

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
BUREAU OF AIR, PERMIT SECTION
1021 N. GRAND AVENUE EAST
P.O. BOX 19276
SPRINGFIELD, ILLINOIS 62794-9276
217/782-2113

PROJECT SUMMARY
FOR A CONSTRUCTION PERMIT APPLICATION
FROM
PATRIOT RENEWABLE FUELS, LLC
FOR A
ETHANOL PLANT
IN ANNAWAN, ILLINOIS

Site Identification No.: 073802AAD
Application No.: 06010085
Date Received: January 27, 2006

Schedule

Public Comment Period Begins: June 17, 2006
Public Hearing: August 2, 2006
Public Comment Period Closes: September 1, 2006

Illinois EPA Contacts

Permit Analyst: Minesh Patel
Community Relations Coordinator: Brad Frost

I. INTRODUCTION

Patriot Renewable Fuels, LLC (Patriot) has proposed to construct an ethanol production facility in Annawan, Henry County. The facility would produce 110 million gallons of ethanol per year. The construction of the proposed facility requires a permit from the Illinois EPA because of its associated air emissions.

II. PROJECT DESCRIPTION

The principal products produced at ethanol plants are ethanol and distiller grains. The distiller grains are the grains with soluble that can be used as an animal feed. 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.

Patriot has proposed to construct 110 million gallon per year dry mill ethanol plant. In this process corn is received by the rail or truck and screened for rocks and cobs before sent to storage bins. Corn is then transferred to a “day bin” by conveyor and metered to a hammermill by a weigh belt feeder. The PM emissions from these operations are controlled by baghouses.

The ground corn is then sent to enzymatic processing. In the enzymatic process ground corn is turned into fine slurry by adding water, heat and enzymes. The fine slurry is then sent to liquefaction process where other enzymes are added to convert the starches into glucose sugars. Next the corn slurry is sent to fermentation process where yeast is added to begin the fermentation process. The VOM emissions from fermenters and beer well would be controlled by CO₂ scrubber.

Distillation process utilizes a vacuum distillation system to separate the alcohol from the corn mash. Both streams are routed to the dehydration equipments to extract the ethanol. Ethanol is further refined to have 200 proof ethanol alcohols in molecular sieve. The ethanol is stored and denatured prior to sent out to customers. Mash stream from the dehydration equipments are sent to solids separation and evaporation equipments where excess water is removed to have “wet cake”. The water, “thin stillage” is pumped to an evaporator to produce thick syrup. The wet cake and thick syrup are conveyed to dryers to remove moisture and produce dried distillers grain with solubles (DDGS). The DDGS is conveyed to a storage area for cooling and readied for shipment via rail car or truck. The VOM emissions from principal distillation units along with other process tanks would be controlled by oxidizer/boiler systems.

Two natural gas fired dryer systems will be sized to dry all wet cake produced at the proposed facility. Each dryer system would have two dryer/cyclones combination in series followed by recuperative thermal oxidizer (oxidizer/boiler). The oxidizer/boiler system is natural gas-fired and would control emissions of CO and VOM as well as PM. The oxidizer will also function as the furnace for the boiler to supply steam to the facility.

The dried feed is then cooled as it is being conveyed to the feed storage area prior to shipping to customers. Oxidizer/boiler systems would control the VOM emissions from this operation. The PM emissions from these operations are controlled by baghouse.

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, ect., 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 annual emissions from the facility would be limited to 96.3 tons of NO_x, 98.3 tons of CO, 98.5 tons of VOM, 97.4 tons of PM/PM₁₀, and 82.4 tons of SO₂. These limits are based on the maximum emissions requested by Patriot. These limits are based on achievement of average annual hourly emission rate as specified by the manufacturer of the equipments, standard emissions factors, engineering estimates, and the potential utilization of the facility as specified by Patriot. Actual annual emissions of the facility would be less than these limits to the extent that the actual performance of the equipment is better than projected and the equipments are not utilized as much.

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).

The facility is also subject to the federal New Source Performance Standards (NSPS), 40 CFR 60 Subpart Db, for oxidizer/boiler systems. The Illinois EPA is administering NSPS in Illinois on behalf of the United States EPA under a delegation agreement. These standard addresses NO_x emission from oxidizer/boiler systems limiting NO_x emissions to 0.1 lb/mmBtu. The oxidizer/boiler systems should readily comply with this standard.

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 oxidizer/boiler systems 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.

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 permit 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.