

**RELIANT ENERGY POWER GENERATION, INC.**  
**PEAKING POWER PLANT, SIGEL, ILLINOIS**

**PROJECT SUMMARY**

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**I. INTRODUCTION**

Reliant Energy Power Generation, Inc. has proposed to construct an electrical generation facility near the Sigel. The facility would use eight turbines to generate up to 328 MW of electricity. The construction of the proposed facility requires a permit because of its associated air emissions.

**II. PROJECT DESCRIPTION**

The proposed project will include eight combustion turbines fired with natural gas. The turbines would be used in a simple cycle configuration, with all power produced by a generator connected to the shaft of the turbine. This facility is designed to function as a peaking station, to generate electricity in the peak demand periods, and at other times when other power plants are not available due to scheduled or unexpected outages. Operations of the facility may occur throughout the year, although the facility is expected to run primarily in the summer months.

Emissions of carbon monoxide (CO), nitrogen oxide (NO<sub>x</sub>), particulate matter/particulate matter <10 microns (PM/PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>) and volatile organic material (VOM) result from the combustion of fuel.

The principal air contaminants emitted from the proposed turbine are NO<sub>x</sub> and CO. NO<sub>x</sub> can be formed thermally by combination of oxygen and nitrogen in the air at the temperatures at which fuel is burned. Thermal NO<sub>x</sub> is formed during the operation of all common high temperature combustion processes. NO<sub>x</sub> can also be formed from the combination of any nitrogen in the fuel with ambient air oxygen component. This is not significant for burning of natural gas, which contains trace amounts of nitrogen. Factors affecting NO<sub>x</sub> formation from a turbine include design, ambient conditions, turbine load and fuel types. The nitrogen oxide (NO<sub>x</sub>) emissions from the proposed turbine will be controlled with water injection into the combustors. Water injection lowers NO<sub>x</sub> formation by lowering the combustion flame temperature.

CO is formed by the incomplete combustion of fuel. CO is associated with most combustion processes and is found in measurable amounts in turbine exhaust. VOM and PM/PM<sub>10</sub> are also emitted as a result of incomplete combustion of fuel. SO<sub>2</sub> is found only in trace amounts from combustion of natural gas.

CO and VOM are controlled by providing adequate fuel residence time and high temperature in combustion zone to ensure complete combustion. PM/PM<sub>10</sub> are controlled by proper combustion control and firing natural gas fuel which has negligible ash content.

**III. PROJECT EMISSIONS**

The total annual emissions from the combustion turbines are limited to 198 tons of NO<sub>x</sub>, 198 tons of CO, 24.8 tons of PM, 1.3 tons of SO<sub>2</sub> and 4.4 tons of VOM. These limits are based on the manufacturer's experience with similar equipment and the potential utilization of the generation

system. Actual emissions will be less than the maximum emissions, depending on actual utilization and performance.

#### **IV. APPLICABLE REGULATIONS**

All emission sources in Illinois must comply with the Illinois Pollution Control Board emission standards. The Board's emission standards represent the basic requirements for sources in Illinois. The proposed project will readily comply with applicable state and federal emission standards, including the Illinois Air Pollution Control Board emission standards and regulations (35 Ill. Adm. Code: Subtitle B).

This project is also subject to the federal New Source Performance Standards (NSPS), 40 CFR 60 Subpart GG, for Stationary Gas Turbines. The Illinois EPA is administering NSPS in Illinois on behalf of the United States EPA under a delegation agreement. This standard addresses NO<sub>x</sub> emissions from gas turbines, limiting NO<sub>x</sub> emissions to 75 ppm<sub>dv</sub>, adjusted for actual turbine efficiency. The project should also readily comply with the applicable requirements of these standards. The application indicates NO<sub>x</sub> emissions of 25 ppm<sub>dv</sub>.

#### **V. APPLICABILITY OF PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY (PSD) RULES AND MAJOR STATIONARY SOURCE CONSTRUCTION AND MODIFICATION (MSSCAM)**

This project is not considered a major project pursuant to PSD. This is because the total emissions from the operation of this facility, as limited by the permit would be less than major source thresholds for PSD, i.e., nitrogen oxides, sulfur dioxide, carbon monoxide, and particulate matter are limited to less than 250 tons/year.

#### **VI. PROPOSED PERMIT**

The conditions of the proposed permit for the facility contain limitations and requirements for the turbines to assure that the facility's emission will be less than the major source threshold (i.e. 250 tons/year for NO<sub>x</sub>, CO, PM, SO<sub>2</sub> and VOM). The permit also establishes appropriate compliance procedures, including inspection practices, recordkeeping requirements, monitoring requirements and reporting requirements.

The proposed permit includes enforceable limits on emissions, operation and fuel consumption to assure that the project remains below the level of major source applicability. A continuous emissions monitoring system and fuel monitoring is required for the turbines to confirm actual levels of operation and compliance with applicable limits.

#### **VII. REQUEST FOR COMMENTS**

It is the Illinois EPA's preliminary determination that the proposed permit meet all applicable state and federal air pollution control requirements. The Illinois EPA is therefore proposing to issue this permit.

Comments are requested on this proposed action by the Illinois EPA and the proposed conditions of the draft permit.