

Illinois Environmental Protection Agency
Bureau of Air, Permit Section
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Project Summary
For a Construction Permit Application
From Invenergy Nelson, LLC
For Combined Cycle Power Plant For
Nelson Generation Facility, Nelson, Lee County

Site Identification No.: 103814AAC

Application No.: 98080039

Date Received: January 18, 2005

Schedule

Public Comment Period Begins: February 16, 2008

Public Comment Period Closes: March 17, 2008

Illinois EPA Contacts

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I. INTRODUCTION

Invenergy Nelson, LLC (Invenergy) has requested a construction permit to complete construction of two combined cycle gas turbines for its Nelson Generation facility. The facility would be developed by completing construction of two "combined cycle" combustion turbines (CT) equipped with heat recovery steam generators (HRSG).

Invenergy must obtain an air pollution control construction permit from the Illinois EPA for the proposed facility because it would be a source of emissions. The Illinois EPA has reviewed Invenergy's application and made a preliminary determination that the application for the facility meets applicable requirements. Accordingly, the Illinois EPA has prepared a draft of the construction permit that it would propose to issue for the facility. The Illinois EPA has also prepared a draft Acid Rain Permit to address requirements under the federal Acid Rain program and draft Clean Air Act Interstate Rule (CAIR) permit to address CAIR trading programs for the plant. However, before issuing these permits, the Illinois EPA is holding a public comment period to receive comments on the proposed issuance of permits and the terms and conditions of the draft permits.

II. PROJECT DESCRIPTION

The proposed facility would be developed by completing construction of two combined cycle turbines on which LSP-Nelson Energy started construction. LSP-Nelson Energy was issued a PSD Construction Permit for a facility that would have included four "combined cycle" gas turbines. However, LSP-Nelson Energy did not complete construction of the facility because of financial difficulties, which eventually resulted in LSP-Nelson entering bankruptcy. LSP-Nelson submitted information indicating that before construction activity ceased, substantial work was completed on the facility and the individual units. Construction of the foundations and infrastructure for all four units and physical installation of one turbine were completed. Construction of all four HRSGs, in which the required selective catalytic reduction (SCR) systems for control of emissions of nitrogen oxides (NO_x) would be located, were also completed.

Natural gas would be used to fire the two combined-cycle combustion turbines and the associated duct burners to produce electricity. As combined-cycle turbines, the turbines are followed by heat recovery steam generators, which produce steam from the hot exhaust from the turbines to produce electric power. The exhaust from each turbine and heat recovery steam generator pair is vented to the atmosphere through 160 foot high stacks. Emissions from the CT/HRSG are controlled or minimized by using good combustion practices, low-NO_x combustors, and add-on selective catalytic reduction (SCR) systems.

Other emission units at the proposed plant would include: cooling towers; fuel heater, natural gas fired space heaters, backup diesel fire pump, and diesel engines for backup and emergency power for the plant.

Based on developments during the design and construction of the facility, Invenergy has requested several changes comparing with the original permit issued to LSP-Nelson for the facility, including: (1)

The scope of the facility is only two units, rather than four units with lower permitted emissions that reflect only two units. (2) The generating units utilize natural gas as their only fuel including duct burners (supplemental firing) to generate additional heat in the HRSG's. (3) Provisions for operation of the turbines as simple cycle units are not present and only combined cycle operation of the units is addressed. (4) Provisions are present to specifically address periodic tuning of the units and power augmentation with steam.

III. FACILITY EMISSIONS

The potential emissions of the facility are listed below. Potential emissions are calculated based on continuous operation at the maximum hourly emission rate. The principal emission units at the facility are the two combustion turbines and associated heat recovery steam turbine generators. Actual emissions of the facility will be less to the extent that the turbines would not operate continuously at its maximum capacity. At this time, similar natural gas fired electric power facilities operate at less than 25 percent of the time.

Pollutant	Permitted Emissions (Tons/year)
CO	405.9
NO _x	361.4
PM/PM ₁₀	246.3
VOM	65.3
SO ₂	122.0

IV. APPLICABLE EMISSIONS STANDARDS

All emission units in Illinois must comply with state emission standards adopted by the Pollution Control Board. The state's emission standards represent the basic requirements for sources in Illinois. The various emission units in the proposed plant should readily comply with applicable state standards.

The combustion turbines and associated heat recovery steam generators would subject to federal New Source Performance Standards (NSPS) for electric utility steam generating units, 40 CFR 60, Subpart Da. This NSPS sets emission limits for nitrogen oxides, sulfur dioxide, particulate matter, as well as opacity, from the units. The combustion turbines are also subject to NSPS for gas turbines, 40 CFR 60, Subpart GG.

V. OTHER APPLICABLE REGULATIONS

A. Prevention of Significant Deterioration (PSD)

The facility would be a major new source subject to the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. The facility would be major for emissions of NO_x, SO₂, PM and CO with potential annual emissions of more than 100 tons for each of these pollutants. Under the PSD rules, once a proposed source is major for any PSD pollutant, all PSD pollutants whose potential emissions are above the specified significant emission rates in 40 CFR 52.21(b)(23) are also subject to PSD review. Therefore, the facility is also subject

to PSD review for VOM, with potential annual emissions that are greater than the significant emission rate of 40 tons.

Under the PSD rules, an applicant for a permit must demonstrate that Best Available Control Technology (BACT) will be used to control emissions of pollutants subject to PSD. Invenergy has provided a BACT demonstration in its application addressing emissions of pollutants that are subject to PSD, i.e., NO_x, CO, SO₂, VOM and PM.

B. Acid Rain Program

The proposed plant is an affected source and the two combustion turbines/heat recovery steam generators are affected units for Acid Deposition: Title IV of the Clean Air Act, and regulations promulgated thereunder. These provisions establish requirements for affected sources related to control of emissions of SO₂ and NO_x, pollutants that contribute to acid rain. Under the Acid Rain program, Invenergy would have to hold SO₂ allowances for the actual SO₂ emissions from the affected units. Effectively, the Acid Rain program requires reductions in SO₂ emissions from existing coal-fired power plants elsewhere in the United States. This is because the number of SO₂ allowances issued by USEPA to coal-fired power plants annually is fixed, to meet the SO₂ emission target set by the federal Clean Air Act as related to acid rain. Another requirement of the Acid Rain program is to operate pursuant to an Acid Rain permit. The Illinois EPA is proposing to issue the initial Acid Rain permit for the proposed plant in conjunction with issuance of the construction permit for the plant.

C. Clean Air Interstate Rule (CAIR)

Combustion turbines used to produce electricity generally qualify as Electrical Generating Units (EGU) for purposes of the NO_x and SO₂ Allowance Programs for Electrical Generating Units - Clean Air Interstate Rules (CAIR), 35 IAC Part 225, Subparts C, D, and E. As EGU, the Permittee would have to hold allowances for the NO_x and SO₂ emissions of the CT/HRSGs during each calendar year and seasonal control period (NO_x only). Another requirement of the CAIR program is to operate pursuant to a CAIR permit. The Illinois EPA is proposing to issue the initial CAIR permit for the EGUs proposed at the plant in conjunction with issuance of the construction permit for the plant.

D. Clean Air Act Permit Program (CAAPP)

This plant would 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 the plant would be a major source for purposes of the CAAPP because it is a major source for purposes of the above regulatory programs, most notably PSD. Invenergy would have to apply for its CAAPP permit within 12 months after initial startup of the plant.

VI. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

BACT is defined as an emission limitation based on the maximum degree of pollution reduction determined on a case-by-case basis considering technical, economic, energy and environmental considerations.

As determined by Illinois EPA, BACT will include use of dry low-NO_x combustors on the CTs and SCR in the HRSGs. While firing natural gas only, the CT/HRSGs will meet a maximum NO_x emission rate of 4.5 ppmvd at 15% oxygen on an hourly average, other than during periods of startup, malfunction, shutdown or periodic tuning. These practices represent a stringent level of control for NO_x that is consistent with the design and capabilities of the CTs and SCRs installed by LSP Nelson.

The proposed facility will employ good combustion control for emissions of VOM and CO.

Use of natural gas and good combustion practices will be used at the facility to minimize emissions of PM/PM₁₀ and SO₂.

The cooling towers at the proposed facility must be equipped with high efficiency drift eliminators to minimize loss of water droplets from the cooling towers and associated PM/PM₁₀ emissions.

VII. AIR QUALITY ANALYSIS

The air quality analysis submitted by Invenergy and reviewed by the Illinois EPA shows that the proposed project will not cause violations of the ambient air quality standard for NO_x, CO, SO₂, and PM/PM₁₀. The air quality analysis shows compliance with the allowable increment levels established under the PSD regulations. The analysis shows air quality impacts that are not considered significant.

An analysis was also conducted for the impact of the facility's VOM emissions on ozone air quality using a conservative screening technique developed by USEPA. The analysis showed that the project should not cause a violation of the ozone air quality standard. This screening methodology predicts increases in 1-hour ozone concentrations from a proposed VOC emissions increase. The Illinois EPA requires that 1-hour ozone impacts be used to address the 8-hour ozone NAAQS as an interim approach until an equivalent methodology is developed for this purpose. The screening tables are conservative in its assumptions concerning baseline conditions for VOC and NO_x emissions from the sources under evaluation. As recommended by Illinois EPA, Invenergy used this approach in calculating a maximum ozone concentration for the surrounding area.

Based on Invenergy's analysis, the 1-hour ozone concentration resulting from the proposed emissions from the facility was 0.012 ppm. Adding a 1-hour background concentration of 0.081 ppm yields a total 1-hour ozone concentration of 0.093 ppm. The background concentration was obtained from Illinois EPA's ambient ozone monitor located in Rockford based on the fourth highest concentration in three years (2004-2006). Since the total concentration of 0.098 ppm is below the NAAQS 1-hour ozone threshold of 0.120 ppm, Invenergy's proposed emissions will not jeopardize the ozone NAAQS.

VIII. DRAFT PERMIT

The Illinois EPA has prepared a draft of the construction permit that it would propose to issue for the plant. The permit is intended to identify the applicable rules governing emissions from the plant and to set limitations on those emissions. The permit is also intended to establish appropriate compliance procedures to accompany those requirements, including requirements for emissions testing, continuous emissions monitoring, recordkeeping, and reporting.

IX. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the proposed permit meets all applicable state and federal air pollution control requirements. The Illinois EPA is therefore proposing to issue a revised construction permit for the facility.

Comments are requested on this proposed action by the Illinois EPA and the proposed conditions on the draft permit. If substantial public interest is shown in this matter, the Illinois EPA will consider holding a public hearing in accordance with 35 Ill. Adm. Code Part 166.