

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

B722033870

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: Brad Stermer, Sr. Environmental Specialist		ACTIVITY DATE: 03/23/2016
STAFF: Steve Lachance	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: On-site Review, Scheduled Inspection for FY '016. See CA_B722033870. (SLachance, 3/24/16)		
RESOLVED COMPLAINTS:		

**Site Contacts: Mr. Brad Stermer, Sr. Environmental Specialist (231-527-2168) and Mr. Larry London, Experienced Engine Care-taker**

### Source Description

The ANR Pipeline Company owns and operates several facilities in Michigan including facilities used in both natural gas transmission and storage. The Woolfolk Compressor Station is located near Big Rapids in Austin Township, Mecosta County, in a remote rural area. The complete facility consists of the Compressor Station and associated underground gas reservoirs. The reservoirs are natural porous rock formations.

The function of a compressor station is to maintain pressure in pipelines transporting sweet natural gas into storage wells for temporary storage and also for transporting the natural gas through main pipelines to storage facilities located in Michigan or to local distribution facilities. The Woolfolk Compressor Station consists of a gas-liquid separator, seventeen reciprocating internal combustion engines, a sorbead dehydrator and auxiliary equipment. The sorbead dehydrator was installed in the 1940's. From 1949 through 1980, the reciprocating compressor engines and related equipment were installed at this facility. The Woolfolk Compressor Station's seventeen reciprocating internal combustion engines are fired on natural gas.

During withdrawal, natural gas flows from the underground reservoirs into a pipeline, slowly reducing the field pressure. If the underground pressure is not enough for the gas to automatically move into the pipeline, one or all of the seventeen internal combustion engines are used to compress natural gas. Depending on several factors, the compressor engines may operate simultaneously, independently, or not at all.

The facility operates different types of internal combustion engines. There are six two stroke engines and eleven four-stroke engines. The 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 percent. Lean-burn engines may operate up to the lean flame extinction limit, with exhaust oxygen levels of 12 percent or greater. The air to fuel ratios of lean-burn engines range from 20:1 to 50:1 and are typically higher than 24:1.

### Regulatory Analysis

The stationary source is located in Mecosta County, which is currently designated by the U.S.

Environmental Protection Agency (USEPA) as attainment/unclassified for all criteria pollutants. The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR), Part 70, because the potential to emit nitrogen oxides and VOCs exceeds 100 tons per year.

The potential to emit of any single HAP regulated by the federal Clean Air Act, Section 112, is equal to or more than 10 tons per year and the potential to emit of all HAPs combined is more than 25 tons per year.

All of the processes at the facility, except the Cooper-Bessemer Compressor Engine Model 12Q145H (EGWL017; "Engine 17"), were constructed/installed prior to the promulgation of the Prevention of Significant Deterioration (PSD) (40 CFR 52.21) requirements. As a result, no review under PSD was done prior to the construction of these processes. Compressor Engine Model 12Q145H (Engine 17), installed in 1980, is subject to PSD (40 CFR 52.21) regulations thereby making the Woolfolk site a PSD major source of criteria air pollutants. Future modifications to the process equipment at the facility may be subject to the PSD requirements.

The sorbead dehydrator equipment and all the reciprocating compressor engines, except Compressor Engine Model 12Q145H, are exempt from requirements of New Source Review Permits (NSR) because they 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. Although, Compressor Engine Model 16Z330, was installed in 1973, this equipment was exempt under an existing permit exemption rule at the time it was installed. However, future modifications of this equipment may be subject to NSR.

Engines listed as EUWL001, EUWL002, EUWL003, EUWL004, EUWL005, EUWL006, EUWL007, EUWL008, EUWL009 ("Engines 1 through 9") at the stationary source are subject to Rule 336.1818 because based on the size they are Large NOx SIP call engines. 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.

Engines 1 through 9 at the stationary source are also subject to the Maximum Achievable Control Technology Standards for Reciprocating Internal Combustion Engines (RICE) promulgated in 40 CFR Part 63, Subparts A and ZZZZ. EUWL010, EUWL011, EUWL012, EUWL013, EUWL014, EUWL015, EUWL016, EUWL017 ("Engines 10 through 17") are not subject to the RICE MACT because they are lean burn engines which are exempt from the standard.

The facility does not have any engines at the stationary source subject to the New Source Performance Standards for stationary compression ignition or spark ignition internal combustion engines (ICE) promulgated in 40 CFR Part 60, Subparts A, IIII and JJJJ because all of the engines were installed prior to July 11, 2005 and have not been modified.

No emission units are subject to the federal Compliance Assurance Monitoring rule under 40 CFR Part 64, because all emission units at the stationary source either do not have a control device; or control device operational requirements are covered by "new" rules such as the RICE MACT.

In order to make testing, recordkeeping, and determination of compliance more practical, the condition "The Nitrogen Oxides emission rate from the compressor engine shall not exceed

9.7 grams per horsepower hour at 100% torque and 100% speed" for Engine 17 has been supplemented by a condition limiting Nitrogen Oxides emissions to 85.7 pounds per hour per engine. The condition is equivalent to the old one at 100% torque and speed, and is more stringent because it applies at any speed or torque.

The facility has 5 natural gas-fired boilers (exempt from permitting based on size; Rule 282(b) (iii)) which are subject to the Major Source Boiler MACT (40 CFR 63, Subpart DDDDD). Timely notifications have been submitted/received; compliance date for this rule was January 31,2016.

### On-Site Visit(s)

This was an unannounced inspection. SL first arrived on-site at about 10:30 AM on 3/17/16. Weather conditions were overcast, about 42F, with strong westerly winds. No undue odors or visible emissions were observed prior to arrival, or while on-site. Mr. Stermer was off-site, and Mr. London was busily engaged. With no pressing or observed issues, SL left his card with on-site personnel and left a voice-mail message for Mr. Stermer, intending to do an inspection in the near future.

On 3/22/16, SL called Mr. Stermer, confirmed his availability the following day and requested operational records for March 17. On 3/23/16, SL arrived on-site at about 9:15 AM. Weather conditions at this time were about 34 F, just starting to spit a rain/snow mix, with northeasterly winds of increasing strength. No odors or visible emissions were noted. SL met with site Environmental Representative Brad Stermer and announced his intention to make compliance determinations relative to ROP No. MI-ROP-B7220-2012a and applicable air use requirements based on this visit, and shared the DEQ "Rights and Responsibilities" brochure.

SL stated that his most pressing current concerns coming into the inspection were the large (400+ ton) increase in reported NOx emissions from RGCOMP-KVH616 (which is comprised of Engines 14 and 15) for EI2015; finalized documentation of current Boiler MACT (40 CFR 63 DDDDD) compliance (effective compliance date was 1/31/16) ; and required testing for Engine 17.

Engines 14 and 15 operated very little in 2014, as they were subject to maintenance overhauls, observed during previous inspections. The work done on the engines was described as "routine", and upon SL's request, Mr. Stermer provided the facility's RMRR (Routine Maintenance, Repair, Replacement Analysis) for the maintenance project. See attached. Their conclusion is that these maintenance activities for Engine 14 (cracked frame repair and cylinder linings) are not subject to permitting. This is based on "routine maintenance" activities for engines, use of original components, and NO INCREASES in engine capacity measures.

"Routine maintenance" can be very difficult to define (at least to mutual agreement among parties), and this analysis does NOT incorporate the concept of "life extension" for the engine. While SL does not necessarily agree that the cracked frame (and foundation) repairs are "routine", the following analysis makes this lack of firm agreement moot at this time:

Back at the office on 3/24/16, SL reviewed emissions from RGCOMP-KVH616 as reported to MAERS for the years 2009 through 2015. See attached. Despite the very large increase in NOx emissions noted from 2014 to 2015, SL notes that the average reported emissions from this equipment (469.1 tons NOx) have not exceeded the "baseline" emissions from the

average of 2010 and 2011 (496.3 tons NOx.) This equipment has operated at higher rates in (recent) previous years, and was not allowed to degrade into a derelict state. This project has therefore NOT resulted in documented significant increases in emissions (as of yet) based on this informal PSD applicability analysis.

During a June 2015 DDDDD Inspection, SL requested and received requested documentation of required Energy Assessment and tune-up work for gas-fired boilers subject to that rule. See the 6/18/15 DDDDD Inspection Report dated 6/18/15, CA\_B722029850. The facility originally indicated 5 subject natural gas (only)-fired boilers, but SL noted that the Energy Assessment covered only 3 boilers. Mr. Stermer provided readily available on-site copies of the complete Energy Assessment and tune-up documentation on 3/23/16; and SL concurs with the Energy Assessment's analysis that based on the facility's heat input for the affected sources (5 small units up to about 6 mmBtu/hr), the Assessment is only required to cover 50% of the heat input capacity (and 8 on-site hours of activity.) By analyzing the 3 largest units, this 50% requirement has been met. SL did view each affected unit (5 total) during the site walk-through with Mr. Stermer later in the inspection.

The ROP requires testing of Engine 17 NOx emissions once per permit cycle. The last test was completed in 2010 and the current permit expires in 2017. Mr. Stermer was aware of the testing requirement and it is on the facility's radar to complete the test. Engine 17 has recently returned to service after a maintenance outage and they are currently accumulating operating hours on the engine to assure reliability. They are approaching their 500 hour "target" and will schedule timely testing accordingly. (Note, later in the inspection it became apparent that the engine had malfunctioned the previous day so the engine's reliability and timing of any subsequent testing is less certain than seemed during these discussions.)

Having addressed SL's preliminary concerns, other discussions included:

\*\*\*Records of operations on March 17, 2016 (the day on which SL observed no odors or issues, but for which an inspection was not attempted) indicate that none of the RICE MACT/R818 engines (Engines 1 through 9) were operating on that day. See attached. SL had requested records for these engines since they are heavily monitored (catalyst inlet temp, differential pressure) during operation. The attached records also demonstrate how these parameters are captured, and how startup/shutdown/malfunction events identified, tracked and if required plans are followed. There were no applicable events on this requested day.

\*\*\*Since there were no operations of these engines on 3/17/16, SL requested records for a recent operating day; and received records for 3/21/16. See attached. These showed operations of Engines 1, 2, 4, 6, 7,8 and 9; as well as catalyst temperatures, identification and duration of S/S/M events, identification of responsible persons and whether appropriate plans were followed.

\*\*\*As part of the RICE MACT monitoring plan for this site, the facility has an EPA-approved plan to separately track engine hours when an engine is operating at loads less than 90%. Also, the facility captures a "monthly snapshot" of catalyst differential pressure to demonstrate that this parameters is in range; this simply demonstrates availability of the catalyst during periods where an engine has not operated above 90% load (when conventional parameter monitoring is in place.)

\*\*\*Operations at the facility have been "low" because of the mild winter and low demands for gas. Weather and fuel demands are the primary factors in how much "work" the facility needs

to complete. Which engine assigned for a given stretch of work depends on availability and engine size. Larger engines are generally only dispatched if there is a known (longer) stretch of work (engine run time) available.

\*\*\*The permit requires records of operation and fuel use for each engine. Mr. Stermer easily produced these for 2016 to date (see attached) and confirmed that these are the basis for MAERS reporting (SL is currently reviewing the MAERS for 2015.) All engines have operated in 2016 except Engine 10.

Here's a Consolidated Site Plan to help SL keep things straight:

"Station 1" = Engines 1 through 13

"Station 2" = Engines 14 and 15

"Station 3" = Engine 16 (the largest)

"Station 4" = Engine 17 (the newest)

Mr. Stermer then escorted SL through the entire facility as SL continued his familiarization with on-site equipment and permitting requirements. Highlights of this on-site review (organized per the ROP as opposed to the sequence of activities and discussions) included:

### **EUWL017 "Engine 17"**

The next required NOx emissions test, while not yet scheduled, is on the facility's radar.

SL requested and received the records required by Section VI of EUWL017; monthly records of operations, fuel used and NOx emissions based on an emission factor from the most recent test (per Section V of this table); see attached.

This engine was not operating at the time of the inspection; it was being examined for the cause of a recent malfunction.

### **FG-RICE-818-WLENGINES ("Engines 1 through 9")**

Only Engines 1 and 7 were operating at the time of inspection. Each was operating at about 2/3 max\_torque, and 280 rpm. See attached screen shots for these engines. Mr. Stermer explained that the operators would likely use multiple engines at reduced work load rather than a single engine at maximum load for reliability and flexibility purposes. 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.

Each engine has passed required MACT testing and annual NOx testing. If an engine experiences a MACT excursion, then (per their MACT plan) it is shut down; catalyst replaced; and re-tested. Part 8 NOx testing is scheduled for the week of June 13, 2016; there have been no issues with recent rounds of testing for these engines.

Per discussions above and review of all required periodic reports (see attached FCE cover sheet and referenced reports), SL believes that the RICE MACT has been appropriately

implemented for these engines.

### **FGWLENGINES (Engines 10 through 16)**

None of these were operating at the time of the inspection. SL confirmed use of natural gas fuel only; and the facility supplied the required records of monthly fuel use for each unit.

### **FGSI-RICEMACT**

SL viewed the two affected units; neither was operating. Hour meters and operations logs were readily accessible on each unit's control panels. These are subject to maintenance work practice standards, monitoring of engine use, identification of emergency use and testing/readiness checks. All requirements appear to be properly addressed and implemented. SL requested and received records of 2016 operation for an engine; see attached. While most operations are for testing purposes, note that Engine 2 operated for emergency use in January 2016 for a period of 4.8 hours.

Metered engine operating hours through this date were 436 hours (Engine 1) and 776 hours (Engine 2.)

SL observed a third on-site engine, but agreed that the engine (which is in the basement of one of the stations) is truly dismantled/rendered not usable via disconnection of fuel and power. The facility has no plans on using this engine; it need not appear in MAERS or ROP.

### **FGLIMITED-RICEMACT**

SL observed the single subject engine adjacent to Engine 17. It was not in use at the time of the inspection. Required hour meter and operating logs were readily accessible on the control panel. Metered hours through this date for this engine were 315.

### **OTHER**

Mr. Stermer mentioned that the facility is preparing their application for ROP renewal, and SL reminded him that the application should include a table of requirements for the **DDDDD-subject natural gas (only) units**. There is an available template that should be easily modified given the past initial compliance date and requirements, and resolution of various issues (such as recording all unit startups and shutdowns, reporting timeframes, etc.) via the rule's final reconsideration.

### **CONCLUSION:**

Based on each Partial Compliance Evaluation as outlined in the accompanying FCE Summary Report, these observations and the data collected during on-site activities, SL concludes that the facility is currently in compliance with applicable air quality requirements.

**Attachments:**

**A** Two Engine 14 RMRR Approval Sheets

**B** RGCOMP-KVH616 MAERS Reporting, 2009-2015

**C** RICE MACT 24-hour Logs for Engines 1 through 9, 3/17/16


**D** RICE MACT 24-hour Logs for Engines 1 through 9, 3/21/16

**E** 2016 Monthly Records (Fuel and Hours, per engine to date)

**F** 2016 Emissions Inventory Tracking for Engine 17 (to date)

**G** Current Operating Screen Shots for Engines 1 and 7 (3/23/16)

**H** RICE MACT Engine Logs for Engine 2, January and February 2016

NAME 

DATE 3/25/16

SUPERVISOR 