

Illinois Environmental Protection Agency
Bureau of Air, Permit Section
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Project Summary for an Application from
Lincolnland Agri-Energy, LLC for Issuance of a
Federally Enforceable State Operating Permit (FESOP) for
a Fuel Ethanol Plant Near
Palestine, Illinois

Site Identification No.: 033899AAA
Application No.: 05070015

Important Dates:

Comment Period Begins: June 16, 2010
Comment Period Closes: July 16, 2010

Illinois EPA Contacts:

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PROJECT SUMMARY

I. INTRODUCTION

Lincolnland Agri-Energy, LLC (Lincolnland) has applied for a Federally Enforceable State Operating Permit (FESOP) for its fuel ethanol plant near Palestine in Crawford County. This plant requires an air pollution control operating permit because it is a source of emissions. The Illinois EPA has prepared a draft of the permit that it would propose to issue for the plant. However, before issuing the permit, the Illinois EPA is holding a public comment period to receive comments on this proposed action and the terms and conditions of the draft permit it would propose to issue.

II. SOURCE DESCRIPTION

Lincolnland operates an ethanol production plant with a nominal capacity of 52 million gallons of ethanol per year. Ethanol, or ethyl alcohol, is made from the starch in corn. Ethanol can be used as an octane enhancer in gasoline, an oxygenated gasoline additive that can reduce the carbon monoxide emissions from vehicles, or a non petroleum-based gasoline extender. The plant would also produce distillers grains as a byproduct. It would be made from the components of corn other than starch, including protein, oil and fiber. Distillers grain is used as feed for livestock.

Receiving and Storage

Corn is received by rail or truck and screened for rocks and cobs before transfer to storage bins. From storage bins, the corn is ground to a flour or powder using hammer mills and sent to enzymatic processing.

Cooking, Liquefaction, and Fermentation

Water is added to the ground corn and heated to produce a slurry. The slurry is pumped to liquefaction tanks where enzymes are added to convert the starch into sugars. The fermentation process involves adding yeast to the corn slurry, or mash, which gradually converts the sugars into alcohol.

Distillation and Storage

The alcohol/solids mixture from the fermentation process is separated in the distillation process. Ethanol exits the top of the final processing column and the water and solids exit the bottom. The ethanol leaving the distillation process contains a small amount of water which is removed in molecular sieves (the dehydration process). The ethanol is sent to storage tanks where a small amount of natural gasoline is added to the ethanol to "denature" the product prior to being transferred to customers.

Solids Separation, Evaporation, and Drying

The solids and water from the distillation process are separated using a centrifuge and evaporator to produce a "wet cake" and "syrup." The wet cake and syrup are combined and conveyed to natural gas-fired dryers to produce dried distillers grain. The dried distillers grain is conveyed to a storage area for cooling and holding pending shipment via rail car or truck.

Corn Oil Separation System

The thick syrup is further processed in a corn oil separation system that consists of a tricanter centrifuge, a thick syrup holding tank, two corn oil storage tanks, and a truck load out system.

Emissions Control

The plant is equipped with various add on control devices including: (i) an oxidizer/boiler system for control of volatile organic material (VOM) emissions from the distillation process and the dryers, (ii) baghouses for the dry material processing operations, e.g., corn receiving/storage system, hammer milling operation, feed cooler, feed load out, (iii) floating roofs for control of VOM at the liquid storage tanks, (iv) scrubber for the control of VOM for the fermenters and beer well, and (v) a flare for control of VOM at the ethanol loading rack.

III. GENERAL DISCUSSION

FESOPs are federally enforceable, that is, the terms and conditions of FESOPs can be enforced by USEPA under federal law, as well as by Illinois government and the public under state law. These permits can establish federally enforceable limitations on the operation and emissions of a source that restrict the potential emissions of the source.

The Lincolnland plant is eligible for a FESOP because the actual emissions of the plant are below the levels at which the plant would be considered a major source under Title V of the federal Clean Air Act. However, in the absence of federally enforceable limitations, the plant's potential emissions would be such that the plant would be considered a major source. The FESOP would act to restrict the plant's potential emissions so that it need not be considered a major source. As a result, Lincolnland would not need to obtain a Clean Air Act Permit Program (CAAPP) permit for the plant, as would otherwise be required.

The FESOP would limit the operation and annual emissions of the plant to below the major source thresholds of 100 tons for volatile organic material (VOM), nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter, sulfur dioxide (SO₂) and below 10 tons for an individual hazardous air pollutant (HAP) and 25 tons for combined HAPs.

IV. APPLICABLE EMISSION STANDARDS

All emission units in Illinois must comply with state emission standards adopted by the Illinois Pollution Control Board. These emission standards represent the basic requirements for sources in Illinois. The conditions of this permit are intended to ensure that the units at this plant will comply with all applicable Board standards.

The plant is also subject to federal New Source Performance Standards (NSPS), including 40 CFR 60 Subpart Db for the oxidizer/boiler system and 40 CFR 60 Subpart VV for the component equipment leaks such as valves and flanges. Subpart Db limits the NO_x emission from the oxidizer/boiler system to 0.1 lb/mmBtu. Subpart VV requires implementation of a leak detection and repair program. The Illinois EPA is administering NSPS in Illinois on behalf of the United States EPA under a delegation agreement.

V. CONTENTS OF PERMIT

The permit that the Illinois EPA is proposing to issue would identify the specific emission standards that apply to the emission units at the plant. The conditions of this permit are intended to ensure that the plant continues to comply with applicable emission standards.

The permit would also contain limitations and requirements to assure that this plant is operated as a non-major source. The permit would limit the operation and annual emissions of the plant to below the major source thresholds. The table below summarizes the maximum allowable annual emissions and the major source threshold for each pollutant of concern:

Pollutant	PM/PM ₁₀	NO _x	SO ₂	CO	VOM	Individual HAP	Total HAP
Plant Emissions	76.34	97.42	0.70	98.22	93.44	9.34	14.02
Major Source Threshold	100	100	100	100	100	10	25

The permit conditions would also continue to establish appropriate compliance procedures, including inspection practices as well as recordkeeping and reporting requirements. The source must carry out these procedures on an on-going basis to demonstrate that the plant is being operated within the limitations set by the permit and the plant's emissions are being properly controlled.

VI. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the FESOP application for this plant meets the requirements for issuance of a permit. The Illinois EPA is therefore proposing to issue a FESOP for the plant.

Comments are requested on this proposed action by the Illinois EPA and the proposed conditions on the draft permit. If substantial public interest is shown in this matter, the Illinois EPA will consider holding a public hearing in accordance with 35 IAC Part 166.