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BUREAU OF AIR, PERMIT SECTION
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PROJECT SUMMARY
FOR A CONSTRUCTION PERMIT APPLICATION
FROM
ABENGOA BIOENERGY OF ILLINOIS, LLC.
FOR A
ETHANOL PLANT
IN MADISON, ILLINOIS

Site Identification No.: 119465AAG
Application No.: 06090039
Date Received: September 15, 2006

Schedule

Public Comment Period Begins: May 20, 2007
Public Comment Period Closes: June 19, 2007

Illinois EPA Contacts

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I. INTRODUCTION

Abengoa Bioenergy of Illinois, LLC. (Abengoa Bioenergy) has submitted an application to construct a fuel ethanol plant in Madison. The construction of the proposed plant requires a permit from the Illinois EPA because the plant would be a source of emissions.

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

II. PROJECT DESCRIPTION

The principal products produced at ethanol plants are ethanol and distiller grains. The ethanol is ethyl alcohol, made primarily from corn and various other grains and can be used as an octane enhancer in fuel, an oxygenated fuel additive that can reduce the carbon monoxide emissions from the vehicle. The distiller grains are the grains with soluble that can be used as an animal feed.

Abengoa Bioenergy has proposed to construct 100 million gallon per year dry mill ethanol plant. In this process corn is received by the rail and truck and stored in bins prior to processing. The stored corn is also screened or cleaned to remove cobs and other foreign matter. Corn is then transferred to a surge bin, ground in hammermill and conveyed to slurry tanks for enzymatic processing.

In the enzymatic process ground corn is prepared for fermentation by converting it to “mash”, by adding water, heat and enzymes in a series of liquefaction and saccharification tanks. The mash is then sent to the fermentation tanks, where yeast is added to begin the fermentation process.

The “beer” produced in the fermentation process is then sent to the distillation process, where solids and water are separated from the ethanol. The remaining water in ethanol is removed in a molecular sieve. Denaturant is added to the finished product prior to storage. The solids and water that are separated from the beer is processed in mechanical centrifuges to de-water and produce “wet cake”. The recovered water from the centrifuges is further processed to remove the water and produce thick syrup. The water stream from the evaporators is routed to an anaerobic biological treatment system. The bio-gas from the anaerobic treatment system would be flared if not used as fuel at the plant.

Two indirect dryers would be used to produce dry feed from wet cake. These dryers would have the capacity to convert all wet cake produced at the facility into dry feed. Each dryer system includes burner/kiln, mixer, drying drum, cyclone, heat exchanger, cooler and cooler cyclone, and series of conveyors.

The wet cake from the centrifuges and thick syrup from evaporators are fed into a bin, which controls the flow of wet cake to dryer drum. The heated air stream (from closed steam loop) passing through dryer drum evaporates the water and other organic material from the wet cake.

The dried feed collected by cyclone is sent to the feed storage and loadout operation. The gases evaporated from the dryer drum are removed and sent to the furnace and used as combustion air for the burners. The burner/kiln, which acts as oxidizers, would controls emissions of CO, VOM, HAP, and condensable PM from the dryer. The emissions from the feed dewatering units are also vented to the burner/kiln for controlling VOM emissions. The closed steam loop gases are re-heated in the heat exchanger and are sent to dryer drum. The dry feed, also referred to as distillers grain with soluble (DDGS), produced in the dryers is conveyed to a storage area for shipment.

The loading racks transfers ethanol into tank trucks, railcars and barges for shipment. VOM emissions occur from the VOM-laden air displaced from the tank when material is loaded. Emissions are controlled by capturing the displaced air with a vapor collection system and ducting it to the flares.

Two gas fired boiler would be used to generate the steam required for the ethanol process. Both boilers will be equipped with low-NO_x burner.

A non-contact wet cooling tower would be used for process cooling. The PM emissions from cooling tower are controlled by mist eliminators.

Equipment components, such as valves, flanges, pump seals, etc., involved with fermentation and subsequent handling of ethanol and denaturant generates VOM emissions when they leak. These emissions will be minimized with a Leak Detection and Repair (LDAR) Program, which requires regular inspections of component for leaks and timely repairs of any leaking components.

Fugitive dust and particulate matter emissions are generated by vehicle traffic and wind blown dust on roadways, parking lots and other open areas at the plant. These emissions would be minimized with a Fugitive Dust Control Program as well as pavement of new roadways and the parking lots for the facility.

III. PROJECT EMISSIONS

The proposed fuel ethanol plant would use appropriate equipment for effective control of emissions from the various operations at the plant. Fabric filters would be used to control particulate matter emissions from the principle grain handling and milling operations at the facility. A filter would be used to control particulate matter emissions from the handling and load out of the dried feed.

Separate scrubbers would be used to control organic material emissions from mash preparation, fermentation and distillation operations. The organic material laden water from these scrubbers would be reused at the plant, so that the scrubber would not be a source of wastewater.

As a result of this emission control equipment and other equipment and control measures that would be used at the source, Abengoa Bioenergy has proposed to control emissions of the source so that it would not be a major source subject to the Clean Air Act Permit Program (CAAPP) after the start up of the fuel ethanol plant. Annual emissions from the source would be limited to

no more than 98.06 tons of each criteria pollutant (particulate matter, nitrogen oxides (NO_x), carbon monoxide, etc.), 8.31 tons of any single hazardous air pollutant¹ and 23.67 tons of total hazardous air pollutants.² These limits are based on data for the maximum emissions of the proposed plant and represent its permitted emissions. Actual emissions of the plant would be less than these limits to the extent that the actual performance of the equipment is better than projected and the plant does not operate at its capacity.

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 facility will readily comply with applicable state emission standards (35 Ill. Adm. Code: Subtitle B).

Certain emissions units at the proposed plant would also be subject to the federal New Source Performance Standards (NSPS), at 40 CFR 60, which the Illinois EPA administers for source in Illinois on behalf of the United States EPA under a delegation agreement. These units include the boilers (40 CFR 60, Subpart Db), product ethanol storage tanks (40 CFR 60, Subpart Kb) and component leaks in the distillation area (40 CFR 60, Subpart VV). These units should also readily comply with applicable NSPS standards and requirements.

V. APPLICABLE REGULATORY PROGRAMS

This facility is not considered a new major stationary source under the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. This is because the potential emissions from the proposed facility, as limited by the permit, would be less than the major source thresholds for PSD.

VI. PROPOSED PERMIT

The conditions of the draft permit for the facility contain limitations and requirements for the grain handling, fermentation system, distillation system, feed drying/cooling, ethanol storage/loading, and boilers to help assure that the facility complies with applicable regulatory requirements. The draft permit also identifies measures that must be used as good air pollution control practices to minimize emissions.

The draft permit includes enforceable limits on emissions and operation for the equipments to assure that facility remains below the levels at which it would be considered major for PSD. In addition to limiting annual emissions, the permit also includes limits on hourly emissions, annual ethanol production, and annual grain receipts.

¹ While most of the organic material emissions of the proposed plant would be ethanol, the plant would also have emissions of organic compounds, such as acetaldehyde, formaldehyde and methanol, which are listed as hazardous air pollutants by Section 112(b) of the federal Clean Air Act.

² The draft permit would limit emissions from the source to less than the thresholds for a major source under the Clean Air Act Permit Program (CAAPP), e.g., annual emissions of 100 tons or more of an individual criteria pollutant, with a margin of compliance to assure that the actual emissions of this source are both enforceably and practically constrained to levels below those at which it would be a major source required to have a CAAPP permit.

The permit also establishes appropriate compliance procedures for the facility, including requirements for emission testing, monitoring, recordkeeping, and reporting. Emission testing is required as part of the initial shakedown and operation of the facility after completion of construction.

These measures are being imposed to assure that the emissions of the facility are accurately tracked to confirm compliance with both the short-term and annual emission limits established for them.

VII. REQUEST FOR COMMENTS

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

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