

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
BUREAU OF AIR, PERMIT SECTION
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PROJECT SUMMARY
FOR A CONSTRUCTION PERMIT APPLICATION
FROM
ROCHELLE ETHANOL, LLC
FOR AN
ETHANOL PLANT
IN JOLIET, ILLINOIS

Site Identification No.: 197445AAC
Application No.: 04020058
Date Received: July 5, 2005

Schedule

Public Comment Period Begins: 01/11/2006
Public Comment Period Closes: 02/10/2006

Illinois EPA Contacts

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I. INTRODUCTION

Rochelle Ethanol, LLC (Rochelle) has proposed to construct an ethanol production facility in Joliet, Will County. The facility would produce 50 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 dried distillers grain with solubles (DDGS). DDGS are the solid product left at the end of the distilling process 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 and an oxygenated fuel additive that can reduce the carbon monoxide emissions in vehicle exhaust.

Rochelle has proposed to construct a 50 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 being sent to storage bins. Corn is then transferred by conveyor to a “day bin” and metered to a hammermill by a weigh belt feeder. The hammermill crushes the grain into ground corn. The particulate matter (PM) emissions from the storage, transfer and hammermill 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 a 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 fermentation. VOM emissions from the fermenting process would be controlled by CO₂ scrubber.

After distillation, a vacuum distillation system is used to separate the alcohol from the corn mash. Both streams are routed to dehydration equipment to extract ethanol. Ethanol is further refined in a molecular sieve to produce 200 proof ethanol alcohols. The ethanol is stored and denatured prior to being sent out to customers. The corn mash stream is sent from the dehydration equipment to solids separation and evaporation equipment where excess water is removed to create a “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 DDGS. The DDGS is conveyed to a storage area for cooling and readied for shipment via rail car or truck. The volatile organic material (VOM) emissions from principal distillation units along with other process tanks would be controlled by a vent gas scrubber.

Two natural gas fired dryers will be used to dry the wet cake. The dryers will be equipped with cyclones for initial control of emissions of PM. The exhaust from the cyclones then goes to the natural gas-fired oxidizer to control emissions of carbon monoxide (CO) and VOM as well as PM.

The dried feed is then cooled as it is being conveyed to the feed storage area prior to shipping to customers. The oxidizer would also 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.

Two natural gas fired boilers would provide the steam for the process. The NO_x emissions from boiler would be controlled by use of a low-NO_x burner.

Equipment components, such as valves, flanges, pump seals, etc., involved with fermentation, distillation, and subsequent handling can generate 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 paving of new roadways and the parking lots for the facility.

III. PROJECT EMISSIONS

The annual emissions from the facility would be limited to 91.0 tons of NO_x, 50.2 tons of CO, 58.5 tons of VOM, 60.2 tons of PM/PM₁₀, and 1.1 tons of SO₂. These limits are based on the maximum emissions requested by Rochelle. These limits are based on achievement of average annual hourly emission rate as specified by the manufacturer of the equipment, standard emissions factors, engineering estimates, and the potential utilization of the facility as specified by Rochelle. 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 equipment is 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 boiler. 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 boiler limiting NO_x emissions to 0.1 lb/mmmbtu. The boiler 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 boiler 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 equipment 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.