where engines 1-9 are housed. Only one engine was operating the day of the inspection, EUWL004. It should be noted that none of the engines have readable hours located on them due to the continuous monitoring systems (CMS) but can be provided upon request. The facility was in the process of doing some site wide resurfacing and painting on the pipelines throughout the site and contractors were on site sandblasting and painting.

FG-RICE-818-WLENGINES (Engines 1-9)

Engines 1-9 are currently subject to Rule 818 and the NESHAP RICE MACT (40 CFR Part 63, Subparts A and ZZZZ) requirements. Engines 1-9 are subject to a 76%, or greater, formaldehyde reduction limit per the RICE MACT. The facility meets this limit by operating the engines with a properly maintained Non-Selective Catalytic Reduction (NSCR) unit. Each unit has a pressure and temperature sensor installed as required. The facility continuously monitors and records atmospheric pressure and NSCR inlet pressure and temperature and maintains the catalyst so that the pressure drop across the catalyst does not change by more than 2" w.c. at 100% load plus or minus 10% from the pressure drop across the catalyst measured during the previous successful performance test and a catalyst inlet temperature of greater than or equal to 750°F and less than or equal to 1,250°F (40 CFR Part 63.6600). NSCR units are tested as required when

replaced and differential pressure is continuously monitored to determine if maintenance or replacement is necessary. The stacks for units 1-9 were replaced in 2021, therefore the catalysts were tested in July of 2021.

At this time, Mr. Samuelkutty explained that the facility is in the process of reducing the amount of gas stored in the underground reservoir during a lower demand time period. While the facility prefers to use multiple engines at reduced workloads rather than a single engine at maximum load for reliability and flexibility purposes, on this day only one was operating. These levels of operation, for which conventional MACT differential pressure monitoring might not be appropriate, are covered by their EPA-approved alternative monitoring supplement for load conditions less than 90%. These hours are tracked and totaled each semi-annual operating period. If an engine experiences a MACT excursion, then (per their MACT plan) it is shut down, catalyst replaced and re-tested.

Previously engines (1-9) were subject to a NOx emission limits and Rule 818 by which the facility demonstrated compliance with the NOx emission limit by conducting annual performance testing. During review for ROP renewal, this requirement changed, and these engines now have a formaldehyde emission limit under 40 CFR 63 Subpart ZZZZ. Woolfolk complies with the greater than or equal to 76% reduction of formaldehyde emissions requirement. Monitoring is done via CMS and when catalysts are changed a stack test is performed. The most recent catalyst change and stack test was performed on engine EUWL004 in August 2023.

FGWLENGINES (Engines 10-16)

Engines 10-13 are also housed in building 1, from there we continued the site walkthrough to building 2 where engines 14 and 15 are housed and then on to building 3 where engine 16 is located. Engine 16 is equipped with 6 compressors with hydraulic loaders. The hydraulic loaders allow the operator to load all 6 compressors simultaneously or independently as needed.

The facility continuously monitors and records engine operating hours and natural gas consumption. These records were requested via email following the inspection and were promptly provided. This is the only record keeping requirement for engines 10-16.

EUWL017 (Engine 17)

Building 4 houses engine 17 which was our last stop on the site walk-through. The engine is subject to NOx limits of 9.7 grams per horsepower hour at 100% torque and 100% speed and 85.7 pounds per hour averaged on a monthly basis. Testing is required to be completed at least once within the five-year ROP cycle which was conducted concurrently with the previous inspection in 2022. The test results were submitted electronically with other requested records required by the ROP.

Monthly records for April 2022 through April 2024 indicate that the highest NOx emission rate was 41.5 lb./hr. in December 2022 (5.677 mmscf of fuel consumed and 268.85 hours of operation) and 41.3 lb./hr. in December 2023 (3.186 mmscf of fuel consumed and 151.2 hours of operation).

Fuel consumption and operating hours were included in the records received and are being recorded appropriately. The emission rate is being calculated using the emission factor determined during the previous stack test as required by the permit and observable in the records received. A change in emission factor occurs following a stack test in April 2022. The new emission factor determined during the stack test takes effect in May 2022 records.

FGLIMITED-RICEMACT (Emergency Generators)

Emergency generators EUWLGEN003 and EUWLGEN004, were not operating during this inspection. These generators are subject to 40 CFR Part 63, Subparts A and ZZZZ. Since EUWLGEN004 was installed after June 12, 2006, and is subject to NSPS 40 CFR Part 60, Subpart JJJJ, compliance with this NESHAP is demonstrated by complying with 40 CFR Part 60, Subpart JJJJ. Emission unit EUWLGEN003 was installed prior to June 12, 2006, therefore it is not subject to 40 CFR Part 60, Subpart JJJJ. EUWLGEN004 is not a certified engine therefore emissions testing is required every three (3) years or 8,760 hours of operation. Since the emergency generators don't operate frequently EUWLGEN004 is tested every three (3) years. Testing was last successfully conducted on November 23, 2021 (See MACES Activity report CA_B722060912). Testing will be required again no later than November 23, 2024.

All requirements appear to be properly addressed and implemented. Required hour meter and operating logs were readily accessible on the control panels. Total metered hours for generator 3 were 669.4 hours. In 2023, 12.5 hrs. were for maintenance and 6 hrs. for emergency use. The total metered hours for Generator 4 were 312.1 hrs. In 2023, 12.1 hrs. were for maintenance and 3.3 hrs. for emergency use.

Generator logs were provided as requested via email. Generators at this facility typically do not operate for more than 500 hours per year. Therefore, the facility has opted to utilize an oil analysis program to extend the oil change requirement. The facility inspects air cleaners every 1,000 hours of operation or annually and all hoses and belts every 500 hours of operation or annually as required. These records were provided via email following the on-site inspection. The generators are housed individually and within various buildings across the property. All generators were observed during the on-site inspection.

FGWL-BOILERMACT

The facility operates four (4) boilers (EUWBOILER001, EUWBOILER002, EUWBOILER003 and EUWBOILER004) and one process heater (EUWLFURN002) subject to the 40 CFR 63, Subpart DDDDD requirements.

The facility is required to complete a tune-up every five (5) years for boilers/process heaters less than or equal to 5 MMBtu/hr. and every two (2) years for boilers greater than 5 MMBtu/hr. and less than 10 MMBtu/hr. All required Energy Assessments and tune-ups have been completed and submitted as required. The facility appears to be current and up to date with all boiler MACT 5(D) requirements. Energy Assessments, notifications and tune-up reports were received by the AQD.

Energy Assessments, notifications and tune-up reports were received by the AQD and are organized in the table below.

Boiler ID	Date of Energy Assessment	Date of Initial Notification (Received by AQD)		Required Tune-up Frequency (years)	Date of Initial Tune-up	Date of most recent Tune-ups
EUWLBOILER001 (Station #2)	4/17/2015	5/30/2013	11/2/2015	2	9/14/2015	9/5/2023
EUWLBOILER002 (Breakroom – Small)	4/17/2015	5/30/2013	11/2/2015	5	9/14/2015	9/24/2019^
EUWLBOILER003 (Breakroom -Big one)	4/17/2015	5/30/2013	11/2/2015	5	9/14/2015	9/24/2019^
EUWLBOILER004 (Station #4 - Cleaver Brooks)	**NA	5/30/2013		5	9/11/2017	9/24/2019^
*EUWLBOILER005	~~**NA~~	~~5/30/2013~~		~~5~~	--	--
EUWLFURN002 (Sorbead Dehy)	***NA	1/5/2018		5	NA	3/21/2019^

NA = Not Applicable

*Boiler was determined to be for comfort heat only and not subject to 5(D) Requirements.

** Not Required. See Boiler MACT discussion.

*** Installed in 2017. Energy assessments and initial tune-ups are not required for "new" units.

^ Due for Tune-Up in 2024.

Emission Inventory Report

The facility's 2023 emissions were reported to SLEIS on March 11, 2024, and review completed by the AQD on March 13, 2024. Reported source emission totals are summarized in the table below.

Pollutant	Amount (tons)
CO	220.66
NOx	140.42
PM	2.42
SO2	0.08
VOC	4.32

Compliance Determination

Based on observations made during this inspection and a records review, Woolfolk appears to be in compliance with ROP MI-ROP-B7220-2017a and any other applicable air rules and regulations.

NAME Laura Martin DATE 6/5/24 SUPERVISOR