

Illinois Environmental Protection Agency
Bureau of Air, Permit Section
Springfield, Illinois

Project Summary for a
Construction Permit Application
from Power Ventures Group LLC
for a Natural Gas-Fired Power Facility
near Garden Prairie, Illinois

Site Identification No.: 007808AAC
Application No.: 09050009
Date Received: May 6, 2009

Schedule

Public Comment Period Begins: March 14, 2012
Public Comment Period Closes: April 13, 2012

Illinois EPA Contacts

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I. INTRODUCTION

Power Ventures Group, LLC (Power Ventures) has proposed to construct an electrical power facility near the town of Garden Prairie in Boone County. The facility would have 12 natural gas-fired engines to generate up to 112 MW of electricity. The construction of the proposed facility requires a permit from the Illinois EPA because of its air emissions.

The Illinois EPA has reviewed Power Ventures' application and made a preliminary determination that the application meets applicable requirements. Accordingly, the Illinois EPA has prepared a draft construction permit that it would propose to issue for the proposed facility. However, before issuing this permit, the Illinois EPA is holding a public comment period to receive comments on the proposed issuance of the permit and the terms and conditions of the draft permit.

II. PROJECT DESCRIPTION

The proposed facility will include 12 natural gas-fired internal combustion engines driving electrical generators. This facility would be developed as a source of reserve power for operators of wind turbine power plants, to enable them to meet contractual obligations during periods of low or variable winds. This facility would also be able 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. Emissions of carbon dioxide (CO₂), carbon monoxide (CO), nitrogen oxide (NO_x), particulate matter/particulate matter <10 microns (PM/PM₁₀), sulfur dioxide (SO₂) and volatile organic material (VOM) would result from the combustion of fuel in the engines.

Aside from greenhouse gases, the principal air contaminants emitted from the proposed engines would be CO, VOC and NO_x. NO_x can be formed thermally by combination of oxygen and nitrogen in the air at the temperatures at which fuel is burned. Thermal NO_x is formed during the operation of all common high temperature combustion processes including engines. NO_x can also be formed from the combination of any nitrogen in the fuel with oxygen, but this is not relevant for burning of natural gas, which contains minimal amounts of nitrogen. Factors affecting NO_x formation from an engine include design, ambient conditions, load, and fuel types. The NO_x emissions from the proposed engines will be controlled with selective catalytic reduction. SCR lowers NO_x formation by injecting ammonia or urea into the flue gases and converting a portion of the NO_x into nitrogen in the presence of a catalyst. CO is formed by the incomplete combustion of fuel. CO is associated with most combustion processes and is found in measurable amounts in engine exhaust. VOM and PM/PM₁₀ are also emitted as a result of incomplete combustion of fuel. CO and VOM are controlled by providing adequate fuel residence time and high temperature in the combustion zone to ensure complete combustion. PM/PM₁₀ is controlled by proper combustion control and firing natural gas fuel, which has negligible ash content. SO₂ is found only in trace amounts from combustion of natural gas.

Greenhouse gases (GHG), most notably, carbon dioxide (CO₂), and to a lesser extent, methane and N₂O, are combustion products from the combustion of natural gas. Carbon dioxide comprises the bulk of the greenhouse gases because of the carbon in the natural gas fuel. Virtually all of the natural gas fuel will be combusted but a very negligible amount will be emitted as methane, a greenhouse gas with over 20 times the amount of global warming potential as CO₂. One of the speciated NO_x byproducts of combustion will be

N₂O, another contributor to greenhouse gases. This will also have a small contribution to greenhouse gas emissions, relative to the emissions of CO₂.

III. PROJECT EMISSIONS

The annual emissions from the facility would be limited to 29.7 tons of NO_x, 47.6 tons of CO, 19.2 tons of PM/PM₁₀, 35.7 tons of VOM and 99,639 tons of greenhouse gases (as CO₂e, or CO₂ equivalents). These limits are based on the hourly emission rates provided by the manufacturer of the engines, which reflects its experience with similar equipment, and the permitted operation of the engines as proposed by Power Ventures in the application¹. Actual emissions will be less than the maximum emissions, depending on actual performance of the engines and their utilization.

IV. APPLICABLE EMISSION STANDARDS

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

The natural gas-fired engines are also subject to the federal New Source Performance Standards (NSPS), 40 CFR 60 Subpart JJJJ, for Stationary Spark Ignition Internal Combustion Engines. The emergency diesel engines are subject to the NSPS for Compression Ignition Internal Combustion Engines, 40 CFR 60, Subpart IIII. The Illinois EPA is administering NSPS in Illinois on behalf of the United States EPA under a delegation agreement. The project should also readily comply with the applicable requirements of these standards.

V. APPLICABLE REGULATORY PROGRAMS

Prevention of Significant Deterioration (PSD)

This proposed facility will not be a major project for purposes of the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. This is because the potential emissions of pollutants, other than greenhouse gases, from the facility will be less than 250 tons per year for each applicable NSR pollutant². In addition, emissions of greenhouse gases will be less than 100,000 tons per year, so that PSD will not apply to this pollutant.

Trading Programs for SO₂ and NO_x

The proposed gas-fired engines will be exempt new units for purposes of Title IV of the Clean Air Act (Acid Deposition), and the regulations promulgated thereunder because (1) they will not use coal or a coal-derived fuel and (2) the fuel will have a sulfur content no greater than 0.05 percent, on an annual average.

¹ The operation of all 12 natural gas-fired engines combined will not exceed 18,200 engine-hours per year.

² The facility is not in one of the 28 listed categories of source for which the major source threshold is the potential to emit 100 tons per year or more.

Likewise, the engines will not be subject to the NO_x Trading Program for Illinois' version of the Clean Air Trading Rule, 35 IAC Part 225, Subparts C, D and E, because the nameplate capacity of each generator will not exceed 25 MW and the engines do not qualify as cogeneration units.

Clean Air Act Permit Program (CAAPP)

At the present time, the proposed facility would not be considered a major source under Illinois' Clean Air Act Permit Program (CAAPP) pursuant to Title V of the Clean Air Act. This is because it would have permitted emissions for pollutants other than GHG that are less than 100 tons per year, and permitted GHG emissions that are less than 100,000 tons of CO_{2e} per year, making it a non-major source under the CAAPP program.

VI. AIR QUALITY IMPACTS

With its application, Power Ventures submitted an air quality impact analysis for NO_x, CO, SO₂, and PM. The analysis shows that the proposed facility would not significantly affect ambient air quality in the vicinity of the facility.

The projected air quality impacts of the proposed facility for PM₁₀ (24-hour), NO_x (1-hour and annual), SO₂ (1-hour and 3-hour) and CO (1-hour and 8-hour) will not be significant. For PM_{2.5}, the maximum modeled concentration of 34.19 µg/m³ will be slightly less than the National Ambient Air Quality Standard concentration of 35 µg/m³ (24-hour) when including the existing background concentration of 17.6 µg/m³. The modeled plus background annual PM_{2.5} concentration of 10.86 will be much less than the NAAQS concentration of 15.0 µg/m³.

VII. DRAFT PERMIT

The Illinois EPA has prepared a draft of the construction permit that it would propose to issue for this facility. The conditions of the permit for the facility set forth the air pollution control requirements that the project must meet. These requirements include the applicable emission standards that apply to the project. They also include the measures that must be used and the emission limits that must be met for emissions of different regulated pollutants from the project.

The conditions of the draft permit for the facility contain limitations and requirements for the engines to help assure that the facility complies with applicable regulatory requirements. The proposed permit includes enforceable limits on emissions, operation and fuel usage for the facility to ensure that it remains below the levels at which it would be considered major for PSD (i.e. 250 tons/year for NO_x, CO, PM, VOM and SO₂ and 100,000 tons/year for CO_{2e}). The permit also establishes appropriate compliance procedures for the facility, including requirements for emission testing, monitoring, recordkeeping and reporting. Continuous fuel monitoring is required for the engines to confirm actual levels of operation. Emission testing is required as part of the shakedown of the engines. These measures are imposed to assure that the operation and emissions of the source are appropriately tracked to confirm compliance with the various limitations and requirements established for individual emission units.

VIII. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the application for the proposed facility meets all applicable state and federal air pollution control requirements, subject to the conditions in the draft permit. Comments are requested on this proposed action by the Illinois EPA and the conditions of the draft permit.