

Illinois Environmental Protection Agency
Bureau of Air, Permit Section
1021 N. Grand Avenue East
Springfield, Illinois 62794-9276

Project Summary for a
Construction Permit Application
from BioPro Rock Falls LLC
for a Biomass-Fired Power Plant
in Rock Falls, Illinois

Site Identification No.: 195045ABM
Application No.: 08110007
Date Received: November 9, 2008

Schedule

Public Comment Period Begins: July 30, 2009
Public Comment Period Closes: August 30, 2009

Illinois EPA Contacts

Permit Analyst: Bob Smet
Community Relations Coordinator: Brad Frost

I. INTRODUCTION

BioPro Rock Falls LLC ("BioPro") has proposed to construct a biomass-fired power plant at 1902 McNeil Road in Rock Falls. The plant would generate up to 25 MW of electricity to be sent to the grid. The project requires a permit from the Illinois EPA because of its emissions.

The Illinois EPA has reviewed BioPro's 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 power plant. 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 plant would have one boiler. The steam from the boiler would be sent to a turbine generator to produce electricity. The maximum nominal heat input capacity of the boiler will be 338 million Btu per hour. The boiler would be designed to fire corn stover supplied from farms in the area surrounding the plant. Natural gas will be used as the auxiliary fuel for the boiler.

Corn stover is the dry stalks and leaves of the corn plant and the corn cobs, which remain after the grain has been harvested. Corn stover can be harvested by a separate collection of corn stover in a second pass over the field. Bales of corn stover will be transported to the plant by trucks. While the boiler's principal biomass fuel will be corn stover, the boiler would be allowed to fire other vegetative biomass fuels, such as switchgrass or miscanthus grass. BioPro has not proposed to burn wood fuel in the boiler.

The boiler would be a source of emissions of particulate matter (PM), nitrogen oxides (NO_x), sulfur dioxide (SO₂), carbon monoxide (CO) and volatile organic material (VOM). To control emissions, various techniques and add-on controls equipment would be used, including a selective non-catalytic reduction (SNCR) system, sorbent injection and an electrostatic precipitator.

The formation of NO_x will be minimized by low NO_x burners and overfire air (OFA) which are approaches for mixing fuel and air in a way that reduces the peak gas temperatures and peak oxygen concentrations. The initial combustion zone is operated with low oxygen levels (fuel rich) to enable most combustion to occur under conditions where NO_x formation is suppressed. Combustion is then completed by providing the remainder of the oxygen needed for complete fuel oxidation. Low NO_x burners control the mixing of fuel and air in a pattern that keeps the flame temperature low and dissipates the heat quickly. Overfire air involves operating the lower burners as fuel rich and placing air injection nozzles above the burners to complete the combustion process.

A selective non-catalytic reduction (SNCR) system would be used to control NO_x that is formed. In an SNCR system, ammonia or urea is injected into the flue gases at a point where reactions leading to the reduction of NO_x can occur (at gas temperatures greater than 1550°F). These reactions are completed within the boiler, and no waste products are generated.

Emissions of particulate matter would be controlled by an electrostatic precipitator (ESP). ESPs apply an electrical charge to particles in the flue gas. The charged particles move toward the grounded collection plates, where

they accumulate. Electrostatic precipitators can have high efficiencies due to the strong electrical forces applied to the small particles.

The sorbent injection system would control emissions of SO₂ by injecting trona (sodium sesquicarbonate) into the flue gas upstream of the electrostatic precipitator. This will provide a moderate level of SO₂ control. This technology can remove significant levels of hydrogen chloride as well.

Carbon monoxide (CO) and volatile organic material (VOM) emissions are a result of incomplete combustion of fuel. A properly designed and operated boiler effectively functions as a thermal oxidizer. The boiler will be operated with good combustion practices to minimize emissions of CO and VOM.

This project also includes fuel and bulk material storage, processing and handling facilities for the boiler. Control of particulate matter (PM) will be by work practices and by baghouses. Fugitive dust and particulate matter emissions are also generated by vehicle traffic and wind blown dust on roadways, parking lots and other open areas at the plant. These emissions would be minimized by implementation of a fugitive dust control program as well as pavement of roadways area for the plant.

III. PROJECT EMISSIONS

The potential or permitted annual emissions of the proposed plant, as would be allowed by the draft permit, are summarized below. Actual emissions will be less than the permitted emissions to the extent that the proposed plant would operate at less than its maximum capacity and control equipment normally operates to achieve emission rates that are lower than the applicable standards and limitations.

Permitted Annual Emissions of the Plant (Tons/Year)

<u>PM*</u>	<u>NO_x</u>	<u>SO₂</u>	<u>CO</u>	<u>VOM</u>
45.3	240.0	59.2	240.0	25.2

*Filterable particulate matter

IV. APPLICABLE EMISSION STANDARDS

The application shows that the proposed plant will readily comply with applicable state and federal emission standards, including the emission standards and regulations of the State of Illinois (35 IAC Subtitle B) and applicable federal emission standards adopted by the United States EPA (40 CFR Parts 60)¹.

Potential emissions of hazardous air pollutant (HAP) from the proposed plant would be less than 25 tons per year in the aggregate and less than 10 tons per year for any single HAP. Specifically, emissions of hydrogen chloride (HCl), the HAP of greatest concern, will not exceed 9.9 tons per year. As a consequence, National Emission Standards for Hazardous Air Pollutants are not applicable to the various emissions units at the plant.

¹The proposed boiler would not be subject to any emission standards pursuant to the NSPS. However, it would be required to use good air pollution control practices to minimize emissions pursuant to 40 CFR 60.11(d).

V. APPLICABILITY OF STATUTORY AND REGULATORY PROGRAMS

Prevention of Significant Deterioration (PSD)

This proposed plant 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 (1) because the potential emissions of the plant will be less than 250 tons per year for each NSR pollutant. The plant 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. This is because the primary fuel fired in the boiler, biomass, is not a fossil fuel. The capacity of the auxiliary natural gas burner will be no greater than 73.0 mmBtu/hr, well below the applicability level of 250 mmBtu/hr, at which the PSD applicability threshold for a major source would be 100 tons per year.

Trading Programs for SO₂ and NO_x

The proposed boiler will not be an affected source for purposes of Title IV of the Clean Air Act (Acid Deposition), and the regulations promulgated thereunder because (1) the biomass boiler will not produce over 25 MW of electricity that can be sent to the grid, (2) the boiler will not use coal or a coal-derived fuel, and (3) the fuel will have a sulfur content no greater than 0.05 percent, on an annual average.

Likewise, the boiler will not be subject to the NO_x Trading Program for Illinois' version of the Clean Air Interstate Rule, 35 IAC Part 225, Subparts C, D and E. This is because the nameplate capacity of the generator will not exceed 25 MW and the boiler does not qualify as a cogeneration unit.

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 it would have permitted NO_x and CO emissions of more than 100 tons per year, making it a major source under the CAAPP program.

Pollution Control Facility

The plant will not be a pollution control facility and will not require local siting approval pursuant to Section 39.2 of Illinois' Environmental Protection Act. The suppliers of corn stover or other biomass fuel to the plant would be required to provide only clean fuel to the plant. No mixed biomass material streams are allowed to be processed as fuel at the plant.

VI. DRAFT PERMIT

The Illinois EPA has prepared a draft of the construction permit that it would propose to issue for this project. The conditions of the permit for the plant 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 permit also establishes enforceable limitations on the amount of emissions for which the project is permitted. In addition, to limit annual emissions, the permit includes short-term emission limitations and operational limitations, as needed to provide practical enforceability of the annual emission limitations. As previously noted, actual emissions associated with the project would be less than the permitted emissions to the extent that the plant operates at less than capacity and control equipment normally operates to achieve emission rates that are lower than the applicable standards and limitations.

The permit also establishes appropriate compliance procedures for the ongoing operation of emission units, including requirements for emission testing, required work practices, emissions monitoring (for NOx, CO and opacity), recordkeeping, and reporting. 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.

In particular, for the biomass fuel, BioPro must implement procedures to ensure that only clean biomass fuel is accepted, that is, the biomass fuel is free of foreign matter and contaminants. It must also keep records listing its sources of biomass fuel and detailed records of fuel that must be rejected.

VII. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the draft permit would meet 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.