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PROJECT SUMMARY  
FOR A CONSTRUCTION PERMIT APPLICATION  
FROM LITCHFIELD TRAIL ENERGY, LLC  
FOR AN ETHANOL PLANT  
NEAR LITCHFIELD, ILLINOIS

Site Identification No.: 135040ACD  
Application No.: 07020060  
Date Received: February 21, 2007

Schedule

Public Comment Period Begins: June 25, 2007  
Public Comment Period Closes: July 25, 2007

Illinois EPA Contacts

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## **I. INTRODUCTION**

Litchfield Trail Energy, LLC (Litchfield Trail Energy) has submitted an application to construct a fuel ethanol plant near Litchfield. 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**

Litchfield Trail Energy has proposed to construct a plant to produce ethanol from corn. The Plant would be designed to have nominal capacity of 123.9 million gallons denatured ethanol per year. The denatured ethanol produced by the plant would be used as motor vehicle fuel. When added to gasoline, ethanol is an octane enhancer and oxygenated fuel additive, which reduces hydrocarbon and carbon monoxide emissions in vehicle exhaust. The plant would produce ethanol by fermentation of ground corn, followed by processing to separate out and purify the ethanol. The plant would also produce animal feed from the stillage material remaining after the fermentation process. The plant would have facilities to receive and ship out products (grain, fuel ethanol, and feed) by both truck and rail. Natural gas would be used as the fuel for the plant.

The proposed plant would have grain elevator, at which corn would be received and stored. The first step in the production of ethanol by fermentation is to prepare the corn. Corn would be transferred from the elevator to the ethanol plant. The corn is first milled or ground, mixed with water, and heated, producing fine slurry. Enzymes are then added to convert the starch in the corn into sugar. The resulting mash is then sterilized before sent for fermentation.

The mash is processed in batches in the fermentation tanks, where yeast is added for conversion of the sugar into ethanol. The product from fermentation is a water-ethanol mixture known as beer. The beer from each fermentation batch is temporarily held in a separate tank, the beer well, pending further processing. The exhaust streams from the yeast tanks, fermenters and beer well are sent to a scrubber to control VOM emissions.

The beer is processed in a distillation system to separate out ethanol. The ethanol stream is then further refined to water-free, 200 proof ethanol in molecular sieves. This ethanol is then denatured and stored prior to being sent out to customers by railcar and truck. The non-ethanol, stillage stream from distillation is also further processed with centrifuges and evaporators to yield “wet cake” and “thick syrup” and to recover water, which is reused at the plant. The wet cake and thick syrup are combined and dried to make an animal feed known as dried distiller’s grain with solubles (DDGS). While wet cake can also be sold to farms within a few days drive of the plant for use “as is” for cattle feed, the plant will have two direct-fired dryers, with the capacity to dry all the wet cake produced by the plant. The hot feed leaving the dryers is cooled

in cooling drums and stored pending shipment to customers. The oxidizers that control VOM emissions from the fermentation units also control the emissions of VOM, carbon monoxide (CO) and particulate matter (PM) from the feed dryers and coolers. The VOM emissions from the ethanol loadout operation would be collected and routed to flare system.

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

Equipment components, such as valves, flanges, pump seals, pressure relief devices, etc., involved with fermentation and subsequent handling of ethanol and denaturant 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 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 major roadways and parking lots at the plant.

### **III. PROJECT EMISSIONS**

The proposed 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 (PM) emissions from the principle grain handling operations at the elevator and from milling of grain. A filter would be used to control PM emissions from the handling and load out of the dried feed.

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

Combustion control, with natural gas fired thermal oxidizers, would be used for emissions of VOM, CO and PM from the feed dryers. These oxidizers, as well as the feed dryers, would be equipped with low-NO<sub>x</sub> burners to minimize nitrogen oxide (NO<sub>x</sub>) emissions. These oxidizers would also be used to control emissions from the distillation and solid separation and evaporation operations

As a result of this emission control equipment and other equipment and control measures that would be used, the plant proposed by Litchfield Trail Energy would not be a major source subject to the Clean Air Act Permit Program (CAAPP). Annual emissions from the source would be limited to no more than 98 tons of each criteria pollutant (PM, NO<sub>x</sub>, CO, etc.), 9.8 tons of any single hazardous air pollutant<sup>1</sup> and 20 tons of total hazardous air pollutants.<sup>2</sup> These limits

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<sup>1</sup> 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.

<sup>2</sup> 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.

are based on data for the maximum emissions of the proposed plant and represent permitted emissions. Actual emissions source would be less than these limits to the extent that the actual performance of the equipment is better than projected and equipment does not operate at its capacity.

#### **IV. APPLICABLE EMISSION STANDARDS**

All emission units in Illinois must comply with the Illinois Pollution Control Board's emission standards. The Board's emission standards represent the basic requirements for units in Illinois. The emission units at the proposed plant should be able to readily comply with the applicable 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 sources in Illinois on behalf of the United States EPA under a delegation agreement. These emission units include the boilers (40 CFR 60, Subpart Dc), 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**

The proposed plant is not considered a new major 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 plant, as limited by the permit, would be less than the major source threshold under the PSD program.

The proposed plant also is not considered a major source for emissions of hazardous air pollutants (HAPs), as regulated under Section 112 of the Clean Air Act. This is because the potential emissions of HAPs from the proposed plant, as limited by the permit, would be less than the major source thresholds for HAPs, i.e., emissions of 10 tons per year or more of any individual HAP and emissions of 25 tons per year or more of all HAPs.

#### **VI. DRAFT PERMIT**

The conditions of the draft construction permit for the plant contain limitations and requirements for the preparation of mash, fermentation system, distillation system, feed drying/cooling, ethanol storage/loading, and boilers to help assure that the plant 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 of individual equipment to assure that plant 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 draft permit would also establish appropriate compliance procedures for the plant, including requirements for emission testing, monitoring, recordkeeping, and reporting. Emission testing is

required as part of the initial shakedown and operation of the plant after completion of construction. These measures are being imposed to assure that the emissions of the plant 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 application for the proposed plant 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.