

Illinois Environmental Protection Agency
Bureau of Air, Permit Section
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Project Summary
For a Construction Permit Application
From Eastern Illinois University
For a Renewable Energy Center

Site Identification No.: 029010AAK
Application No.: 09070002
Date Received: July 1, 2009

Schedule

Public Comment Period Begins: September 30, 2009
Public Comment Period Closes: October 30, 2009

Illinois EPA Contacts

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I. INTRODUCTION

Eastern Illinois University (EIU) has applied for a construction permit for a new Renewable Energy Center (REC) to supply steam for heating and cooling university buildings. This new facility is being developed to use wood chips as its principal fuel. This new facility would replace EIU's existing steam plant that uses coal as its principal fuel.

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

II. PROJECT DESCRIPTION

The new REC facility will have two biomass gasifier-boiler systems that will be designed to use chipped wood and bark as fuel. The wood fuel would be virgin material, which is expected to be obtained from forestry, lumber production and tree trimming operations. The gasifiers will also be capable of using other biomass fuels such as switchgrass, miscanthus, wheat straws, corn stover (leaves, stalks, and cobs), dried grain pellets, and other agri-fuels. Other emission units at the new facility would include two natural gas/oil fired backup boilers, biomass storage and handling, ash handling, and ancillary equipment.

The first part of each gasifier-boiler system, the gasifier, will process biomass fuel or feedstock to produce a hot fuel gas. This fuel gas will be mixed with additional air and combustion will be carried to completion in a separate combustion chamber. The hot combustion gases will pass to a boiler in which the thermal energy of the hot gases will be recovered as steam.

The gasifier boiler systems would emit particulate matter (PM), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic material (VOM) and sulfur dioxide (SO₂). PM emissions from the gasifier-boiler units will be controlled by multi-tube cyclones followed by a common electrostatic precipitator (ESP) control device. ESPs apply an electrical charge to particles in the flue gas. The charged particles move toward the grounded collection plates, where they accumulate. ESPs can have high efficiencies due to the strong electrical forces applied to the small particles. Emissions of NO_x will be minimized by the staged combustion that is present with the gasifier-boiler system. Emissions of CO and VOM will be minimized by good combustion practices. Emissions of SO₂ will be minimized by the low sulfur content of wood chips and other biomass fuels.

This project also includes installation of two natural gas/oil fired boilers that are planned to be used primarily as back-up for the biomass gasifier-boiler units. One of these boilers will be relocated from the existing steam plant, where it was recently installed. The other boiler will be a new boiler. Natural gas will be the primary fuel for the boilers and distillate oil will be backup fuel for the standby boilers.

This project also includes fuel and bulk material storage, processing and handling for the gasifier-boiler units. Control of PM will be by work practices and by baghouse control device. Fugitive dust is also potentially generated by vehicle traffic and windblown dust on roadways at the new facility. These emissions would be minimized by implementation of a fugitive dust control program as well as pavement of roadways. Lastly the new facility would include emergency engine generators. Emissions would be minimized by the design of the engines and the limited amount of operation.

III. PROJECT EMISSIONS

The potential or permitted annual emissions of the proposed facility, 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 facility would operate at less than its maximum capacity and control measures and equipment normally operate to achieve emission rates that are lower than the applicable standards and limitations.

Permitted Annual Emissions of the Facility (Tons/Year)

PM*	NOx	CO	VOM	SO ₂
13.1	97.3	98.0	7.4	33.3

*Filterable particulate matter

IV. APPLICABILITY OF PSD/ EVALUATION OF THE CHANGE IN EMISSIONS

This project will not constitute a major modification subject to review under the federal regulations for Prevention of Significant Deterioration (PSD), 40 CFR 52.21. EIU has addressed the applicability of PSD demonstrating that this project will not result in significant increases in emissions of PSD pollutants, subject to the limitations and requirements that are proposed in the draft permit. For emissions of nitrogen oxides (NOx), this is because the project will be accompanied by decreases in emissions from the existing steam plant, which will be replaced by the new facility. In particular, the two coal-fired boilers and the natural gas/oil fired backup boilers at the existing steam plant will be shutdown and cease operation once shakedown of the new facility is complete. As a result, as further explained below in the table, the net increase in NOx emissions is only 39.4 tons per year, which is not significant. For other pollutants, the permit does not rely on accompanying decreases in emission from the shutdown of the existing steam plant, as the emissions of the new facility are not projected to be significant.

Net Change in NOx Emissions from the Project (Tons/Year)

Activity	Emissions
Proposed Project	
Permitted Emissions of Renewable Energy Center	97.3
Past Actual of Existing Steam Plant ^a	57.9
Project Net Change	39.4
Other Contemporaneous Projects	
None ^b	0
Net Change	39.4
PSD Significant Increase Threshold	40
Subject to PSD Review	No

^a The only "contemporaneous project" is the construction of a new gas/oil fired backup boiler at the existing steam plant. This unit is being relocated to the new facility and is addressed as part of the proposed project.

^b Based on 2-year average of actual emissions from 2007 and 2008.

V. APPLICABLE EMISSION STANDARDS

All emission sources in Illinois must comply with Illinois Pollution Control Board emission standards. The Board's emission standard represents the basic requirements for sources in Illinois. The application shows that the proposed facility 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). The proposed gasifier-boiler units and two natural gas/oil fired standby boilers are subject to New Source Performance Standards (NSPS), 40 CFR 60, Subpart Dc.

VI. APPLICABILITY OF MACT

This project will not constitute a major project for emissions of hazardous air pollutants (HAPs). Potential emissions of HAPs from the proposed facility 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 potentially emitted in the greatest amount from the gasifier-boiler units, would not exceed 6.1 tons per year. As a consequence, case-by-case determinations of Maximum Achievable Control Technology are not required for the emissions of HAPs from the project pursuant to Section 112(g) of the Clean Air Act.

VII. CONTENTS OF 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 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, opacity monitoring, 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, EIU must implement procedures to ensure that only virgin wood and clean biomass fuel are accepted, that is, the biomass fuel is free of foreign matter and contaminants. EIU must also keep records listing its suppliers of biomass fuel and documenting implementation of its procedures for ensuring that only clean biomass is used , including detailed records for any loads fuel that are rejected.

Finally, the draft permit includes provisions requiring the shutdown of the existing steam plant when the new facility has completed shakedown.

VIII. REQUEST FOR COMMENTS

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

Comments are requested on this proposed action by the Illinois EPA and the proposed conditions of 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 IAC Part 166.