

**ENGINEERING ANALYSIS
URBAN OIL AND GAS GROUP, LLC
WHITE OAK CREEK EAST SCREW COMPRESSOR STATION
WALKER COUNTY, ALABAMA
FACILITY NO. 414-0021
SYNTHETIC MINOR OPERATING PERMIT NO. X007**

On May 15, 2020, the Air Division received a complete Air Permit application from Urban Oil and Gas Group, LLC (Urban Oil & Gas) for the proposed construction and operation of a replacement natural gas-fired reciprocating internal combustion engine (RICE) at the existing White Oak Creek East Screw Compressor Station located in Walker County. The facility is currently a synthetic minor source under Title V regulations and a minor source under PSD regulations. Based on the information provided in the application for the replacement engine, the facility would remain a synthetic minor source under both Title V and PSD regulations after the project. Urban Oil & Gas would be issued SMOP No. X007 for the replacement RICE.

Proposed Modification

Urban Oil & Gas utilizes compressors to increase the pressure and continue the flow of natural gas that has been extracted from various wells (i.e. coalbed methane) within the Black Warrior Basin. Each compressor is driven by a natural gas-fired RICE. Urban Oil & Gas is proposing to replace one 1,025 hp Waukesha L7042G, 4-stroke, rich-burn (4SRB) natural gas-fired RICE controlled by a catalytic converter (SMOP No. X006) with one 1,025 hp Waukesha L7042G, 4SRB natural gas-fired RICE controlled by a catalytic converter (Proposed SMOP No. X007). There is also one other 400 hp Waukesha F18GL, 4-stroke, lean-burn (4SLB) natural gas-fired RICE (N003).

Emissions

The pollutants of concern that would be emitted from the proposed replacement RICE would be nitrogen oxides (NO_x), carbon monoxide (CO) and formaldehyde (CH₂O). Emissions of other criteria and hazardous air pollutants (HAP) were reviewed but determined to be insignificant. Emission calculations for the engine are included as Appendix A.

State Regulations

Although the replacement RICE would be a fuel combustion source, it would not be subject to any particulate matter (as TSP) emission limitation of ADEM Admin. Code chap. 335-3-4 or any sulfur dioxide (SO₂) emission limitation of ADEM Admin. Code chap. 335-3-5 because it would not meet the definition of fuel burning equipment nor would it be considered one of the process industries, general or specific. The RICE would, however, be subject to the state visible emission standard of ADEM Admin. Code r. 335-3-4-.01), which states that no air emission source may emit particulate of an opacity greater than 20% (as measured by a six-minute average) more than once during any 60minute period and at no time shall emit particulate of an opacity greater than 40% (as measured by a six-minute average). The RICE would be expected to be able to comply with this standard because it would be fired exclusively by natural gas.

Federal Regulations

PSD

The facility operations are not one of the 28 listed major source categories, and the facility is located in an attainment area for all criteria pollutants; therefore, the major source threshold of concern is 250 TPY for criteria pollutants. After the proposed replacement, the facility-wide uncontrolled potential emissions would be less than 250 TPY for each criteria pollutant; therefore, Urban Oil & Gas would remain a minor source under PSD regulations. Based on the location coordinates provided in the applications, this station would not be located within one mile of any compressor station owned/operated by Urban Oil & Gas; therefore, its potential emissions would not be aggregated with other sources in accordance with the State's sensible grouping policy to determine PSD status.

Title V

To remain below the major source threshold, Urban Oil & Gas requested a NO_x limit of 4.52 lb/hr and a CO limit of 6.78 lb/hr to remain a synthetic minor source under Title V. A catalytic converter would be utilized to meet these limits. After the proposed replacement of the RICE, the facility would remain a synthetic minor source under Title V regulations because the potential controlled emissions of each individual criteria pollutant would not exceed 100 TPY, the potential emissions of each individual HAP would not exceed 10 TPY, and the potential emissions of combined HAP would not exceed 25 TPY.

There are no other compressor stations that are owned and operated by Urban Oil & Gas that are located within a 1-mile radius of the White Oak East Screw Compressor Station compressor station. Therefore, no other compressor stations would be considered in determining PSD and Title V Applicability.

NESHAP/MACT

40 CFR Part 63 Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary RICE (Subpart ZZZZ) applies to existing engines at area sources. This engine was manufactured prior to 2006, and has been operated at other locations. Therefore, the proposed RICE would be considered an existing non-emergency 4SRB RICE greater than 500 hp located at an area source. The requirements for the proposed engine are based on whether it would be a "remote engine" as defined in 40 CFR §63.6675.

As a remote engine, it would be subject to the following requirements:

Emission/Operation Limitations

There are no emission limitations for this engine under Subpart ZZZZ.

In accordance with 40 CFR §63.6603 and Table 2d to Subpart ZZZZ, Urban Oil & Gas would be required to change the oil and filter every 2,160 hours of operation or annually, whichever comes first; inspect spark plugs every 2,160 hours of operation or annually, whichever comes first and

replace as necessary; and inspect all hoses and belts every 2,160 hours of operation or annually, whichever comes first and replace as necessary.

Testing Requirements

There are no emission testing requirements for this engine under Subpart ZZZZ.

Continuous Compliance Monitoring

Urban Oil & Gas would be required to operate and maintain the engine in a manner consistent with safety and good air pollution control practices for minimizing emissions.

Notifications

There are no notification requirements for this engine under Subpart ZZZZ.

Reports

There are no reporting requirements for this engine under Subpart ZZZZ.

Recordkeeping

The recordkeeping requirements are outlined in Table 6 to Subpart ZZZZ to show continuous compliance. Urban Oil & Gas would be required to develop a maintenance plan and to keep records of the maintenance conducted on the stationary RICE.

Urban Oil & Gas would be required to conduct a review of the surrounding area every 12-months to determine if the nearby population has changed. If the engine no longer meets the criteria for a remote stationary RICE, Urban Oil & Gas must comply with the requirements below for non-remote stationary RICE within one year of making that determination. In addition Urban Oil & Gas would be required to retain on file the annual determination of the surrounding area for determining if the engine is classified as remote or non-remote.

As a non-remote engine, it would be subject to the following requirements:

Equipment Standards and Other Requirements

The applicable equipment standards are found in 40 CFR §63.6603 and Table 2d to Subpart ZZZZ. Urban Oil & Gas would be required to install an oxidation catalyst on the proposed 4SLB engine. Also, Urban Oil & Gas would be required to minimize the engine's time spent at idle and startup time to a period needed for appropriate and safe loading of the engines not to exceed 30 minutes.

Operating Limitations

The applicable operating limitations are found in 40 CFR §63.6630 and Table 5 to Subpart ZZZZ. No later than the applicable compliance date, Urban Oil & Gas would be required to either install and operate a continuous parameter monitoring system (CPMS) to continuously monitor the catalyst inlet temperature according to the requirements found in 40 CFR §63.6625(b), or install and operate equipment to automatically shut down the engines if the catalyst inlet temperature exceeds 1250 °F.

Testing Requirements

Urban Oil & Gas would be required to perform an initial performance test on these units within 180 days after the compliance date (which would be one year from the date Urban Oil & Gas determines that the engine is no longer considered a remote engine) in accordance with 40 CFR §63.6630(e) to demonstrate the average reduction of emissions of CO is 75% or more, the average CO concentration is ≤ 270 ppmvd at 15% O₂ or the average reduction of emissions of total hydrocarbons (THC) is 30% or more. In addition, ARP Production would be required to perform annual compliance demonstrations as specified in §63.6640(c) to show that the average reduction of emissions of CO is by 75% or more, the average CO concentration is ≤ 270 ppmvd at 15% O₂ or the average reduction of emissions of THC is 30 % or more.

Continuous Compliance Monitoring

In accordance with 40 CFR §63.6640 and Table 6 to Subpart ZZZZ, Urban Oil & Gas would be required to either collect catalyst inlet temperature data according to 40 CFR §63.6625(b); reduce these data to 4-hour rolling averages; and maintain the 4-hour rolling averages within the limitation of greater than 750 °F and less than or equal to 1250 °F or immediately shut down the engine if the catalyst inlet temperature exceeds 1250 °F. If Urban Oil & Gas chooses to utilize a CPMS to monitor the catalyst inlet temperature, they would be required to maintain the CPMS according to the requirements in 40 CFR §63.6625(b), and monitor the inlet temperature continuously at all times that the engine is operating.

Notifications

In accordance with 40 CFR §63.6645, Urban Oil & Gas would be required to submit an Initial Notification within 120 days of its annual review that indicates that the engine is no longer considered a remote engine and is subject to the numerical emission limitations of Subpart ZZZZ. Urban Oil & Gas would be required to submit a Notification of Intent at least 60 days prior to conducting each performance test. Following the initial performance test of the proposed engine, Urban Oil & Gas would be required to submit a Notification of Compliance Status, including the performance test results, within 60 days of completing the performance test. These notifications are required to be submitted to the EPA because Alabama has not adopted the area source RICE MACT. However, the Air Division will request a courtesy copy of each notification.

Reports

The reporting requirements are outlined in 40 CFR §63.6650 and Table 7 to Subpart ZZZZ. Urban Oil & Gas would be required to submit a semiannual compliance report to the EPA Administrator and the Air Division, based on the semiannual periods of January – June and July – December. Each report must be submitted by July 31st and January 31st, respectively. However, no report would be required for the semiannual period in which the annual compliance demonstration is conducted.

Recordkeeping

All notifications and reports (and supporting documentation) including records pertaining to initial and continuous compliance, all maintenance conducted, and the annual review of the

surrounding area must be maintained for a period of 5 years from the date of each record or report. They must be maintained on-site for at least 2 years and may be kept off-site for the remaining 3 years.

NSPS

Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE) [Adopted by reference in ADEM Admin. Code r. 335-3-10-.02(88)]

40 CFR §60.4230(a)(4)(i) states that engines with a maximum engine power greater than or equal to 500 hp (except lean burn engines with a maximum engine power \geq 500 hp and $<$ 1,350 hp) are subject to this subpart if construction commences after June 12, 2006, and the stationary SI ICE are manufactured on or after July 1, 2007. Since the proposed SI ICE was manufactured prior to 2006, it would not be subject to this Subpart.

Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced After August 23, 2011, and on or before September 18, 2015

The replacement RICE's compressor would not be subject to this Subpart because this compressor is a rotary screw compressor.

Subpart OOOOa, Standards of Performance for Crude Oil and Natural Gas facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 [Adopted by reference in ADEM Admin. Code r. 335-3-10-.02(91)] [Adopted by reference in ADEM Admin. Code r. 335-3-10-.02(91)(a)]

The compressor associated with the replacement RICE would not be subject to this Subpart because this compressor is a rotary screw compressor. In addition, the White Oak Creek East Screw Compressor Station would not be subject to the fugitive emissions monitoring outlined in 40 CFR §60.5397(a) since this replacement would not meet the definition of modification as defined in 40 CFR §60.5365a(j).

Air Quality Impact

This facility is located in Walker County, an attainment area for all criteria pollutants. It is located more than 100.0 km from the Sipsey Wilderness Area, the nearest Class I Area. This unit would not be expected to have a significant impact on this area.

Public Comment

In accordance with ADEM Admin. Code r. 335-3-15-.05, the Air Division will initiate a 15-day public comment period in order to solicit public input regarding the Department's preliminary determination to issue the Synthetic Minor Operating Permit to Urban Oil & Gas.

Recommendations

Upon receipt of the payment of fees and the resolution of any public comment received, I recommend the issuance of SMOP No. X007 be issued to Urban Oil & Gas for the 1,025 hp Waukesha L7042G, 4SRB natural gas-fired RICE controlled by a catalytic converter.



Brandon Cranford

May 18, 2020

Date

11223 414-0021 127 05-18-2020 SMOPEA BRC SMOP X007

Proposed X007 –1,025 hp Waukesha L7042G, 4-Stroke, Rich-Burn Natural Gas-fired Reciprocating Internal Combustion Engine Controlled by Catalytic Converter

Uncontrolled Emissions

NO_x

$$\frac{29.42 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{128.86 \text{ TPY}}$$

CO (based on manufacturer's guarantee)

$$\frac{20.36 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{89.18 \text{ TPY}}$$

VOC (based on manufacturer's guarantee)

$$\frac{0.68 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{2.98 \text{ TPY}}$$

Particulate (based on AP-42 emission factors)

$$\frac{0.07 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{0.31 \text{ TPY}}$$

SO₂ (based on AP-42 emission factors)

$$\frac{0.004 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{0.02 \text{ TPY}}$$

Formaldehyde (based on AP-42 emission factors)

$$\frac{0.18 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{0.79 \text{ TPY}}$$

Potential/Expected Emissions

Control Device: DLC, DC76
Removal Efficiency (%) NO_x: 84.6%
CO: 66.6%

Urban Oil and Gas has requested a NO_x emission limit of 2.94 lb/hr

NO_x (based on manufacturer's guarantee)

$$\frac{4.52 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{19.80 \text{ TPY}}$$

Urban Oil and Gas has requested a CO emission limit of 2.04 lb/hr

CO (based on manufacturer's guarantee)

$$\frac{6.78 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{29.70 \text{ TPY}}$$

VOC (based on manufacturer's guarantee)

$$\frac{0.68 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{2.98 \text{ TPY}}$$

Particulate (based on AP-42 emission factors)

$$\frac{0.07 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{0.31 \text{ TPY}}$$

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$$\frac{0.004 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{0.02 \text{ TPY}}$$

Formaldehyde (based on AP-42 emission factors)

$$\frac{0.18 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{\text{T}}{2000 \text{ lb}} = \mathbf{0.79 \text{ TPY}}$$

Unit	NOx	CO	VOC	Formaldehyde
X006-1024 hp Waukesha w/CC	12.88	8.94	2.01	2.54
N003-400 hp Waukesha	7.71	6.57	1.75	0.36
Total	20.59	15.51	3.76	3.59
Remove X006-1024 hp Waukesha w/CC	-12.88	-8.94	-2.01	-2.54
Add X007-1025 hp Waukesha w/CC	<u>+19.80</u>	<u>+29.70</u>	<u>+2.98</u>	<u>+0.79</u>
Total	27.51	36.27	4.73	1.84