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February 1, 2013

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BUREAU OF AIR

Kansas Department of Health & Environment
Bureau of Air
1000 SW Jackson, Suite 310
Topeka, KS 66612-1366

Attention: Mr. Gerald McIntyre

Re: Kansas Municipal Energy Agency
Jameson Energy Center
Garden City, Kansas

SUBJECT: CONSTRUCTION PERMIT APPLICATION

Dear Mr. McIntyre:

Kansas Municipal Energy Agency (KMEA) is constructing an electric generating station in Garden City, Kansas to be named the Jameson Energy Center (JEC). The facility is to consist of five Siemens trailer-mounted SGT-400 combustion turbine generator sets and one black-start engine. This permit application is based upon limiting annual operations to levels below the thresholds which would trigger PSD.

The project has a critical schedule for completion before the end of 2013.

KMEA and their Design-Builder (Sega Inc.) will be contacting you for a meeting to review the application. Please contact Brian Petermann or Steven Babler at Sega Inc. at (913) 681-2881 if you have any questions.

Sincerely,

Robert L. Poehling
General Manager
Kansas Municipal Energy Agency

RP/kge

Kansas Municipal Energy Agency

KMEA
KANSAS MUNICIPAL ENERGY AGENCY

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Construction Permit Application
Jameson Energy Center
Garden City, Kansas

February 2013

Sega®
ENGINEERING & TECHNICAL SERVICES

Project No. 13-0016

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SECTION 1

INTRODUCTION

INTRODUCTION

This permit application is for an electric generating station to be built by the Kansas Municipal Energy Agency (KMEA) in Garden City, Kansas to be named the Jameson Energy Center (JEC). The facility is to consist of five Siemens trailer-mounted SGT-400 combustion turbine generator (CTG) sets and one black-start engine. The air emissions from this project will be limited to below major thresholds.

The goal of this project is to supply a new source of power to Garden City, Kansas for peaking operations. As a new source, KMEA is obtaining this construction permit in accordance with Kansas Air Quality Regulations (K.A.R.) 28-19-300. KMEA is permitting this facility as a minor stationary source by limiting annual fuel consumption for the CTGs and annual hours for the black-start engine. This approach limits emissions to levels below major source significance levels, eliminating the need for a major source permit.

The following appendices are attached to this Application:

1. The required KDHE forms can be found in Appendix A.
2. Emission calculations are presented in Appendix B.
3. A preliminary site drawing is in Appendix C.
4. CTG vendor performance and emission data is found in Appendix D.
5. Black-start engine vendor performance and emission data is found in Appendix E.
6. A proposed draft Kansas Department of Health and Environment (KDHE) permit can be found in Appendix F.

SECTION 2

PROJECT DESCRIPTION

PROJECT DESCRIPTION

KMEA seeks to install peaking capacity for direct interconnection into the Garden City, Kansas service grid. A preliminary site arrangement can be found in Appendix C. This facility will utilize five Siemens SGT-400 CTGs. The facility will also include one black-start engine generator limited to 500 hours of operation a year. A description of these sources can be found in *Figure 2.1 - Emission Source Summary.*

Emission ID	Description	Fuel	Annual Operation	Size[1]
EU-001	Siemens Combustion Turbine SGT-400	Natural Gas	1.518 MMSCF/Yr of Natural Gas Burned	12.3 MW (Gross)
EU-002	Siemens Combustion Turbine SGT-400	Natural Gas		12.3 MW (Gross)
EU-003	Siemens Combustion Turbine SGT-400	Natural Gas		12.3 MW (Gross)
EU-004	Siemens Combustion Turbine SGT-400	Natural Gas		12.3 MW (Gross)
EU-005	Siemens Combustion Turbine SGT-400	Natural Gas		12.3 MW (Gross)
EU-006	Caterpillar Black-Start Engine C15 DITA (or Equivalent)	Diesel	500 Hours of Operation	762 bhp

1. Amounts shown are maximum anticipated for site elevation over range of ambient condtions.

Figure 2.1 - Emission Source Summary

The CTGs and their auxiliary systems are permanently assembled onto over-the-road drop-axle truck trailers. The SGT-400 turbine uses six reverse-flow, cannular combustion chambers in Siemens' dry low NOx emission (DLE) combustion system. The DLE technology utilizes the "lean pre-mix" combustion process to minimize NOx formation.

Natural gas delivered to the site will be taken from a Black Hills Energy pipeline metering connection through a fuel gas conditioning skid on the site to remove particles and liquids before the gas is piped to each of the CTGs. The fuel gas supply pipeline will be extended onto the southwest corner of the site.

Siemens guarantees emissions rates for the CTGs firing natural gas. NOx emissions are guaranteed not to exceed 15 ppmvd, while carbon monoxide (CO) and unburned hydrocarbon (UHC) emissions are guaranteed not to exceed 10 ppmvd each. These guarantees are referenced to 15-percent oxygen and apply to full-load operation only. The turbine emissions will likely have emissions at or below these levels at lower operating loads so long as the combustion process remains in lean pre-mix DLE mode.

The black-start engine will meet the appropriate U.S. Environmental Protection Agency (EPA) Tier emission limit to be based on the date of engine manufacture. The emissions will be certified by the engine manufacturer.

SECTION 3

EMISSIONS CALCULATIONS

EMISSIONS CALCULATIONS

This section assesses the emission calculations and synthetic minor source strategy for the new JEC. This facility will consist of five Siemens model SGT-400 units and one black-start engine. The air quality emission limits that were evaluated include New Source Performance Standards (NSPS) and KDHE requirements.

Siemens has issued emissions guarantees for the CTGs for NOx, CO, and UHC. The SGT-400 model has DLE combustion technology which utilizes the "lean pre-mix" combustion process to minimize NOx formation. NOx emissions are guaranteed not to exceed 15 ppmvd, while CO and UHC emissions are guaranteed not to exceed 10 ppmvd each. These guarantees are referenced to 15-percent oxygen and apply to full-load operation only. Performance and emission data can be found in Appendix D. The emission factor for the CTGs can be found in *Figure 3.1 - Combustion Turbine Emission Factors.*

Pollution	Emission Factor (lb/MMBtu)	Source
NOx	0.066	Vendor[1]
CO	0.027	Vendor[2]
SO_2	0.0006	Acid Rain[3]
VOC	0.021	Vendor[4]
PM	0.007	AP42[5]
CO_{2e}	118.49	GHG[6]

1. Siemens data based on 15 ppmvd at 15-percent oxygen.
2. Siemens data based on 10 ppmvd at 15-percent oxygen.
3. EPA's Acid Rain Program default factor for pipeline quality natural gas.
4. Siemens data based on 10 ppmvd of UHC at 15-percent oxygen and 50 percent of UHC is VOC.
5. AP-42 Table 3.1-2a: Emission Factors for Criteria and GHG from Station Gas Turbines.
6. Greenhouse Gas Reporting Rule Factor for Natural Gas Combustion.

Figure 3.1 - Combustion Turbine Emission Factors

The black-start engine will meet the appropriate EPA emission limit to be based on the date of engine manufacture. For the emission calculations, Sega Inc. (Sega) conservatively assumes that they will meet Tier 2 standards per the vendor performance data supplied by Caterpillar (Appendix E). The engine performance and emission data, included in Appendix E, are based on meeting Tier 2 standards. The emissions will be guaranteed by the engine manufacturer, who has not yet been selected. The engine will be limited to 500 hrs/yr of operation.

Pollution	Emission Factor	Units	Source
NOx	5.74	g/hp-hr	Vendor[1]
CO	0.40	g/hp-hr	Vendor[1]
SO_2	0.0008	lb/MMBtu	Fuel[2]
VOC	0.01	g/hp-hr	Vendor[1]
PM	0.018	g/hp-hr	Vendor[1]
CO_{2e}	165	lb/MMBtu	GHG[3]

1. Caterpillar data based on Tier 2 emission standards.
2. Based on the diesel sulfur content limit of 15 ppm.
3. Greenhouse Gas Reporting Rule Factor for Diesel Combustion.

Figure 3.2 - Black-Start Engine Emission Factors

KMEA is permitting JEC as a "minor" new source by limiting annual natural gas fuel burned by the five combustion turbines and annual hours of operation of the black-start engine to avoid reaching "major" source thresholds. The major source threshold for the entire new facility is 250 tons/year for any pollutant regulated under the federal Prevention of Significant Deterioration (PSD) program. The EPA has extended the list of regulatory pollutants to include CO_{2e}, but its major source threshold is 100,000 tons/year.

Based on the emission factors in *Figure 3.1 - Combustion Turbine Emission Factors, Figure 3.2 - Black-Start Engine Emission Factors*, vendor data, and a conservative assumption of the heating value of natural gas, the five combustion turbines will be limited to 1,518 MMscf/yr of natural gas burned and the black-start engine operation will be limited to 500 hours/yr. The maximum annual emissions of the facility based on the annual limitations are found in *Figure 3.3 - Maximum Annual Emissions of Jameson Energy Center*. Backup calculations for these annual emissions can be found in Appendix B. Note that the calculations of CO_2e include emission of CO_2, CH_4, and N_2O from the combustion of natural gas by the CTGs and diesel fuel by the black-start engine.

There are no other appreciable sources of CO_2e such as SF_6. The electrical breaker equipment of the facility will be of the vacuum type and not contain SF_6.

Pollutant	TPY
NOx	58.2
CO	22.8
SO_2	0.5
VOC	17.8
PM	5.6
CO_{2e}	100,000
Based on 1,518 MMscf/yr of natural gas burned in Units EU-001 through EU-005 and 500 hours/hr of black-start engine (EU-006) operation.	

Figure 3.3 - Maximum Annual Emissions of Jameson Energy Center

SECTION 4

REGULATORY REVIEW

REGULATORY REVIEW

The project is potentially subject to various Federal and State air regulations. A regulatory review was performed to determine specific applicability of the various regulations. A summary of the review is provided below.

4.1 NEW SOURCE PERFORMANCE STANDARDS

4.1.1 New Source Performance Standards, Subpart KKKK - Standards of Performance for Stationary Combustion Turbines

The NSPS, Subpart KKKK applies to each stationary combustion turbine that commenced construction after February 18, 2005 and has a heat input at peak load greater than or equal to 10 MMBtu/hr, based on the higher heating value of the fuel. Therefore, EU-001 through EU-005 will be subject to Subpart KKKK.

Subpart KKKK establishes emission requirements for both NOx and SO_2. Per this rule, NOx emissions from each combustion turbine must not exceed 25 ppmvd measured at 15-percent oxygen (or 1.2 lb/MWh). The emission guarantee from the vendor is 15 ppmvd measured at 15-percent oxygen and can be found in Appendix D.

Subpart KKKK establishes emission monitoring requirements to demonstrate compliance with the applicable emission limits. To demonstrate compliance with the above NOx emission limit, JEC must conduct an initial stack emission test and do one of the following: perform annual emission performance tests[1], install a continuous emissions monitoring system (CEMS), or operate a continuous parameter monitoring system. KMEA is proposing to operate a continuous parameter monitoring system for each CTG by tracking whether the CTG is operating in the DLE mode and is, therefore, less than 25 ppm.

[1] If JEC elects to demonstrate compliance through emission performance tests, and the NOx emission results are less than or equal to 75 percent of the NOx emission limit for each combustion turbine (i.e., less than 18.75 ppmdv), the testing frequency may be reduced to once every two years.

Subpart KKKK establishes emission limits for SO_2 of 0.060 lb/MMBtu. JEC can comply with either emission or fuel standard limits. The facility will burn low sulfur pipeline quality natural gas, and meet the fuel standard limit. JEC will comply with the total sulfur content of the fuel by meeting the requirements of 40 CFR 60.4365(a) or (b) by using natural gas that has SO_2 emissions less than 0.060 lb/MMBtu.

4.1.2 New Source Performance Standards, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The NSPS, Subpart IIII applies to compression ignition internal combustion engines with a displacement of less than 30 liters per cylinder where the model year is 2007 or later. Therefore, EU-006 will be subject to Subpart IIII.

EU-006 will meet all applicable emission limitations established in 40 CFR 60.4201. The engine will be certified by the manufacturer to meet the applicable emission limitation based on the year of its manufacture.

JEC will meet the diesel fuel requirements established in 40 CFR 60.4207 and will purchase diesel that meets the requirements of 40 CFR 80.510(b) for non-road diesel fuel.

4.2 KANSAS AIR REGULATIONS

Several State regulations have been identified as potentially applicable to the Project. A review of each potentially applicable regulation is provided below.

4.2.1 Kansas Air Quality Regulation 28-19-300 - Construction Permits and Approvals; Applicability

This regulation requires that anyone who proposes to construct or modify a stationary source or emissions unit shall obtain a construction permit prior to commencing such operations. KMEA is applying for a construction permit pursuant to K.A.R. 28-19-300(a)(1) as the increase in NOx emissions exceeds 40 tpy. Major source PSD regulations do not apply since the emissions are less than all major source trigger thresholds.

4.2.2 Kansas Air Quality Regulation 28-19-500 - Operating Permit; Applicability

JEC will obtain a Class II operating permit in accordance with K.A.R. 28-19-540. In accordance with the regulatory schedule, the application for this operating permit will be submitted within one year of the commencement of operation.

4.2.3 Kansas Air Quality Regulation 28-19-650 - Emissions Opacity Limits

The opacity from any emission source at JEC may not exceed 20 percent.

4.3 ACID RAIN

4.3.1 40 CFR, Part 72, Subpart A

The combustion turbines will meet the requirements of the new unit exemption (40 CFR 72.7(a)) and therefore will not be subject to the Acid Rain Rule. In accordance with the applicable acid rain regulations, JEC will submit the new unit exemption form by December 31 of the first year for which the units are to be exempt.