DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
Permit Application Analysis
A0000492

August 19, 2015

NAME OF FIRM:	Rowdy Pipeline, LLC
NAME OF FACILITY:	Uprising Compressor Station
FACILITY LOCATION:	SW¼SE¼ Section 28, T42N, R72W Lat: 43.57848° Long: -105.51085° (WGS84) Campbell County, Wyoming
TYPE OF OPERATION:	Gas Compression
RESPONSIBLE OFFICIAL:	Kerry Egan, Environmental Technician
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REVIEWING ENGINEER:	Nathan Henschel, Air Quality Modeler

1. PURPOSE OF APPLICATION

On February 3, 2015, the Division of Air Quality received an application from Compliance Partners, Incorporated, on behalf of Rowdy Pipeline, LLC (Rowdy), to modify the Uprising Compressor Station by installing one (1) 1.5 MMBtu/hr line heater or multiple units not to exceed 1.5 MMBtu/hr, two (2) flares, two (2) pig receivers and launchers, one (1) vapor recovery unit (VRU), two (2) 40,000 gallon or less pressurized tanks for condensate storage, to change the existing 400 bbl condensate tank to a produced water tank, and to remove the one (1) Ajax DCP-2803LE engine (ENG008). Rowdy also proposes to update facility emissions to account for installed units and to allow flexibility to install Caterpillar G3516LEU or Caterpillar G3516B engines for ENG006-ENG007. The Uprising Compressor Station is located in the SW¼SE¼ of Section 28, T42N, R72W, approximately thirteen (13) miles south of Reno Junction, in Campbell County, Wyoming.

A map of the compressor station location is attached as Appendix A.

2. PERMIT HISTORY

On August 27, 2012, Air Quality Permit MD-12882 was issued to Rowdy Pipeline, LLC to modify the Uprising Compressor Station by converting the existing coal-bed methane facility to an associated gas compressor station. This will allow the facility to gather gas from oil wells. The Uprising Compressor Station will consist of one (1) existing 353 hp Ajax DPC-2802LE engine, one (1) 528 hp Ajax DPC-2803LE engine, three (3) 1,380 hp Caterpillar G3516B engines, four (4) engines of any combination of 4-stroke rich burn/lean burn engines limited to 637 hp, two (2) 10 MMscfd TEG dehydration units with 0.75 MMBtu/hr reboilers, two (2) 400 bbl atmospheric storage tanks, inlet separators and various pneumatic devices.

On March 21, 2005, Rowdy Pipeline, LLC was issued Air Quality Permit CT-3848. This permit authorized the Uprising Compressor Station consisting of four (4) engines of any combination of 4-stroke lean burn or rich burn engines limited to 637 horsepower (hp), and four (4) engines of any combination of 518 hp Ajax DPC-2803LE engines or 353 hp Ajax DPC-2802LE engines.

As of the date of this analysis, two (2) Caterpillar G3412LE engines (ENG001-ENG002), one (1) Caterpillar G3516B engine (ENG005), and one (1) Ajax DPC-2802LE engine (ENG009) have been installed and are operational. The following table shows the engine currently in operation along with the latest performance testing results:

Table 1: Performance Testing Results

Engine	Serial Number	Tested hp	NO_x				CO				VOC			
			g/hp-hr		lb/hr		g/hp-hr		lb/hr		g/hp-hr		lb/hr	
			test	limit	test	limit	test	limit	test	limit	test	limit	test	limit
Caterpillar G3412LE	6ZM00527	637	0.56	1.0	0.79	1.4	0.03	0.5	0.05	0.7	0.14	0.7	0.19	1.0
Caterpillar G3412LE	6ZM02606	425	0.61	1.0	0.57	1.4	0.01	0.5	0.01	0.7	0.68	0.7	0.64	1.0
Caterpillar G3516B	WPW02030	1,133	0.45	0.5	1.11	1.5	0.01	0.5	0.03	1.5	0.46	0.7	1.16	2.1
Ajax DPC-2802LE	84526	176	0.54	1.00	0.21	0.80	1.94	2.00	0.75	1.60	--	--	--	--

3. ESTIMATED EMISSIONS

3.1 Engines

The major pollutants emitted from gas combustion include nitrogen oxides (NO_x) with some carbon monoxide (CO) from incomplete combustion. Volatile organic compounds (VOCs) including some hazardous air pollutants (HAPs) will also be emitted from the engines. All of the engines will be field gas fired. Emission factors and estimated emissions for the engine types are shown in Tables 2 and 3.

Table 2: Engine Emission Factors (g/hp-hr)						
Engine	hp	Controls	NO_x	CO	VOC	Formaldehyde
Post Modification Configuration						
4-stroke Rich Burn	637	NSCR/AFRC	0.7	2.0	0.7	0.05
4-stroke Lean Burn	637	Lean Burn w/ Oxidation Catalyst	1.0	0.5	0.7	0.07
Caterpillar G3516B	1,380	Lean Burn w/ Oxidation Catalyst	0.5	0.5	0.7	0.07
Caterpillar G3516LEU	1,340	Lean Burn w/ Oxidation Catalyst	0.5	0.5	0.7	0.07
Ajax DPC-2802LE	353	Lean Burn w/ Derated hp	1.0	2.0	0.55	0.3

Table 3: Engine Emissions								
Engine	NO_x		CO		VOC		Formaldehyde [1]	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Post Modification Configuration								
4-stroke Rich Burn	1.0	4.3	2.8	12.3	1.0	4.3	0.07	0.31
4-stroke Lean Burn	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
Caterpillar G3516B	1.5	6.7	1.5	6.7	2.1	9.3	0.21	0.93
Caterpillar G3516LEU	1.5	6.5	1.5	6.5	2.1	9.1	0.21	0.91
Ajax DPC-2802LE	0.8	3.4	1.6	6.8	0.4	1.9	0.23	1.02

[1] Formaldehyde is the only significant HAP emitted from the engines.

3.2 Line Heaters

The 1.5MMBtu/hr or less heater or set of heaters will be installed to heat product entering the bullet tanks should operating conditions warrant its/their operation. Emission factors from AP-42 Tables 1.4-2 and 1.4-3 were used. Estimated emissions if a 1.5 MMBtu/hr heat input heater or set of heaters is installed are 0.6 tpy NO_x, 0.5 tpy CO, <0.1 tpy VOC, and <0.01 tpy of HAPs.

3.3 Tanks and Truck Load-out

Two (2) 400 bbl produced water tanks will be utilized at the facility. These tanks will store produced water until they are loaded onto tanker trucks for sale or disposal. The major pollutants from the storage tanks are VOC and HAP emissions associated with flashing, working, and breathing losses. The two (2) produced water storage tanks and their accompanying load-out are uncontrolled. Emissions were estimated using ProMax. Estimated emissions were 0.3 tpy of VOC and <0.01 tpy of HAPs.

The two (2) 40,000 gallon or less pressurized condensate tanks utilized at the facility will operate under pressure (6-10 psig). Flashing, working, and breathing losses were estimated with a ProMax simulation. Flash vapors from the condensate tanks will be routed to the facility inlet via tank pressure or an electric VRU.

Condensate loading will operate under one of two methods:

1) Using pressurized tanker trucks, which would create insignificant emissions, or

2) Using atmospheric tanker trucks, which will utilize the line heater to reduce flashing vapors during the loading process, with additional vapors being routed to the low pressure flare for thermal destruction.

Method 2 accounts for the highest level of emissions from the truck load-out, and are reflected as worst case emissions in this analysis. Emissions for the condensate load-out are reported at the low pressure flare.

3.4 Compressor Blowdown, and Rod Packing Emissions

3.4.1 Blowdown Emissions

Blowdown VOC emissions result from leftover gas in the compressor upon shutdown remaining pressurized or vented to the atmosphere. Emissions from compressor engine blowdown events were determined from a vented volume of 4.2 Mscf per blowdown event per compressor as provided by the applicant, a VOC volume percent of 19.74%, and fifty-two (52) blowdown events per year per engine. Emissions are conservatively considered to be the same for all compressors and are based upon the larger of the compressor types associated with the site. All blowdown emissions will be routed to the high pressure flare and are reported there.

3.4.2 Rod Packing Emissions

Rod packing VOC emissions result from gas leaks from the packing and within the distance piece. VOCs are vented at the packing flange and/or the distance piece to areas outside the compressor building. Four (4) of the associated compressors are screw type compressors which have no rod packing vent emissions. The other four (4) compressors are reciprocating. Conservatively, emissions from the three (3) large compressors, run by the Caterpillar G3516B/LEU engines, are estimated at 50 scf/hr of vented gas, while the smaller Ajax DPC-2802LE engine will run a smaller compressor accounting for 25 scf/hr. Estimated VOC emissions were calculated for all compressors to be 24.6 tpy VOC and 1.29 tpy HAPs.

3.5 Pigging Activities

The Uprising Compressor Station will have two (2) pig launchers and two (2) pig receivers. Emissions were calculated on an inlet pressure of 75.0 psig and a discharge pressure of 750.0 psig. Estimated emissions from the pigging activities are 1.8 tpy VOC and 0.12 tpy HAPs.

3.6 Flares

The Uprising Compressor Station shall utilize both a high and low pressure flare. The low pressure flare shall be used to control the condensate tanks and the condensate loading emissions. The high pressure flare shall be used to control the emissions from blowdown events. Estimated emissions for the low pressure flare were based upon condensate tank vapors, as estimated by ProMax, at a waste gas flow rate of 186 scf/hr and a pilot gas flow rate of 90 scf/hr. The high pressure flare emissions are based upon pilot gas flow rate of 50 scf/hr, and a purge gas flow rate of 40 scf/hr. The waste gas and purge gas flow rates are based upon 8,760 hours of operation per year, but in actuality the emissions will occur much faster and in shorter time frames (during loading and blowdown events). Emissions for the low pressure flare were calculated to be 0.5 tpy NO_x, 0.1 tpy CO, 3.0 tpy VOC, and 0.22 tpy HAPs. Emissions from the high pressure flare were calculated to be 0.3 tpy NO_x, 0.1 tpy CO, 1.3 tpy VOC, and 0.20 tpy HAPs.

A summary of the existing and proposed emissions from the Uprising Compressor Station are detailed in Tables 4 and 5.

Table 4: Permitted Worst Case NO_x Uprising Compressor Station Emissions (MD-12882)

ID	Source	NO_x		CO		VOC		Formaldehyde[1]	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
E1	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
E2	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
E3	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
E4	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
E5	Caterpillar G3516B	1.5	6.7	1.5	6.7	2.1	9.3	0.21	0.93
E6	Caterpillar G3516B	1.5	6.7	1.5	6.7	2.1	9.3	0.21	0.93
E7	Caterpillar G3516B	1.5	6.7	1.5	6.7	2.1	9.3	0.21	0.93
E8	Ajax DPC-2803LE	1.2	5.1	0.3	1.5	0.3	1.5	0.10	0.46
E9	Ajax DPC-2802LE	0.8	3.4	1.6	6.8	0.4	1.9	0.23	1.02
D1a	10.0 MMscfd TEG Still Vent	--	--	--	--	Controlled by Condenser/Reboiler			
D1b	10.0 MMscfd TEG Flash Tank	--	--	--	--	Controlled by Reboiler			
R1	0.75 MMBtu/hr Reboiler	0.1	0.3	0.1	0.3	1.1	4.9	<0.01	0.01
D2a	10.0 MMscfd TEG Still Vent	--	--	--	--	Controlled by Condenser/Reboiler			
D2b	10.0 MMscfd TEG Flash Tank	--	--	--	--	Controlled by Reboiler			
R2	0.75 MMBtu/hr Reboiler	0.1	0.3	0.1	0.3	1.1	4.9	<0.01	0.01
T1	400 bbl Condensate Tank	--	--	--	--	8.6	37.7	--	--
T2	400 bbl Produced Water Tank	--	--	--	--	--	--	--	--
Start	Start-up Emissions[3]	--	--	--	--	0.7	3.1	--	--
CBD	Compressor Blowdown[3]	--	--	--	--	2.8	12.3	--	--
RP	Rod Packing Emissions[3]	--	--	--	--	10.9	47.9	--	--
CL	Condensate Loadout	--	--	--	--	0.1	0.5	--	--
PL	Produced Water Loadout	--	--	--	--	<0.1	<0.1		
Fug.	Fugitives	--	--	--	--	3.9	17.1	--	--
Permitted Facility Emissions		**12.3**	**54.0**	**9.4**	**41.4**[4]	**40.2**	**176.9**	**1.36**	**5.99**

[1] Formaldehyde is the only significant HAP emitted from the engines.
[2] Unit may consist of a 4-stroke rich burn/lean burn engine limited to 637 hp.
[3] Start-up, blowdown, and rod packing vent emissions represent a total from all nine (9) engines.
[4] Worst case CO totals 78.2 tpy depending on engine types installed.

Table 5: Proposed Worst Case NO_x Uprising Compressor Station Emissions										
IMPACT ID	ID	Source	NO_x		CO		VOC		HAPs[1]	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
ENG001	E1	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
ENG002	E2	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
ENG003	E3	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
ENG004	E4	4-stroke Lean Burn[2]	1.4	6.2	0.7	3.1	1.0	4.3	0.10	0.43
ENG005	E5	Caterpillar G3516B	1.5	6.7	1.5	6.7	2.1	9.3	0.21	0.93
ENG006	E6	Caterpillar G3516B [3]	1.5	6.7	1.5	6.7	2.1	9.3	0.21	0.93
ENG007	E7	Caterpillar G3516B [3]	1.5	6.7	1.5	6.7	2.1	9.3	0.21	0.93
ENG009	E9	Ajax DPC-2802LE	0.8	3.4	1.6	6.8	0.4	1.9	0.23	1.02
DHY001	D1a/b	10.0 MMscfd TEG Dehy Unit	--	--	--	--	Controlled by Condenser/Reboiler (HET001)			
HET001	R1	0.75 MMBtu/hr Reboiler	0.1	0.3	0.1	0.3	1.1	4.9	<0.01	0.01
DHY002	D2a	10.0 MMscfd TEG Dehy Unit	--	--	--	--	Controlled by Condenser/Reboiler (HET002)			
HET002	R2	0.75 MMBtu/hr Reboiler	0.1	0.3	0.1	0.3	1.1	4.9	<0.01	0.01
TNK001	T1	40,000 gallon Pressurized Condensate Tank	--	--	--	--	Controlled by Low Pressure Flare (FLR002)			
TNK002	--	40,000 gallon Pressurized Condensate Tank	--	--	--	--				
LUD001	CL	Condensate Loadout	--	--	--	--				
FLR002	--	Low Pressure Flare	0.1	0.5	<0.1	0.1	0.7	3.0	0.05	0.22
HET003	--	1.5 MMBtu/hr Line Heater	0.1	0.6	0.1	0.5	<0.1	<0.1	<0.01	<0.01
TNK003	T2	400 bbl Produced Water Tank	--	--	--	--	<0.1	0.1	--	--
TNK004	--	400 bbl Produced Water Tank	--	--	--	--	<0.1	0.1	--	--
LUD002	PL	Produced Water Loadout	--	--	--	--	<0.1	<0.1	<0.01	<0.01
--	Start	Start-up Emissions [4]	--	--	--	--	0.7	3.1	--	--
BVC001	CBD	Compressor Blowdown [4]	--	--	--	--	Controlled by High Pressure Flare (FLR001)			
FLR001	--	High Pressure Flare	0.1	0.3	<0.1	0.1	0.3	1.3	0.05	0.20
VNT001	RP	Rod Packing Vent Emissions [4]	--	--	--	--	5.6	24.6	0.29	1.29
BVC002	--	Pigging Activities	--	--	--	--	0.5	2.0	0.03	0.13
FUG001	Fug.	Fugitives	--	--	--	--	3.9	17.1	--	--
Change in Emissions			**-0.9**	**-3.7**	**-0.2**	**-0.8**	**-15.6**	**-68.8**	**0.32**	**1.40**
Permitted Facility Emissions			**11.4**	**50.3**	**9.2**	**40.6 [5]**	**24.6**	**108.1**	**1.68**	**7.39**

[1] Formaldehyde is the only significant HAP emitted from the engines.
[2] Unit may consist of a 4-stroke rich burn/lean burn engine limited to 637 hp.
[3] Unit may consist of a Caterpillar G3516B or Caterpillar G3516LEU engine.
[4] Start-up, blowdown, and rod packing vent emissions represent a total from all eight (8) engines.
[5] Worst case CO totals 77.4 tpy depending on engine types installed.

4. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Per the requirements of Chapter 6 Section 2 of the Wyoming Air Quality Standards and Regulations (WAQSR), all facilities must demonstrate the use of BACT.

4.1 Caterpillar G3516LEU engines

The Caterpillar G3516LEU engines (ENG006-ENG007) will be controlled through ultra lean-burn technology to the levels listed in Table 2, and has a baseline emission rate of 0.5 g/hp-hr NO_x. This emission rate is below the NO_x emission rate given to a well-controlled rich-burn engine that demonstrates BACT. Given that these lean burn engines can meet an emission rate of 0.5 g/hp-hr without any add-on control equipment such as Selective Catalytic Reduction (SCR), the Division will consider ultra lean-burn technology to represent BACT for these engines.

The proposed Caterpillar G3516LEU engines (ENG006-ENG007) will be equipped with oxidation catalysts which aids in the destruction of CO, VOCs, formaldehyde and other HAPs. The Division considers the installation of an oxidation catalyst meeting emission rates as listed in Table 2 as representing BACT for these engine types.

4.2 Tanks

Emissions of VOC and HAPs from the two (2) 400 bbl produced water tanks and the produced water load-out will be uncontrolled. Due to the insignificant nature of these emissions the Division considers this to represent BACT for these units.

Emissions from the two (2) 40,000 gallon pressurized condensate tanks and the condensate load-out will be routed to the low pressure flare for combustion. The low pressure flare will reduce the VOC and HAP mass content of the emissions by a minimum of ninety-eight percent (98%). The Division considers this to represent BACT for these types of units.

4.3 Blowdown, and Pigging Activities

Blowdown emissions will be controlled by the high pressure flare. The Division will consider this to represent BACT. The high pressure flare will reduce the VOC and HAP mass content of the emissions by a minimum of ninety-eight percent (98%). The Division considers this to represent BACT for this emission source.

Emissions from the pigging activities are uncontrolled. The Division considers this to meet BACT due to the low levels of emissions associated with pigging.

4.4 Rod Packing Vents

Rod packing vents will be a source of VOC emissions from compressors at the station. Emission rates are highly variable, making the implementation of control systems difficult. Flares and vapor recovery units can create pressure or vacuum conditions which can be detrimental to the operation of the compressor. In this case, the emissions cannot be recycled back to the inlet due to the high pressure associated with the inlet. The Division will require that Rowdy Pipeline, LLC utilize best management practices and the maintenance requirements for compressor rod packing within 40 CFR part 60, subpart OOOO as BACT for rod packing emissions.

5. CHAPTER 6, SECTION 3 APPLICABILITY

The Uprising Compressor Station is not a "major source" as defined by Chapter 6, Section 3 of the Wyoming Air Quality Standards and Regulations (WAQSR) for NO_x, CO, or HAPs. Total VOC emissions from the compressor station exceed the one-hundred (100) tpy threshold. However, the compressor station includes several sources of VOC emissions that can be considered "fugitives", including engine start-up, compressor blowdown, rod packing, and facility fugitives. These fugitive emissions are not considered in determining whether a facility is a major source, in accordance with Chapter 6, Section 3 of the Wyoming Air Quality Standards and Regulations (WAQSR). Total VOC emissions from these sources are estimated to be 48.1 tpy. When removing them from the Chapter 6, Section 3 determination, applicable VOC emissions are below the one-hundred (100) tpy threshold. Therefore, the Uprising Compressor Station is subject to the operating permit requirements of Chapter 6, Section 2.

6. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (MACT)

EPA's current promulgated NESHAP rules under 40 CFR part 63, subpart ZZZZ apply to major sources of HAP emissions, as well as area sources of HAP emissions. Since the compressor station has the potential to emit less than ten (10) tpy of any individual HAP, or twenty-five (25) tpy of any combination of HAPs, the facility is considered an area source of HAPs, and engines at this facility will be subject to all applicable requirements of 40 CFR part 63, subpart ZZZZ.

7. PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

No air pollutant is emitted at a rate of 250 tpy or more. Therefore, the compressor station is not a "major emitting facility" as defined in Chapter 6, Section 4 of the WAQSR, and a PSD analysis is not required.

8. NEW SOURCE PERFORMANCE STANDARDS (NSPS)

Engines at this facility are subject to all applicable requirements of 40 CFR part 60, subpart JJJJ based on the manufacture date.

The Uprising Compressor Station is not subject to the requirements of 40 CFR part 60, subpart KKK. Condensate liquids are separated from the gas as it runs through a condenser, then sent to a storage tank. These liquids are not fractionated into natural gas products. This does not meet the definition of fractionation under the subpart, and therefore does not subject the facility to this subpart.

The two (2) 400 bbl produced water tanks are not subject to the requirements of 40 CFR part 60, subpart Kb, as the tanks are less than 75 cubic meters, or 471.7 bbl.

The two (2) 40,000 gallon pressurized condensate tanks are subject to the requirements of 40 CFR part 60, subpart Kb, as the tanks exceed a capacity of $151m^3$ (39,900 gallons) and will store liquids with a true vapor pressure exceeding 3.5 kPa (0.5 psia).

40 CFR part 60, subpart OOOO - *Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution* applies to any new, modified or reconstructed emission source installed after August 23, 2011**.** The affected emission sources include centrifugal and reciprocating compressors, and continuous bleed pneumatic controllers. The affected emission sources at the Uprising Compressor

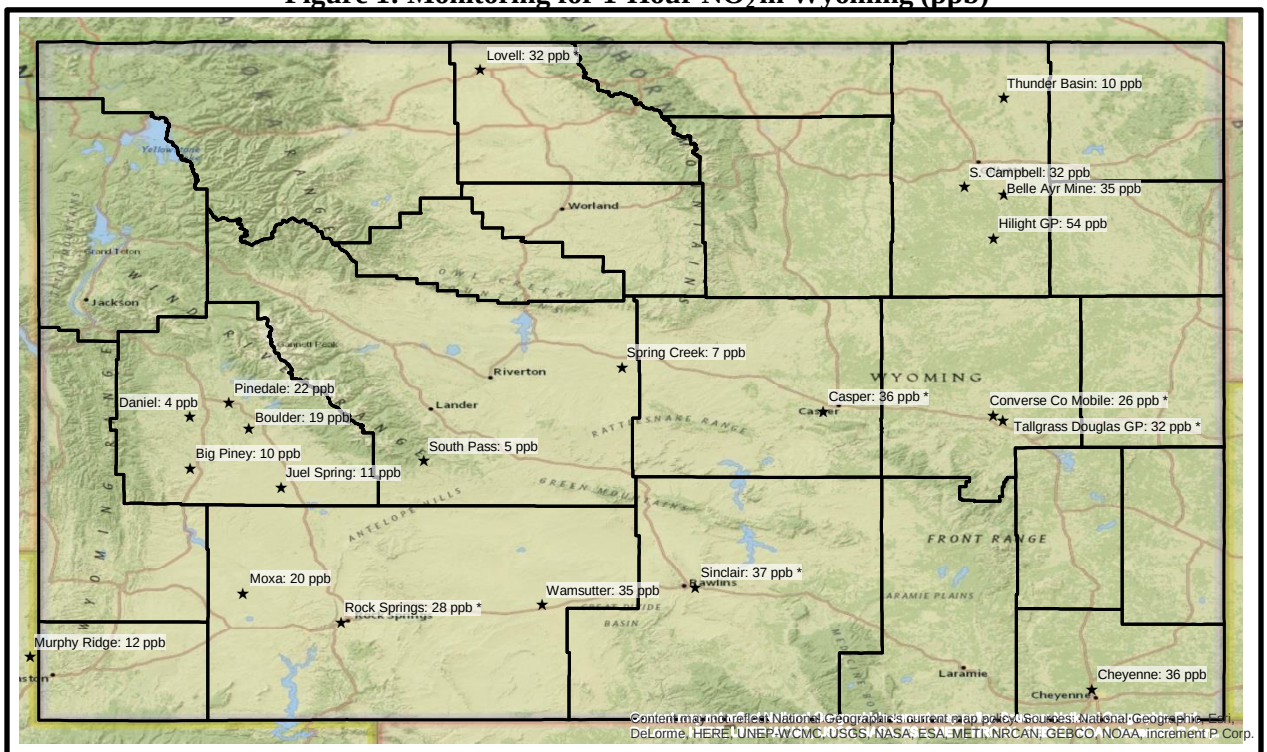
Station are subject to all applicable requirements of 40 CFR part 60, subpart OOOO based on the installation/modification date.

9.0 IMPACT ON EXISTING AMBIENTY AIR QUALITY

With the proposed decrease of NO_x emissions (3.7 tpy) at this facility due to this modification, no ambient air modeling was requested. Modeling completed in June 2012 showed that the maximum modeled annual concentration of NO_2 was 12.4 µg/m^3, well below the National Ambient Air Quality Standard (NAAQS) of 100 µg/m^3 and the Class II PSD Increment of 25 µg/m^3.

Statewide monitoring of NO_2 on the basis of a 1-hour averaging period indicates that the 1-hour NAAQS of 100 ppb is not threatened at any of twenty-one (21) monitoring sites through 2014 (see Figure 1 below). Several of the Wyoming monitors are located in areas of concentrated industrial development. County-wide NO_x emissions in Sweetwater County were an estimated 38,280 tons in 2011. Multiple monitors are also located in Campbell County (estimated 44,420 tons of NO_x in 2011), Converse County (estimated 19,280 tons in 2011) and Sublette County (estimated 4,970 tons NO_x in 2011). Based on the current statewide 1-hour NO_2 monitoring and the minor-source NO_x emissions total from the Uprising Compressor Station, the Division is satisfied that the operation of the Uprising Compressor Station will not prevent the attainment or maintenance of the 1-hour NAAQS for NO_2.

Figure 1: Monitoring for 1-Hour NO_2 in Wyoming (ppb)



Note: To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour averages must not exceed 100 ppb. Concentrations shown in the figure above from Wyoming monitoring stations are 3-year (2012-2014) averages of the 98th percentile of the daily maximum 1-hour averages. If three years of data were not available for a particular station, the 98th percentile of the daily maximum 1-hour averages over the period of available data is shown.
* Less than three (3) years of complete data reported

Based on results of this previous modeling and this modification's decrease in total NO_x emissions, the Division is satisfied that the Uprising Compressor Station will be in compliance with all applicable ambient standards.

10. PROPOSED PERMIT CONDITIONS

The Division proposes to issue an Air Quality Permit to Rowdy Pipeline, LLC for the modification of the Uprising Compressor Station with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.

2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

3. That a permit to operate, in accordance with Chapter 6, Section 2(a)(iii) of the WAQSR, is required after a 120 day start-up period in order to operate this facility.

4. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 2100 West 5th Street, Sheridan, WY 82801. Submissions may also be done electronically through https://airimpact.wyo.gov to satisfy requirements of this permit.

5. That written notification of the actual date of initial start-up for each source is required fifteen (15) days after start-up in accordance with Chapter 6, Section 2(i)(ii) of the WAQSR. For engines, such notification shall be submitted on a complete Engine Installation/Removal form. The form can be downloaded from the Air Quality website http://deq.wyoming.gov/aqd/ or obtained from the Air Quality Division.

6. That upon shutdown and removal of an engine from the facility, written notification is required within fifteen (15) days of removal. Such notification shall be submitted on a complete Engine Installation/Removal form. Once an engine is removed from the facility, an engine cannot be installed and operated in its place unless authorized by an appropriate permit modification.

7. That the date of commencement of construction shall be reported to the Administrator within thirty (30) days of commencement. In accordance with Chapter 6, Section 2(h) of the WAQSR, approval to construct or modify shall become invalid if construction is not commenced within twenty-four (24) months after receipt of such approval or if construction is discontinued for a period of twenty-four (24) months or more. The Administrator may extend the period based on satisfactory justification of the requested extension.

8. That performance tests be conducted, in accordance with Chapter 6, Section 2(j) of the WAQSR, within thirty (30) days of achieving a maximum design rate but not later than ninety (90) days following initial start-up, and a written report of the results be submitted. The operator shall provide fifteen (15) days prior notice of the test date. If a maximum design rate is not achieved within ninety (90) days of start-up, the Administrator may require testing be done at the rate achieved and again when a maximum rate is achieved.

9. Initial performance tests, as required by Condition 8 of this permit, shall be conducted on the following units, and each time a new unit is installed for units ENG001-ENG004:

   i. 4-stroke rich burn/lean burn (ENG001-ENG004), Caterpillar G3516B (ENG006-ENG007), Caterpillar G3516LEU (ENG006-ENG007):

      <u>NO_x, CO, and VOC Emissions</u>: Testing shall follow 40 CFR part 60, subpart JJJJ §60.4244, except that §60.8 only applies to engines subject to 40 CFR part 60, subpart JJJJ. For the initial performance test, testing shall not consist of Method 19 or ASTM Methods.

      <u>Formaldehyde Emissions (Lean Burns Only)</u>: Each engine in operation shall be tested for formaldehyde. Testing shall consist of three (3) 1-hour tests following EPA Reference Methods and a Division approved formaldehyde test method.

   A test protocol shall be submitted to this office for review and approval prior to testing. Engine horsepower, inlet temperature to the catalyst, pressure drop across the catalyst and other operating conditions shall be recorded during each test run and submitted with the test report. Results shall be submitted to this Division within forty-five (45) days of completion.

10. That emissions from the following engine shall be limited as follows:

Engine	ID	NO_x			CO		
		g/hp-hr	lb/hr	tpy	g/hp-hr	lb/hr	tpy
Ajax DPC-2802LE	ENG009	1.0	0.8	3.4	2.0	1.6	6.8

11. That units ENG001-ENG004 shall be limited to the horsepower and g/hp-hr limits in the following table. Emission limits for NO_x, CO, VOC, and formaldehyde on a pound per hour basis are established based on the g/hp-hr limits and the engine information submitted in the Engine Installation/Removal form required by Condition 5 of this permit. Compliance with the g/hp-hr limit is presumed to demonstrate compliance with the lb/hr limit as long as the engine is operated within the horsepower reported in the Engine Installation/Removal form.

Engine	ID	hp	NO_x	CO	VOC	Formaldehyde
			g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr
4-Stroke Lean Burn	ENG001-ENG004	Max. 637	1.0	0.5	0.7	0.07
4-Stroke Rich Burn	ENG001-ENG004	Max. 637	0.7	2.0	0.7	--

12. That emissions from the following engines shall be limited as follows:

Engine	ID	NO_x			CO			VOC			Formaldehyde	
		g/hp-hr	lb/hr	tpy	g/hp-hr	lb/hr	tpy	g/hp-hr	lb/hr	tpy	lb/hr	tpy
Caterpillar G3516B	ENG005-ENG007	0.5	1.5	6.7	0.5	1.5	6.7	0.7	2.1	9.3	0.21	0.93
Caterpillar G3516LEU	ENG006-ENG007	0.5	1.5	6.5	0.5	1.5	6.5	0.7	2.1	9.1	0.21	0.91

13. That upon completion of the modification authorized by this permit, the engine configuration for the Uprising Compressor Station shall be limited to eight (8) engines consisting of the following:

ENG001-ENG004: May consist of a 4-stroke lean burn engine equipped with an oxidation catalyst or a rich burn engine equipped with an AFRC and a NSCR catalyst limited to a maximum of 637 horsepower.

ENG005: Caterpillar G3516B engine equipped with oxidation catalyst.

ENG006-ENG007: May consist of Caterpillar G3516B engines equipped with oxidation catalysts or Caterpillar G3516LEU engines equipped with oxidation catalysts.

ENG009: Ajax DPC-2802LE engine de-rated to 353 hp.

Once constructed, units ENG006-ENG007 lose their flexibility and cannot be replaced by a different model engine unless authorized by an appropriate permit modification.

14. The engine flexibility authorized for units ENG001-ENG004 is valid provided each initial engine is constructed within the regulatory time frame in Condition 7.

15. After the initial installation of units ENG001-ENG004, a BACT review under Chapter 6, Section 2(c)(v) for units ENG001-ENG004 is required prior to installing a new engine type. Approval from the Division that the new engine type meets current BACT requirements is required prior to installation.

16. That Rowdy Pipeline, LLC shall follow the testing requirements as follows for engines ENG001-ENG007, ENG009:

    i. That every twelve (12) calendar months, or more frequently as specified by the Administrator, the Ajax DPC-2802LE engine (ENG009) shall be tested to verify compliance with the NO_x and CO limits set forth in this permit. Periodic tests for each engine are required within twelve (12) calendar months after completion of the last periodic test. Testing for NO_x and CO shall be conducted in accordance with EPA reference methods or the State of Wyoming's Portable Analyzer Protocol. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results of the tests shall be submitted to this Division within forty-five (45) days of completing the tests.

ii. That every twelve (12) calendar months, or more frequently as specified by the Administrator, the engines (ENG001-ENG007) shall be tested to verify compliance with the NO_x, CO, VOC, and formaldehyde limits set forth in this permit. Formaldehyde testing is only required for lean burn engines. VOC testing is only required for engines with VOC limits established in this permit, or for engines subject to 40 CFR part 60, subpart JJJJ. Periodic tests for each engine are required within twelve (12) calendar months after completion of the initial performance test or the last periodic test. Testing for NO_x, CO and VOCs shall follow 40 CFR part 60, subpart JJJJ §60.4244, except that §60.8 only applies to engines subject to 40 CFR part 60, subpart JJJJ. Testing for formaldehyde shall follow EPA reference methods and a Division-approved formaldehyde test method. Formaldehyde emissions in terms of lb/hr shall be calculated using the methodology in Sections 10.1.1.1 and 10.1.1.2 of the State of Wyoming's Portable Analyzer Protocol. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results of the tests shall be submitted to this Division within forty-five (45) days of completing the tests.

iii. The Air Quality Division shall be notified within twenty-four (24) hours of any engine where the testing/monitoring required by (i) and (ii) of this condition shows operation outside the permitted emission limits. By no later than seven (7) calendar days of such testing/monitoring event, the owner or operator shall repair and retest/monitor the affected engine to demonstrate that the engine has been returned to operation within the permitted emission limits. Compliance with this permit condition regarding repair and retesting/monitoring shall not be deemed to limit the authority of the Air Quality Division to cite the owner or operator for an exceedance of the permitted emission limits for any testing/monitoring required by (i) and (ii) of this condition which shows noncompliance.

17. That Rowdy Pipeline, LLC shall follow the monitoring and maintenance requirements as follows for engines (ENG001-ENG007) equipped with a NSCR catalyst or oxidation catalyst:

i. Operate and maintain the engine, air pollution control equipment, and monitoring equipment according to good air pollution control practices at all times, including startup, shutdown, and malfunction.

ii. Install a thermocouple to measure the inlet catalyst temperature.

a. The inlet temperature shall be recorded at least monthly. If the temperature is outside of the range listed below, corrective action shall be taken.

NSCR Catalyst:	750 °F to 1250 °F
Oxidation Catalyst:	450 °F to 1350 °F

iii. Install a device to measure the pressure drop across the catalyst.

a. The pressure drop across the catalyst shall be recorded at least monthly. If the pressure changes by more than two (2) inches of water at one-hundred percent (100%) load, plus or minus ten percent (10%), from the pressure drop as determined below, corrective action shall be taken.

1. During the initial performance test required by this permit, the reference pressure drop shall be established. When the catalyst is replaced, the reference pressure drop shall be reestablished during the subsequent periodic testing required by this permit.

iv. Records of catalyst inlet temperature, pressure drop, and any maintenance or corrective actions shall be kept and maintained for a period of five (5) years and shall be made available to the Division upon request.

18. Compliance with 40 CFR part 63, subpart ZZZZ §63.6605 and §63.6640 can be used in lieu of the monitoring and maintenance requirements in Condition 17.

19. That Rowdy Pipeline, LLC shall follow the preventative maintenance (PM) plan attached as Appendix C for the Ajax DPC-2802LE (ENG009) engine. The PM plan may be revised without administratively amending the applicable permit, but revisions shall be approved by the Division prior to implementation.

20. That the stack heights for compressor engines (ENG001-ENG007) shall be a minimum of 1.5 times the compressor building height. That the stack height for the Ajax DPC-2802LE engine (ENG009) shall be a minimum of 1.6 times the compressor building height.

21. That Rowdy Pipeline, LLC shall comply with all applicable requirements of 40 CFR part 60, subpart JJJJ.

22. That Rowdy Pipeline, LLC shall comply with all applicable requirements of 40 CFR part 63, subpart ZZZZ.

23. That Rowdy Pipeline, LLC shall comply with all applicable requirements of 40 CFR part 60, subpart OOOO.

24. That Rowdy Pipeline, LLC shall comply with all applicable requirements of 40 CFR part 60, subpart Kb.

25. That Rowdy Pipeline, LLC shall comply with all applicable requirements of 40 CFR part 63, subpart HH.

26. For the two (2) 10.0 MMscfd TEG dehydration units, all vapors associated with the still vents shall be controlled with a BTEX unit including a condenser. Condensed liquids from the BTEX unit shall be routed to a storage tank for sale or disposal. Non-condensable vapors from the BTEX unit and flash tank overhead vapors shall be routed to a reboiler for thermal destruction.

27. That emissions caused by blowdown events shall be routed through the high pressure flare (FLR002).

28. That emissions from the two (2) pressurized condensate tanks and the condensate load-out shall be routed to the low pressure flare (FLR001).

29. Rowdy Pipeline, LLC shall maintain and operate the reboilers and flares during all periods of active operation such that they remain effective as viable emissions control devices. Records shall be maintained, noting periods when the reboiler is not operational. Records shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.

30. The two (2) flares shall be operated and maintained to be smokeless per Chapter 5, Section 2(m) of the WAQSR, with no visible emissions except for periods not to exceed a total of five (5) minutes during any two (2) consecutive hours as determined by 40 CFR part 60, appendix A, Method 22.

31. The two (2) reboilers shall be operated and maintained to be smokeless per Chapter 3, Section 6(b)(i) of the WAQSR, with no visible emissions except for periods not to exceed a total of five (5) minutes during any two (2) consecutive hours as determined by 40 CFR part 60, appendix A, Method 22.

32. The presence of the pilot flames for the two (2) reboilers and the two (2) flares shall be monitored using a thermocouple, continuous recording device, or any other equivalent device approved by the Division to detect and record the presence of the flames.

33. That Rowdy Pipeline, LLC shall follow best management practices and the maintenance requirements for compressor rod packing per 40 CFR part 60.5385.

34. Periodic training on the proper operation of equipment, systems and devices used to contain, control, eliminate or reduce pollution shall be provided to company personnel whose primary job is to regularly ensure that facility production equipment is functional. The training shall provide these personnel with the ability to recognize, correct and report all instances of malfunctioning equipment, systems and devices associated with air pollution control. These equipment, systems and devices include, but are not limited to combustion units, reboiler overheads condensers, hydrocarbons liquids storage tanks, drip tanks, vent lines, connectors, fittings, valves, relief valves, hatches and any other appurtenance employed to, or involved with, eliminating, reducing, containing or collecting vapors and transporting them to a pollution control system or device.

35. Trained personnel shall perform, at a minimum, a quarterly site evaluation of the operation of the air pollution control equipment, systems and devices under Condition 34. The first quarterly site evaluation shall be conducted within the second quarter after issuance of this permit. At least one of the quarterly evaluations per calendar year shall include an evaluation of the facility for leaks from the equipment, systems and devices under Condition 34 using an optical imaging device.

36. Notification shall be provided to the Division at least fifteen (15) days prior to each quarterly evaluation under Condition 35.

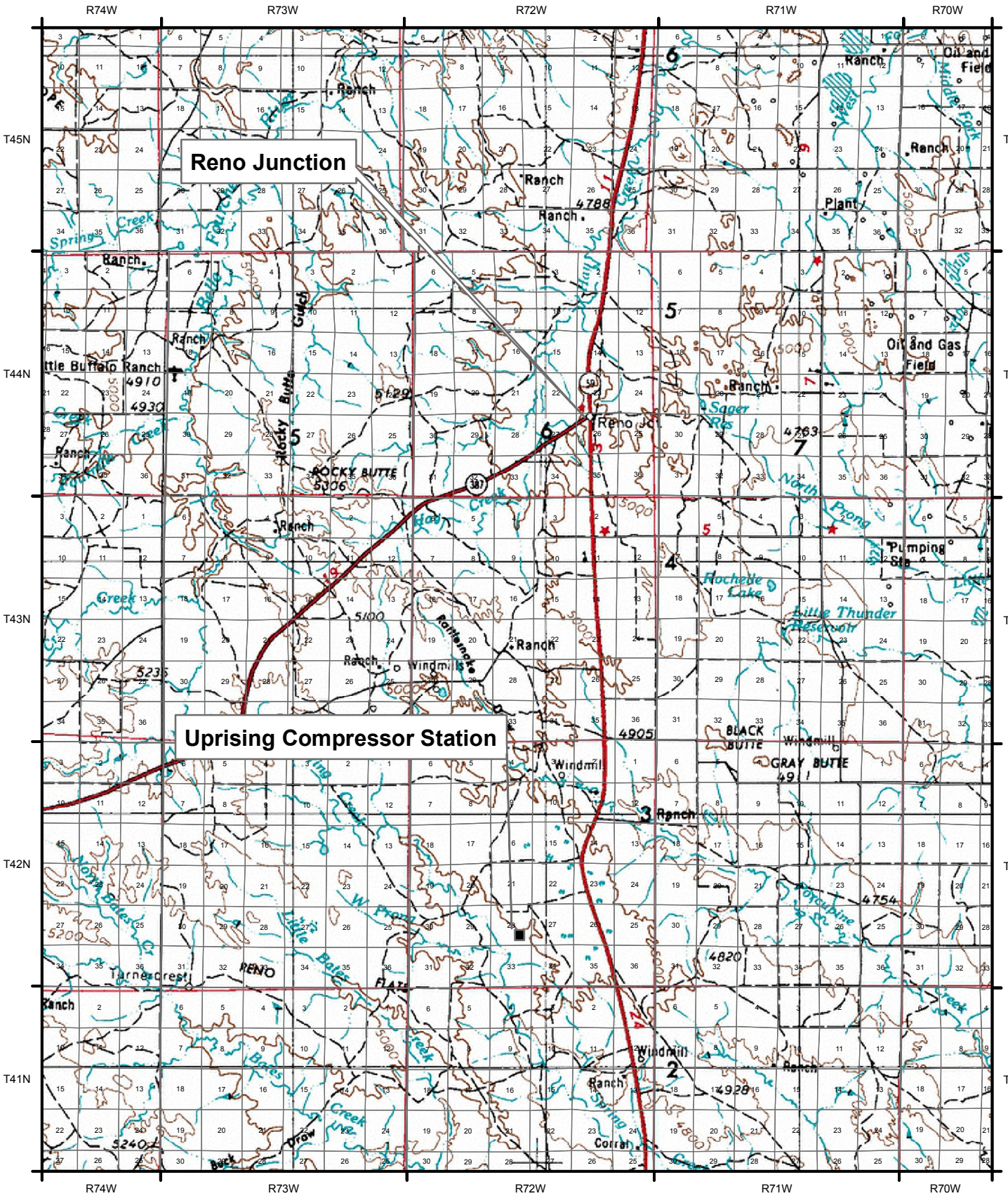
37. An annual preventative maintenance program shall be instituted to inspect and replace equipment, systems and devices under Condition 34 as necessary to ensure their proper operation.

38. Results of all inspections, evaluations and periodic monitoring shall be documented and maintained for review by the Division upon request. Digital files of any optical imaging device evaluations need not be maintained.

39. That the conditions of this permit shall become effective upon permit issuance and shall supersede all Chapter 6, Section 2 Air Quality MD-12882 for the Uprising Compressor Station.

Appendix A

Compressor Station Location



Rowdy Pipeline, LLC

Uprising Compressor Station

SE1/4 of Section 28, T42N, R72W

Campbell County, Wyoming

0 3 6 12 Miles

DEPARTMENT OF ENVIRONMENTAL QUALITY
WYOMING

Appendix B

Preventative Maintenance (PM) Plan
For Ajax DPC-2802LE (ENG009)

Preventative Maintenance Plan - WDEQ Air Quality Permit Compliance Management

Rowdy Pipeline, LLC
Ajax DPC 2802LE Compressor Engine Model

This document identifies and describes the various elements of the preventative maintenance program that Rowdy Pipeline, LLC (Rowdy) will implement to ensure and verify ongoing compliance with the emission limits specified in the WDEQ air quality permit for an Ajax 2802LE.

Horsepower Limitations: The Ajax DPC-2802LE engine model has a maximum site rating of 384 hp. However, each Ajax DPC-2802 LE engine will be limited to operating at a maximum of 353 hp under the permit to satisfy WDEQ emission control requirements. The maximum horsepower generated by each engine will be set in the field during the initial engine "shakedown" field testing. The compressor assemblies on the Ajax 2802 model are equipped with internal "pockets" that can be opened and closed to adjust the volume of gas that the compressor can deliver at a given set of field conditions, which in turn limits the maximum horsepower that the unit can produce. The manufacturer will provide engine and compressor curves that indicate the pocket position required to set the maximum horsepower for a given set of field conditions. Rowdy will determine the engine speed, suction pressure, and discharge pressure at which the units are expected to operate. The pocket position in the compressor assemblies will then be adjusted to set the maximum horsepower that each unit can generate to 353 hp. Rowdy will maintain records of the measurements and calculations used to determine the appropriate pocket position and will record the actual pocket settings.

Routine Inspection and Monitoring: Rowdy will implement an inspection and recordkeeping program to manage and track operational performance and maintenance on the engine. Operators will conduct weekly visual inspections of the engines and will observe engine operations on a regular basis - at least weekly. Suction pressure, discharge pressure, fuel gas pressure, and engine speed will be measured, monitored, and recorded on log sheets or field books on at least a weekly basis. Engines will be adjusted as necessary if the operator observes an engine to be misfiring or otherwise operating in a substandard manner. Records of engine and compressor adjustments will also be maintained by Rowdy.

Routine Maintenance and Service: Rowdy will implement a preventative maintenance program to provide routine maintenance and service on each unit. This program will be based on the Preventative Maintenance Manual developed by Ajax for the DPC-2802LE engine model. Standard preventative maintenance on each engine will be conducted on at least a monthly basis. Items that will be inspected on a monthly basis will include:

- ◊ spark plugs
- ◊ fuel filter
- ◊ air filter
- ◊ air intake manometer
- ◊ belts
- ◊ cooler and water pump bearings
- ◊ crankcase vent breather filters
- ◊ packing
- ◊ throttle valve and linkage
- ◊ gas injection valves

The preventative maintenance program will also include annual service on each engine. Rowdy will inspect each engine and compressor assembly on an annual basis to determine which components and parts require the annual service recommended by Ajax.

Scheduled Overhauls: Overhauls will be conducted on each engine as necessary based on the condition of the unit. The schedule for these overhauls will be determined based on the observations made by the operators during inspection, maintenance, and service activities.

Recordkeeping: Rowdy will maintain log sheets and other records to document the actions taken as part of the routine inspection, maintenance, and service program. This information will also be used to monitor changes in day-to-day readings and operating conditions and respond accordingly.

Initial Performance Test: Emissions of NO_x, CO, and formaldehyde will be measured and recorded during the initial compliance stack test required under the permit.

Annual Emissions Assessment: Rowdy will conduct annual monitoring for NOx, CO, and formaldehyde using an approved protocol.