

Illinois Environmental Protection Agency
Bureau of Air, Permit Section
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Project Summary for an
Application from
Christian County Generation, LLC
To Extend the Construction Permit
for the
Taylorville Energy Center
Christian County, Illinois

Site Identification No.: 021060ACB
Application No.: 05040027
Date Application Received: May 5, 2009

Schedule:

Public Comment Period Begins: September 3, 2009
Public Hearing Date: October 21, 2009
Public Comment Period Closes: November 20, 2009

Illinois EPA Contacts:

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Introduction

Christian County Generation has requested that the previously issued air pollution control construction permit for its proposed power plant be extended to provide additional time to commence construction. The Illinois EPA has determined that it is appropriate to issue a revised permit that extends the period of time during which construction of the plant may commence.

The Illinois EPA has prepared a draft of the revised permit that it is proposing to issue which would extend the time to commence construction. However, before issuing a revised permit, the Illinois EPA is holding a comment period to allow the public to comment on this action and the draft of the revised permit.

Background

Christian County Generation previously received a construction permit/PSD approval for an integrated gasification combined cycle (IGCC) power plant. The proposed plant would produce electric power from Illinois coal using "gasification technology". With gasification technology, coal is first converted into a "synthesis gas" and cleaned of contaminants before being used. For further background on the proposed plant, refer to the original project summary prepared with the draft of the original permit for the proposed project, which is attached.

Request for Extension of the Permit

The construction permit issued for the proposed plant became effective on January 28, 2008 when the USEPA's Environmental Appeals Board concluded its review of an appeal of the permit. This is because the permit also provided authorization to construct the plant under the federal rules for Prevention of Significant Deterioration (PSD), 40 CFR 52.21. In general, PSD approvals becomes invalid if actual construction is not commenced or a binding contract for construction is not entered into within 18 months after the permit becomes effective. This 18-month period may be extended by the permitting authority upon a satisfactory showing that an extension is justified.

The Illinois EPA has determined that the extension requested by Christian County Generation is justified. There are no other proposed major projects in the area competing for the air quality resource. Since the permit became effective, Christian County Generation has been working on matters that will allow construction of the plant to commence. It has been exploring avenues for satisfying the criteria and requirements of recently adopted legislation that promotes the development of advanced clean coal technology in Illinois.¹

¹ The proposed plant is addressed by the Clean Coal Portfolio Standard, Section 1-75(d) of the Illinois Power Agency Act (20 ILCS 3855, as amended by Public Act 95-1027, effective June 1, 2009). For the proposed plant to qualify as a Clean Coal Facility for purposes of this standard, the plant would have to meet the criteria for a Clean Coal Facility in Section 1-10 of the Illinois Power Agency Act. This includes being designed to capture and sequester at least 50 percent of the total carbon emissions that the plant would otherwise emit. (As such, it is expected that as part of the application for extension of the permit, Christian County Generation will commit, consistent with the Clean Coal Portfolio Standard, to capture and sequestration of carbon dioxide from the gasification process.) This standard would also require that Christian

Best Available Control Technology (BACT)

The proposed plant is subject to PSD for emissions of nitrogen oxides (NO_x), sulfur dioxide (SO₂), particulate matter (PM), carbon monoxide (CO) and sulfuric acid mist. As a project subject to PSD, the plant's emissions of these pollutants must be controlled with Best Available Control Technology (BACT). The revised permit would include enhancements to the provisions of the initial permit that establish BACT for the proposed plant to address developments since the original permit was issued. (Refer to the accompanying Project Summary for details on the original determination of BACT.)

The area in which enhancement to the BACT determination is proposed is flaring associated with the gasification block. Flaring is a technique to safely dispose of waste gases from a process that cannot be productively used and that are combustible by burning the waste gases. With coal gasification, flaring is used to combust synthesis gas during overpressure events and other upsets of the gasification process. One aspect of BACT for flares, as already addressed in the issued permit, is operating in accordance with the requirements of 40 CFR 60.18, to ensure effective destruction of CO, organic compounds and reduced sulfur compounds present in the waste gas stream that is being flared. In the revised permit, formal Flare Minimization Planning would also be required to minimize and prevent the occurrence of flaring. This would require that Christian County Generation plan for possible scenarios that would lead to flaring and determine for each scenario how the likelihood of such scenario or the extent of flaring during the scenario could be reduced. Should a significant flaring event still occur, a Root Cause Analysis must be conducted by Christian County Generation to determine the specific causes of the event and identify actions to prevent similar events in the future.

The revised permit would also include secondary BACT limits for flaring that set a cap or ceiling on allowed annual emissions from flaring. This action would be taken in response to USEPA guidance for setting BACT for periods of startup, shutdown and malfunction.

The Illinois EPA also considered whether enhancements should be made to the BACT determination for the proposed plant to explicitly address emissions of PM_{2.5}. Since the original permit was issued, USEPA has completed rulemaking to address PM_{2.5}, particulate matter with aerodynamic diameter of 2.5 microns or less, as a pollutant subject to the federal PSD rules. The Illinois EPA concluded that enhancements to the BACT determination are not needed to address emissions of PM_{2.5}. This is because the issued permit already appropriately addresses emissions of PM_{2.5}. For the combustion turbines and flaring, which will be the principal sources of particulate matter from the proposed plant, based on USEPA emission factors, all the particulate matter emissions will be PM_{2.5}. Accordingly, the BACT determination already addresses the PM_{2.5} emissions of these operations. For other units, PM_{2.5} is only a

County Generation develop a detailed Facility Cost Report for the proposed plant for submission to the Illinois Commerce Commission, which is expected to be completed by December 2010, and that other actions be completed for the proposed plant to be approved under the Clean Coal Portfolio Standard.

fraction of the PM₁₀ emissions, and BACT measures for PM₁₀ are also adequate to address the PM_{2.5} fraction. The revised permit would, however, clarify that the BACT limits set for emissions of PM also serve to address emissions of PM_{2.5}.

Air Quality Analysis

The air quality analysis accompanying the original application for the project showed that it would not threaten applicable ambient air quality standards or PSD increments. (Refer to the original project summary, attached.)

Christian County Generation submitted additional modeling for PM that included three additional minor sources in the general area of the proposed plant, i.e., two concrete batch plants and a grain elevator. This modeling demonstrated that the ambient air quality for PM₁₀ is still protected.

Christian County Generation also submitted an analysis to address the potential impacts of the proposed plant on particulate matter air quality measured as PM_{2.5}. This analysis demonstrated that the PM_{2.5} NAAQS will not be exceeded. This analysis used the results of the PM₁₀ modeling to assess the impact of the proposed plant in PM_{2.5} air quality, with appropriate adjustments² to the impacts of the slag landfill to account for the fact that only 14 percent of its PM₁₀ emissions will be small enough to be PM_{2.5}. On a 24-hour average, this resulted in a plant impact of 6.1 µg/m³, which when added to background air quality as monitored in Springfield, 24.1 µg/m³, yielded an overall concentration of 30.2 µg/m³. This is lower than 35 µg/m³, the 24-hour NAAQS for PM_{2.5}.³

The Springfield ambient monitoring station is believed to be a more appropriate representation of background air quality at the site of the proposed plant than the Decatur monitoring station, which is also about 25 miles away. This is because the monitoring station in Decatur is located on the northeast side of Decatur, near existing industrial facilities. However, the PM_{2.5} analysis would also show attainment of the 24-hour NAAQS for PM_{2.5} using background data from Decatur, which has a 98th percentile concentration of 26.6 µg/m³, 2006 through 2008, yielding an overall concentration of 32.7 µg/m³.⁴

² The 24-hour NAAQS is met when the 98th percentile concentration for PM_{2.5}, as determined in accordance with 40 CFR Part 50, Appendix N, considering three consecutive years of data, is less than the numerical standard. The modeled concentration from a new source that corresponds to the 98th percentile concentration is the sixth highest value from modeling covering three years and the eighth highest value from modeling covering five years.

³ Christian County Generation performed its analysis with ambient monitoring data from 2005 through 2007. For this period, the 98th percentile concentration of PM_{2.5} monitored in Springfield was 28.9 µg/m³. This yielded an overall concentration of 35 µg/m³, exactly at the 24-hour NAAQS for PM_{2.5}. For Decatur, the 98th percentile concentration was 29.5 µg/m³, so that the overall concentration with the proposed plant, 35.6 µg/m³, would have exceeded the NAAQS.

⁴ The predicted annual impact of the proposed plant for PM_{2.5}, in appropriate terms for comparison to the NAAQS, is 0.65 µg/m³. Background air quality from Springfield was 11.0 µg/m³ for 2006 through 2008, yielding an overall concentration of 11.65 µg/m³, which is significantly less than the annual NAAQS for PM_{2.5} adopted by USEPA. Attainment is also shown using 2005 through 2007 background air quality from Springfield, 11.9 µg/m³, and background air quality from Decatur, 12.0 and 12.7 µg/m³, for 2006 through 2008 and 2005 through 2007, respectively.

A similar analysis was made to address impacts of the proposed plant on the annual NAAQS for PM_{2.5}. However, after accounting for the effect of slag pile emissions on annual air quality, the plant's annual impacts are less than 1.0 µg/m³ and can be considered insignificant.

Permit Conditions

Other revisions would also be made in the revised permit to address newly applicable regulations and developments that have arisen since the original permit was issued. Changes would be made to address the adoption of 35 IAC Part 225 (Illinois' version of the federal Clean Air Interstate Rule, a USEPA program to further address SO₂ and NO_x emissions from Electrical Generating Units). Changes would be made to address revisions to the federal New Source Performance Standards for Combustion Turbines (i.e., 40 CFR 60, Subparts GG and KKKK). Changes would also be made to address the vacatur of the federal Clean Air Mercury Rule (CAMR). Lastly, limits on PM_{2.5} emissions from material handling and roadways would be set, to provide consistency with Christian County Generation's air quality analysis for PM_{2.5}, as the PM_{2.5} NAAQS is met.

Request for Comments

The Illinois EPA has determined that the application for revision of the permit to extend the time to commence construction complies with applicable Illinois Air Pollution Control Regulations and the federal PSD rules. The Illinois EPA is therefore proposing to issue a revised permit for the proposed plant.

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

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