



DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
Permit Application Analysis
A0000099

September 3, 2015

NAME OF FIRM: RKI Exploration & Production, LLC

NAME OF FACILITY: Shelden Temporary Compressor Station

FACILITY LOCATION: NW¹/₄NW¹/₄ of Section 16, T37N, R70W
Lat: 43.189232° Long: -105.274651°
(WGS 84)
Converse County, Wyoming

TYPE OF OPERATION: Natural Gas Compression

RESPONSIBLE OFFICIAL: Mr. Jeffrey Ingerson,
Senior Air Permitting Engineer

MAILING ADDRESS: 210 Park Avenue, Suite 900
Oklahoma City, OK 73102

TELEPHONE NUMBER: (405) 987-2181

REVIEWING ENGINEER: Brandi O'Brien, Air Quality Scientist

1. PURPOSE OF APPLICATION

On September 30, 2014, the Division of Air Quality received an application from RKI Exploration & Production, LLC to construct the Shelden Temporary Compressor Station, to consist of two (2) 650 hp NG Engines 21.9L generator engines (ENG001-ENG002), one (1) two-phase inlet slug catcher, one (1) 450 hp electric compressor, one (1) 400 bbl water tank and one (1) solid desiccant dehydration unit with a gas cooler. The Shelden Temporary Compressor Station is located in the NW¹/₄NW¹/₄ of Section 16, T37N, R70W, approximately three (3)miles south southwest of Bill, in Converse County, Wyoming.

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

2. PROCESS DESCRIPTION

The Shelden Temporary Compressor Station will separate inlet gas and liquids, sending the liquids to the 400 bbl water tank to be trucked offsite. The gas will then be compressed via the electric compressor and sent through the solid desiccant dehydration unit to dehydrate the gas. Once the compressed gas is dehydrated it goes through an air cooler and is sent to sales.

3. ESTIMATED EMISSIONS

3.1 Engines

Both of the engines will be field gas fired. 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. Emission factors for the engine types and the estimated emissions from each source at the compressor station are shown in the following tables:

Table 3-1: Engine Emission Factors (g/hp-hr)						
Engine	hp	Controls	NO _x	CO	VOC	Formaldehyde
NG Engines 21.9L	650	NSCR/AFRC	0.5	2.0	0.7	0.08
NG Engines 21.9L	650	NSCR/AFRC	0.5	2.0	0.7	0.08

Table 3-2: Engine Emissions									
ID	Engine	NO _x		CO		VOC		Formaldehyde ¹	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
ENG001	NG Engines 21.9L	0.7	3.1	2.9	12.6	1.0	4.4	0.11	0.50
ENG002	NG Engines 21.9L	0.7	3.1	2.9	12.6	1.0	4.4	0.11	0.50

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

3.2 Dehydration Unit

There are no emissions, other than fugitive emissions, associated with solid desiccant dehydration units.

3.3 Storage Tank and Truck Load-out

Working/breathing losses for the 400-bbl water tank were calculated using GRI-HAPCalc 3.0. Anticipated throughput through the 400 bbl storage tank is 1,642 bbl/yr. Emissions associated with the tanks were calculated to be 1.9 tpy VOC and 0.04 tpy HAPs.

The truck load-out emissions were calculated using AP-42 Section 5.2 and based upon a throughput of 1,642 bbl/yr. These emissions were determined to be insignificant.

3.4 Fugitive Emissions

Equipment fugitive leak emissions were calculated using GRI-HAPCalc 3.0 with a count of connectors, flanges, valves, pump seals and other components for the facility. Estimated emissions were calculated for VOC to be 0.6 tpy and for HAPs to be 0.01 tpy.

Estimated emissions from each source at the compressor station are shown in the following table:

Table 3-3: Proposed Shelden Temporary Compressor Station Emissions									
ID	Source	NO _x		CO		VOC		HAPs ¹	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
ENG001	NG Engines 21.9L	0.7	3.1	2.9	12.6	1.0	4.4	0.11	0.50
ENG002	NG Engines 21.9L	0.7	3.1	2.9	12.6	1.0	4.4	0.11	0.50
TNK001	Water Tank	--	--	--	--	0.4	1.9	<0.01	0.04
FUG001	Fugitive Emissions	--	--	--	--	0.1	0.6	<0.01	0.01
LUD001	Truck Load-out	--	--	--	--	<0.1	<0.1	<0.01	<0.01
Facility Total		1.4	6.2	5.8	25.2	2.5	11.3	0.22	1.05

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

4. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

In accordance with Chapter 6, Section 2(c), a best available control technology (BACT) analysis is required for NO_x, CO, VOC, and HAPs because the proposed project results in a physical change in, or change in the method of operation of, an affected facility which increases the amount of any air pollutant.

4.1 NG Engines 21.9L Engines

The NG Engines 21.9L engines (ENG001-ENG002) will be controlled to the levels listed in Table 3-1. These rich burn engines will be equipped with air/fuel ratio controllers (AFRC) and non-selective catalytic reduction (NSCR) catalysts, which not only controls NO_x but also aids in the destruction of formaldehyde and other HAPs. The Division considers a NSCR catalyst with an AFRC as representing BACT for this type of rich burn engine.

With the finalization of 40 CFR part 60, subpart JJJJ, the Division is establishing VOC limits as part of the BACT analysis. Given all engines are equipped with a NSCR catalyst with an AFRC, the Division considers the VOC limits to represent BACT.

4.2 Additional Sources

RKI Exploration & Production, LLC proposes uncontrolled emissions from one (1) 400 bbl water tank, truck load-out and one (1) solid desiccant dehydration unit with a gas cooler. The resultant emissions levels do not require further BACT review.

5. CHAPTER 6, SECTION 3 APPLICABILITY

The facility is not a “major source” as defined by Chapter 6, Section 3 of the Wyoming Air Quality Standards and Regulations (WAQSR). Therefore, RKI Exploration & Production, LLC shall obtain an operating permit in accordance with Chapter 6, Section 2 of the WAQSR.

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 10 tpy of any individual HAP, or 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 - *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*.

7. PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The Shelden Temporary Compressor Station is not a "major stationary source" as defined by Chapter 6, Section 4 of the WAQSR. Therefore, the Shelden Temporary Compressor Station is not subject to PSD review under Chapter 6, Section 4.

8. NEW SOURCE PERFORMANCE STANDARDS (NSPS)

The engines at this facility are subject to applicable requirements of 40 CFR part 60, subpart JJJJ - *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* based on the manufacture date of the engines.

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 at compressor stations. The affected emission sources include centrifugal and reciprocating compressors, continuous bleed pneumatic controllers, and storage vessels. The affected emission sources at the Shelden Temporary Compressor Station are subject to all applicable requirements of 40 CFR part 60, subpart OOOO based on the installation/modification date.

There are no NSPS standards for dehydration units.

9. PROJECTED IMPACT ON EXISTING AMBIENT AIR QUALITY

Based on the low emission levels for the facility, the Division has determined that the Shelden Temporary Compressor Station is not expected to negatively affect the ambient air quality standards.

10. COUNTY ZONING

RKI Exploration & Production, LLC provided the Division with a letter dated October 21, 2014 from the Converse County Board of Commissioners, stating that Converse County has no local zoning regulations.

11. SAGE GROUSE

The Division has determined that the facility will be located in a sage grouse non-core area and more than two (2) miles from any known occupied lek.

12. PROPOSED PERMIT CONDITIONS

The Division proposes to issue an Air Quality Permit to RKI Exploration & Production, LLC to construct the Shelden Temporary 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, 152 North Durbin Street, Casper, WY 82601. 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 engine is required fifteen (15) days after start-up in accordance with Chapter 6, Section 2(i)(ii) of the WAQSR. 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.
7. Unless engine replacement is specifically authorized for a unit in this permit, 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.
8. 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.

9. 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.

10. Initial performance tests, as required by Condition 9 of this permit, shall be conducted as follows:

i. 650 hp NG Engines 21.9L engines ENG001-ENG002

NO_x, CO, and VOC Emissions: 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.

A test protocol shall be submitted 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.

11. That emissions from engines ENG001-ENG002 shall be limited as follows:

ID	Engine	NO _x			CO			VOC		
		g/hp-hr	lb/hr	tpy	g/hp-hr	lb/hr	tpy	g/hp-hr	lb/hr	tpy
ENG001	NG Engines 21.9L	0.5	0.7	3.1	2.0	2.9	12.6	0.7	1.0	4.4
ENG002	NG Engines 21.9L	0.5	0.7	3.1	2.0	2.9	12.6	0.7	1.0	4.4

12. That the engine configuration for the Shelden Temporary Compressor Station shall be limited to two (2) engines consisting of the following:

ENG001-ENG002: 650 hp NG Engines 21.9L engines equipped with air/fuel ratio controllers (AFRC) and NSCR Catalysts.

13. That RKI Exploration & Production, LLC shall follow the testing requirements as follows for engines (ENG001-ENG002):

i. That every twelve (12) calendar months, the engines (ENG001-ENG002) shall be tested to verify compliance with the NO_x, CO and VOC limits set forth in this permit. 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. 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 the Division within forty-five (45) days of completing the tests.

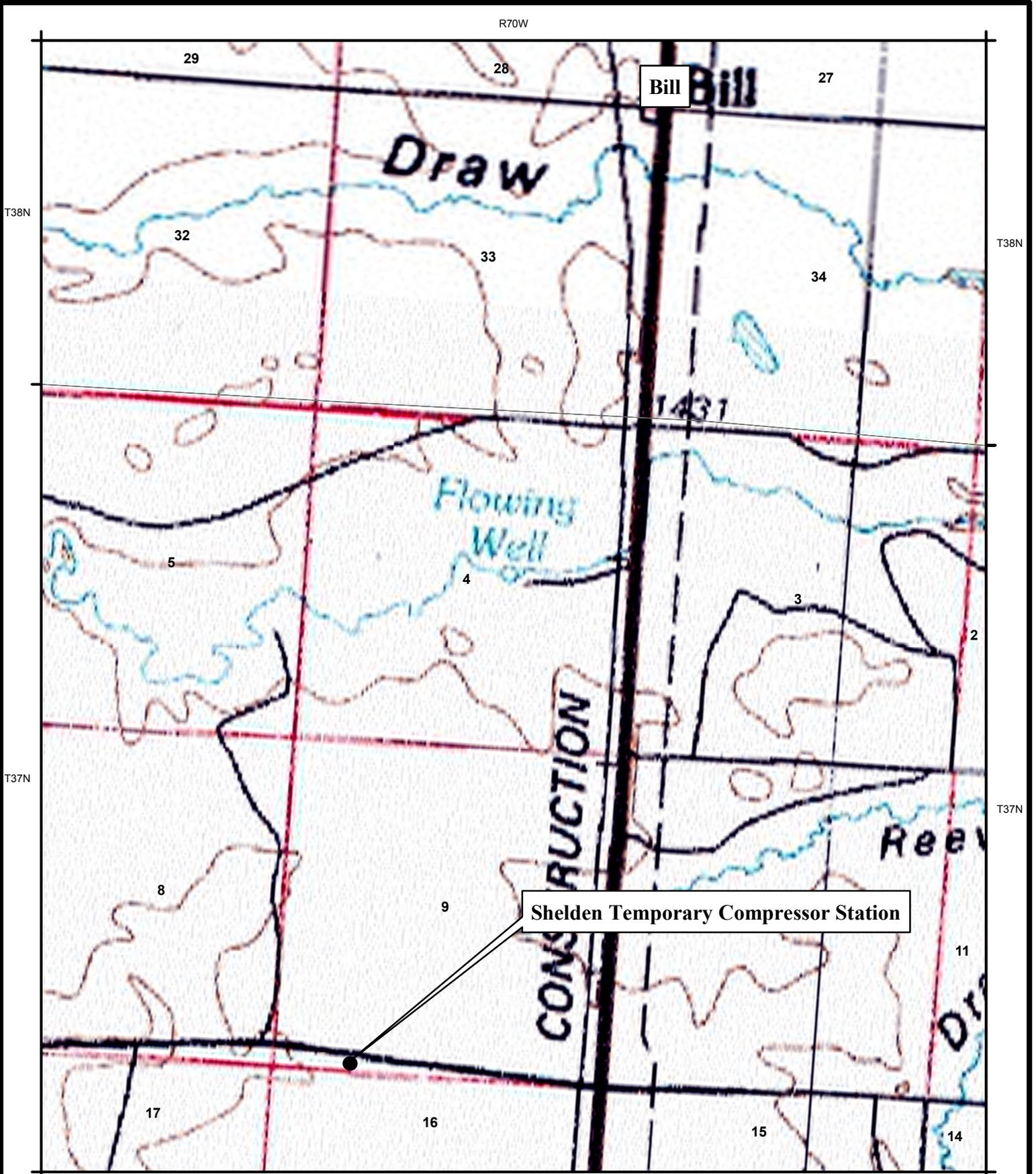
- ii. The Air Quality Division shall be notified within twenty-four (24) hours of any engine where the testing/monitoring required by (i) of this condition shows operation outside the permitted emission limits. By no later than seven (7) calendar days of such testing/monitoring event, the owner or operator 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) of this condition which shows noncompliance.
14. That RKI Exploration & Production, LLC shall follow the monitoring and maintenance requirements as follows for engines ENG001-ENG002 equipped with a NSCR 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
 - 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.
15. 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 14.
16. RKI Exploration & Production, LLC shall comply with all applicable requirements of 40 CFR part 60, subpart JJJJ.
17. RKI Exploration & Production, LLC shall comply with all applicable requirements of 40 CFR part 60, subpart OOOO.

18. RKI Exploration & Production, LLC shall comply with all applicable requirements of 40 CFR part 63, subpart ZZZZ.

Appendix A

Compressor Station Location



Shelden Temporary Compressor Station



RKI Exploration & Production, LLC
Shelden Temporary Compressor Station
 NW¼NW¼ of Section 16, T37N, R70W
 Converse County, Wyoming

