# ENVIRONMENTAL ASSESSMENT

# Design and Construction of a Proposed Fuel Ethanol Plant, Jasper County, Indiana

April 2005

U.S. Department of Energy
Golden Field Office
1617 Cole Blvd.
Golden, CO 80401

DOE/EA-1517

# TABLE OF CONTENTS

## LIST OF TABLES



## LIST OF FIGURES

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| acfm | actual cubic feet per minute |
| ALOHA | Areal Locations of Hazardous Atmospheres |
| APE | area of potential effects |
| ASTM | American Society for Testing and Materials |
| BACT | best available control technology |
| Btu | British thermal unit |
| c. | circa |
| CAAA | Clean Air Act Amendments of 1990 |
| CAC | chronic aquatic criterion |
| CEQ | Council on Environmental Quality |
| CO2 | carbon dioxide |
| dBA | A-weighted decibel |
| DDGS | distillers dried grains with solubles |
| DOE | U.S. Department of Energy |
| EA | environmental assessment |
| EPA | U.S. Environmental Protection Agency |
| ERPG | Emergency Response Planning Guidelines |
| FESOP | Federally Enforceable State Operating Permit |
| FWS | U.S. Fish and Wildlife Service |
| gpm | gallons per minute |
| IBEC | Iroquois Bio-energy Company |
| IDNR | Indiana Department of Natural Resources |
| INDOT | Indiana Department of Transportation |
| kV | kilovolt |
| kW | kilowatt |
| lb | pound |
| $LD_{50}$ | lethal $dose_{50}$ (dose of a substance that will kill 50 percent of test organisms) |
| mg/l | milligrams per liter |
| MTBE | methyl tertiary-butyl ether |
| NEPA | National Environmental Policy Act |
| NIPSCO | Northern Indiana Public Service Company |
| NPDES | National Pollutant Discharge Elimination System |
| OSHA | Occupational Safety and Health Administration or Occupational Safety and Health Act |
| PCBs | polychlorinated biphenyls |
| $PM_{10}$ | particulate matter with a diameter of 10 microns or less |
| ppm | parts per million |
| PSD | Prevention of Significant Deterioration |
| REMC | Rural Electric Membership Corporation |
| SHPO | State Historic Preservation Office |
| USGS | U.S. Geological Survey |
| VOC | volatile organic compound |
| WDG | wet distillers grains |

# GLOSSARY

| | |
|---|---|
| 100-year floodplain | The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood event of such magnitude that it occurs, on average, every 100 years; the 100-year flood equates to a 1-percent chance of occurrence in a given year. |
| attainment | A state of compliance with one or more of the National Ambient Air Quality Standards. |
| biomass | Organic matter, including wood, agricultural waste, and other living-cell material, that can be burned to produce heat energy. |
| British thermal unit (Btu) | The quantity of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit at 39 degrees F; used as the standard for the comparison of heating values of fuels. |
| Council on Environmental Quality (CEQ) | A council within the Executive Office of the President established by Congress with passage of the National Environmental Policy Act (NEPA). The CEQ coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives. |
| deaerator | A device in which oxygen, carbon dioxide, or other noncondensable gases are removed from boiler feedwater, steam condensate, or a process stream. |
| decibel | A standard unit of measuring sound-pressure levels. |
| decibel, A-weighted | A measurement of sound approximating the sensitivity of the human ear and used to characterize the intensity or loudness of sound. |
| decommissioning | The removal from active service of a facility. |
| economizer | A heat recovery section of a furnace that is designed to capture and remove heat from the flue gas as it leaves the furnace. |
| environmental justice | The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. |
| ethanol | A colorless liquid, miscible (*see* miscibility) with water, used as a reagent and solvent; also known as ethyl alcohol and grain alcohol. |
| feedstock | The raw material furnished to a machine or process. |
| fossil fuel | Any hydrocarbon deposit that may be used for fuel; examples are coal, petroleum, and natural gas. |
| greenhouse gas | A gas, such as carbon dioxide or methane, that contributes to potential climate change. |
| groundwater | The supply of fresh water contained in pores and fractures beneath the surface of the Earth that often supplies wells and springs. |

| | |
|---|---|
| hammermill | A grinding machine that pulverizes feed and other products by several rows of thin hammers revolving at high speed; or, a type of impact mill or crusher in which materials are reduced in size by hammers revolving rapidly in a vertical plane within a steel casing. |
| liquefaction | A change in the phase of a substance to the liquid state; usually, a change from the gaseous to the liquid state, especially of a substance that is a gas at normal pressure and temperature. |
| methyl tertiary-butyl ether (MTBE) | An oxygen-containing fuel component used in reformulated gasoline; commonly made from methanol (methyl alcohol) and isobutene. |
| miscibility | The tendency or capacity of two or more liquids to form a uniform blend; that is, to dissolve in each other. |
| National Ambient Air Quality Standards | Standards established by the U.S. Environmental Protection Agency (EPA) that apply to outdoor air throughout the country; the regulated pollutants, called criteria pollutants, are sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and two size classes of particulate matter. |
| National Environmental Policy Act (NEPA) of 1969 | The Federal statute that is the national charter for protection of the environment; NEPA is implemented by procedures issued by the Council on Environmental Quality and the U.S. Department of Energy. |
| nonattainment | A state of noncompliance with one or more of the National Ambient Air Quality Standards. |
| perennial stream | A stream that contains water at all times except during extreme drought. |
| riparian | Located along a riverbank. |
| runoff | The part of precipitation, snowmelt, or irrigation water that runs off the land into streams or other surface-water; runoff can carry pollutants from the air and land into the receiving waters. |
| saccharification | The process of breaking a complex carbohydrate (as starch or cellulose) into simple sugars. |
| stillage | Residue from the bottom of a still after fermentation. |
| till | Unsorted and unstratified drift consisting of a heterogeneous mixture of clay, sand, gravel, and boulders that is deposited by and underneath a glacier. |
| volatile organic compounds (VOCs) | Substances containing carbon and different proportions of other elements such as hydrogen, oxygen, fluorine, chlorine, bromine, sulfur, or nitrogen; these substances are highly mobile in groundwater and are readily volatilized (vaporized) into the atmosphere at a relatively low temperature. |
| watershed | The drainage area of a stream or river. |
| wetland | An area that is regularly saturated by surface water or groundwater and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. |
| zeolite | A natural or synthetic hydrated mineral (aluminosilicate) with an open three-dimensional crystal structure in which water molecules are held; often called molecular sieves. |

# UNITS OF MEASUREMENT

Measurements in this report are presented in English units. Table MC-1 lists the mathematical values or formulas needed for conversion between metric and English units of measurements.

**Table MC–1. Metric Conversion Chart**

| To Convert To Metric | | | To Convert From Metric | | |
|---|---|---|---|---|---|
| **If You Know** | **Multiply By** | **To Get** | **If You Know** | **Multiply By** | **To Get** |
| **Length** | | | **Length** | | |
| inches | 2.54 | centimeters | centimeters | 0.3937 | inches |
| feet | 0.3048 | meters | meters | 3.281 | feet |
| miles | 1.60934 | kilometers | kilometers | 0.6214 | miles |
| **Area** | | | **Area** | | |
| acres | 4,046.825 | square meters | square meters | 0.0002471 | acres |
| square feet | 0.092903 | square meters | square meters | 10.7639 | square feet |
| square miles | 2.58999 | square kilometers | square kilometers | 0.3861 | square miles |
| **Volume** | | | **Volume** | | |
| cubic feet | 0.02831 | cubic meters | cubic meters | 35.31467 | cubic feet |
| cubic yards | 0.76455 | cubic meters | cubic meters | 1.30795 | cubic yards |
| gallons | 3.7854 | liters | liters | 0.26417 | gallons |
| bushels | 35.239 | liters | liters | 0.02838 | bushels |
| barrels | 115.627 | liters | liters | 0.008648 | barrels |
| **Temperature** | | | **Temperature** | | |
| Fahrenheit | Subtract 32 then multiply by 5/9ths | Celsius | Celsius | Multiply by 9/5ths then add 32 | Fahrenheit |
| **Mass** | | | **Mass** | | |
| tons (U.S.) | 0.907 | metric tons | metric tons | 1.10 | tons (U.S.) |

This page intentionally left blank.

# 1.0 INTRODUCTION

Based on action by the U.S. Congress, the U.S. Department of Energy (DOE) has funding available to support a proposal by the Iroquois Bio-energy Company (IBEC), an Indiana limited liability company, to construct a fuel ethanol plant in Jasper County, Indiana (the proposed plant). Congress has acknowledged the merit of this project by providing specific funding through DOE. Consequently, DOE proposes to provide partial funding to IBEC to subsidize the design and construction of the proposed plant (the Proposed Action). In accordance with DOE and National Environmental Policy Act (NEPA) implementing regulations, DOE is required to evaluate the potential environmental impacts of DOE facilities, operations, and related funding decisions. The proposal to use Federal funds to support the project requires DOE to address NEPA requirements and related environmental documentation and permitting requirements. In compliance with NEPA (42 U.S.C. §§ 4321 et seq.) and DOE's NEPA implementing regulations (10 CFR section 1021.330) and procedures, this environmental assessment (EA) examines the potential environmental impacts of DOE's Proposed Action and a No Action Alternative.

## 1.1 The National Environmental Policy Act and Related Procedures

The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508) and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021) require that DOE, as a Federal agency:

- Assess the environmental impacts of its proposed actions;
- Identify any adverse environmental effects that cannot be avoided should a proposed action be implemented;
- Evaluate alternatives to the proposed action, including a no action alternative;
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterize any irreversible and irretrievable commitments of resources that would be involved should the proposed action be implemented.

These requirements must be met before a final decision is made to proceed with any proposed Federal action that could cause significant impacts to human health or the environment. This EA is intended to meet DOE's regulatory requirements under NEPA and provide DOE, the State of Indiana, and other agency decision-makers with the information they need to make informed decisions in connection with the design and construction of the proposed plant.

This EA evaluates the potential individual and cumulative effects of the Proposed Action. No other action alternatives are analyzed (an alternate location, a former rock quarry, was assessed by IBEC as a possible site for the proposed plant but was deemed unsuitable; the site is discussed in this EA as an alternative that was considered but not analyzed [see Section 2.3]). For purposes of comparison, this EA also evaluates the impacts that would occur if DOE decided not to subsidize the design and construction of the fuel ethanol plant (the No Action Alternative).

This EA has been prepared under DOE's regulations and guidelines for compliance with NEPA (42 U.S.C §§ 4321 *et seq*.). A draft version of this EA was distributed to interested members of the public and to Federal, state, and local agencies for review and comment prior to DOE's final decision on the Proposed Action.

## 1.2 Proposed Plant

Annually, the proposed plant would dry-mill, ferment, and distill approximately 14.3 million bushels of locally grown corn that would normally be delivered to the proposed plant by truck. Annually, the proposed plant would produce up to 40 million gallons of denatured fuel ethanol; 128,600 tons of distillers dried grains with solubles (DDGS); and 121,000 tons of raw carbon dioxide gas (CO2).

The denatured ethanol would be shipped from the proposed plant by rail or truck for use as a gasoline additive in regional markets. DDGS would be shipped from the proposed plant by rail or truck and sold as agricultural feedstock. CO2 would be recovered and sold to a third party for liquefaction in a prefabricated CO2 liquefaction plant (the CO2 plant) that would be located adjacent to the proposed fuel ethanol plant on the same site. DOE funding would not subsidize the design or construction of the CO2 plant.

The footprint of the proposed plant would be approximately 15 acres. All requisite state air emission permits have been issued; all requisite state water discharge permit applications have been prepared and are ready for submission consistent with Indiana's required water discharge permit submission schedule. The proposed plant would be situated on an approximately 70-acre site located approximately 3 miles east of Rensselaer, Indiana. Figure 1-1 shows the location of the proposed plant.

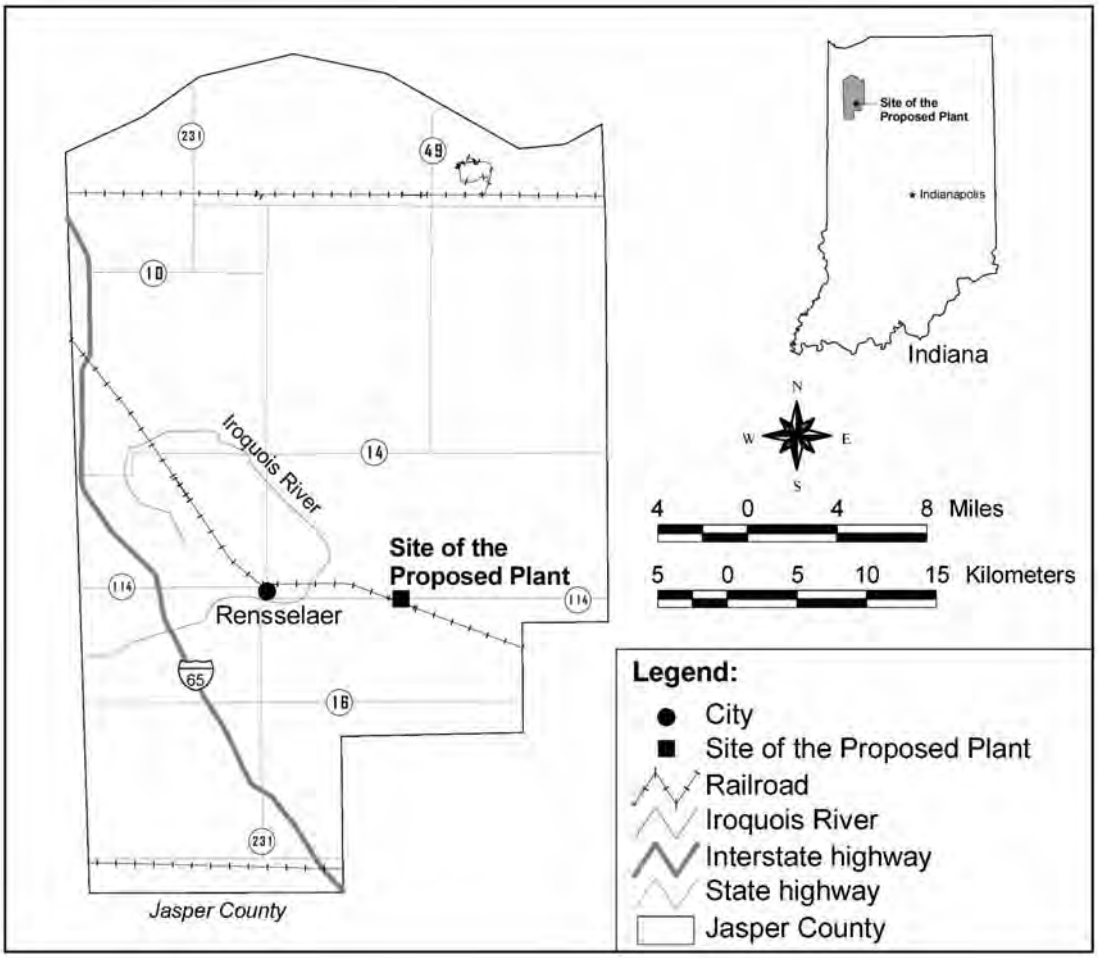


**Figure 1-1. Location of the Proposed Fuel Ethanol Plant, Jasper County, Indiana**

## 1.3 Background

When added to gasoline, certain chemical compounds, in particular ethanol and methyl tertiary-butyl ether (MTBE), reduce exhaust emissions of volatile organic compounds (VOCs), cancer-causing aromatic compounds, carbon monoxide, oxides of nitrogen, and other air toxics. These additives are called gasoline oxygenates because they increase the oxygen content of gasoline. They provide clean octane and are particularly useful in reducing emissions from off-road vehicles and high-emitting vehicles.

The Clean Air Act Amendments of 1990 (CAAA) established the Reformulated Gasoline Program to improve air quality by reducing emissions from automobiles in cities across the country that exceed public health standards for smog, also known as ground-level ozone. Phase 1 of the Reformulated Gasoline Program required refiners distributing gasoline in nine severe ozone nonattainment areas to reduce VOCs and toxic emissions by 15 percent. Phase 2 of the program, which began January 1, 2000, required VOCs to be reduced by 27 percent and toxics by 20 percent. The addition of ethanol and MTBE to gasoline has been a key element of the Reformulated Gasoline Program.

Since 1979, MTBE has been used in U.S. gasoline at low levels to replace lead as an octane enhancer; since 1992, it has been used at higher concentrations in some gasoline to fulfill the oxygenate requirements of the CAAA. In 1998, however, in response to rising national concern about the presence of MTBE in groundwater and the potential threat it posed to public health and the environment, the Administrator of the U.S. Environmental Protection Agency (EPA) appointed a blue ribbon panel to assess policy options for MTBE. The panel recommended that the use of MTBE be dramatically reduced or eliminated (EPA 2004a).

The recommended substantial reduction or elimination of MTBE as a gasoline additive has substantially increased the demand for ethanol as an additive. In early 2000, it was estimated that the replacement of MTBE with ethanol would increase the annual demand for ethanol to nearly 3.2 billion gallons by 2004 (Urbanchuk 2000). This increased demand is being met by improving production efficiency, expanding existing operating facilities, and constructing new, state-of-the-art fuel ethanol plants such as the proposed plant.

## 1.4 Purpose and Need

By partially funding the design and construction of the proposed plant, DOE would support a collaborative effort by DOE and IBEC. Both DOE and IBEC have distinct needs that would be partially met by DOE's Proposed Action.

***U.S. Department of Energy.*** The Proposed Action partially addresses two related national needs: reduced dependency on fossil fuels and reduced environmental pollution. It is a mission of DOE to further the conversion of biomass (renewable plant-derived material) into fuel and power in order to reduce U.S. dependence on foreign oil. The Proposed Action would partially reduce this dependence by supporting a private-sector enterprise to generate fuel ethanol, the only renewable alternative to fossil-based transportation fuels. In addition, the Proposed Action would partially meet the need to reduce or eliminate the use of MTBE, a serious and persistent threat to groundwater quality, by furthering the production of a viable alternate gasoline oxygenate, ethanol.

***Iroquois Bio-energy Company.*** IBEC is a small farmer cooperative venture. Its mission includes "enhancing the value of the family farmer, our rural community, our investors, and the people of the United States through the production and marketing of ethanol and its by-products." IBEC needs to raise capital for the design and construction of a fuel ethanol plant. DOE's Proposed Action would partially meet that need by providing a small percentage, less than 5 percent, of the requisite construction capital.

## 1.5 Scoping

In November 2004, DOE sent scoping letters to the U.S Fish and Wildlife Service (FWS), the Indiana State Historic Preservation Office (SHPO), and the Indiana Department of Transportation (INDOT). The scoping letters described the Proposed Action and requested assistance in identifying potential issues that should be evaluated in this EA. DOE also sent scoping letters to other potentially interested organizations and agencies, including the State of Indiana's NEPA point of contact. DOE ran a 3-day legal notice in a local newspaper, the *Rensselaer Republican*, to inform the public of the Proposed Action and to solicit public comments. DOE received only one response from the newspaper notice and the scoping letters sent to interested organizations—an e-mail response from a member of the Jasper County Coop expressing no objections to the proposed plant. Appendix A contains copies of the scoping letters, Appendix B contains the responses DOE received from the agency scoping letters, and Appendix C contains the scoping letter distribution list.

# 2.0 PROPOSED ACTION AND ALTERNATIVES

Under the Proposed Action, DOE would provide partial funding to subsidize the design and construction of a fuel ethanol plant near Rensselaer, Indiana. Section 2.1 describes both general and site-specific activities that would occur if DOE provided the partial funding and the proposed plant were constructed and operated. The No Action Alternative is described in Section 2.2. Alternatives considered in this EA are limited to the Proposed Action and the No Action Alternative.

The Proposed Action results from consideration of a proposal for a grant. The grant application establishes the scope and approximate location of a project designed to partially meet DOE needs as defined in Section 1.4. The decision to be supported by this EA is whether to provide funds for the grant based on its merit in meeting DOE needs and considering the potential environmental consequences of the project. Consequently, no alternatives to the Proposed Action, other than the No Action Alternative, are considered by DOE in this EA. However, the grant applicant, IBEC, commissioned a Phase I and a Phase II Environmental Site Assessment (Environmental Incorporated 2002a and 2002b) of a candidate alternative site, a former rock quarry. Pursuant to these assessments, IBEC concluded and documented that the former rock quarry did not represent a feasible alternate location for the fuel ethanol plant. Consequently, the former rock quarry site is discussed in Section 2.3 as an alternative that was considered but not analyzed.

## 2.1 Proposed Action

If the Proposed Action were authorized (i.e., if DOE provided partial funding for the proposed fuel ethanol plant), IBEC would execute a contract with Fagen Inc. of Granite Falls, Minnesota, to design and construct a new fuel ethanol plant near Rensselaer, Indiana. The plant would produce denatured ethanol from corn for use as a gasoline additive. One bushel of corn would produce at least 2.8 gallons of denatured ethanol. The ethanol would be denatured by adding unleaded gasoline (5 percent) to prevent human consumption. Upon completion of construction, IBEC would operate the proposed plant. Operations would be continuous (three 8-hour daily shifts) except for scheduled cleaning, preventive maintenance, and repairs. The proposed plant would employ 30 to 35 people and would operate a minimum of 350 days per year. The plant would be constructed largely of stainless steel and have a minimum operating life of at least 30 years.

The proposed plant would be situated on an approximately 70-acre site zoned for open industrial use (Jasper County 2004). A full description and photographs of the proposed site are provided in Section 3.1. Figure 2-1, the site plan, illustrates the 15-acre plant footprint and the approximate location of major plant elements, including the CO2 plant. The CO2 plant is not a component of DOE's Proposed Action, but its potential for resulting in cumulative impacts is discussed in Section 4.0.

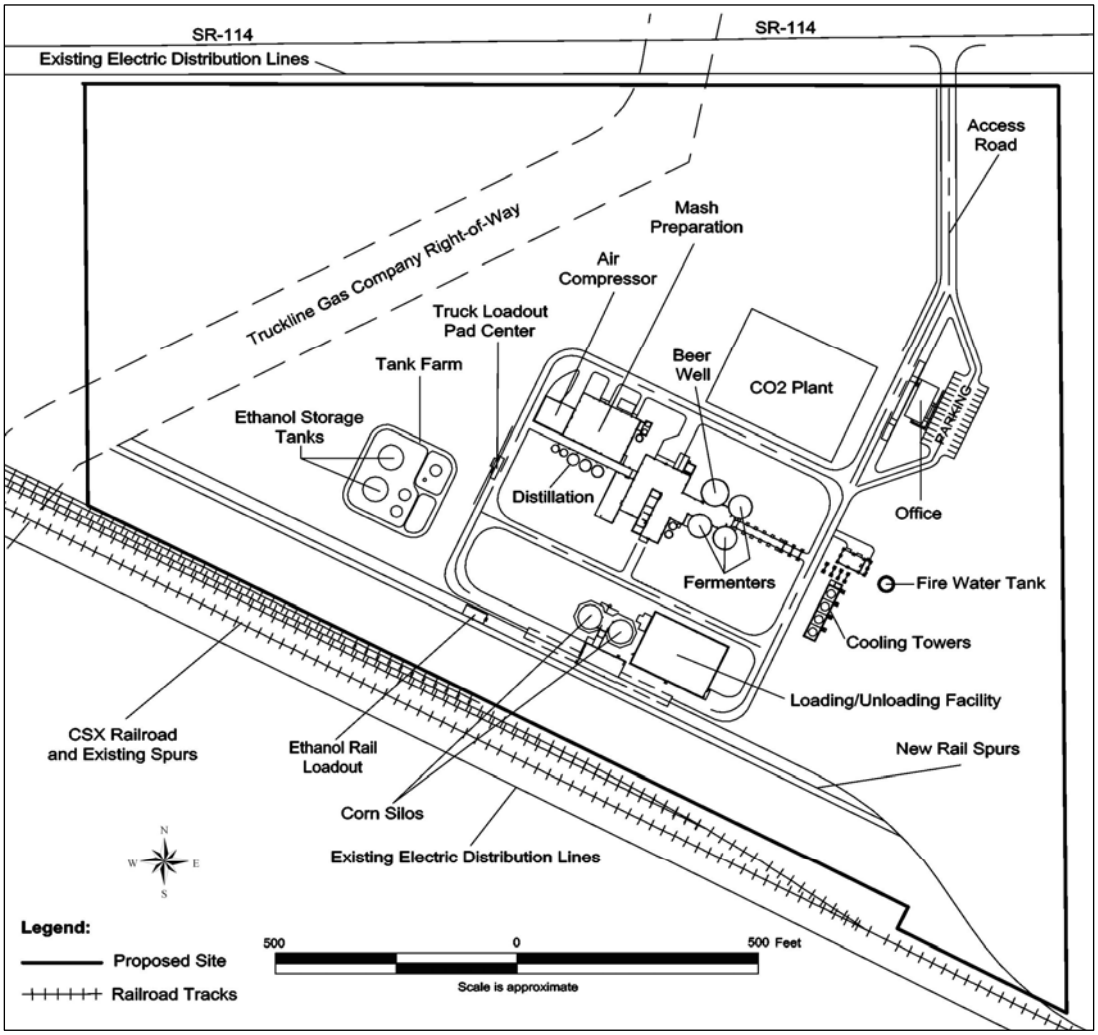


**Figure 2-1. Site Plan for the Proposed Plant**

### *2.1.1 Construction*

Turnkey construction of the proposed plant by Fagen Inc. would take approximately 13 months, would utilize 30 to 80 workers (depending on the stage of construction), and would utilize standard construction equipment. The proposed site is flat and devoid of trees, structures, or visible outcroppings, which obviates the need for clearing or blasting. All requisite construction staging would be done on the site. IBEC has targeted plant construction to begin in mid-2005 and start-up in mid-2006.

### *2.1.2 Operations*

This section describes (1) material inputs and outputs during plant operation and the logistics that would be used for handling materials, (2) the major types of equipment, and (3) the processes that would be used at the proposed plant.

#### *2.1.2.1 Material Balance and Logistics*

*Input*

Annually, the proposed plant would dry-mill, ferment, and distill approximately 14.3 million bushels of primarily locally grown, No. 2 yellow dent shelled whole corn. Plant processes would require use of the following materials: process enzymes, yeast, unleaded gasoline (2 million gallons per year), sodium hydroxide, sulfuric acid, ammonia, calcium chloride, caustic soda, nitrogen, detergent, water treatment additives, and routine consumables. The plant would also use approximately 400 gallons per minute (gpm) of groundwater (645 acre-feet annually) for process feed water, sanitation, emergencies, and other uses. Two high-capacity wells would supply the groundwater; they would be installed on the plant property and would be used on alternate days. Annually, the plant would also use approximately 9.5 tons of corrosion inhibitor, assuming a typical application rate of 20 pounds (lbs) per 1,000 barrels of ethanol produced. The corrosion inhibitor would be added to the denatured ethanol prior to shipment.

*Output*

Annually, the proposed plant would produce approximately:

- 40 million gallons of denatured fuel ethanol;
- 128,600 tons of marketable distillation by-product called corn DDGS; the plant may also produce wet distillers grains (WDG) as a marketable by-product; WDG is economically preferable because it reduces the cost of drying operations.
- 121,000 tons of marketable CO2.

*Waste*

Approximately 100 gpm of non-process wastewater (boiler blowdown and cooling tower water) and additives would be discharged from the plant (see Section 3.2.4.2). The discharge would be permitted under a National Pollutant Discharge Elimination System (NPDES) permit, would occur through a single outfall into the system of drainage ditches that drain the area, and ultimately would reach the Iroquois River (see Section 3.2.4.2). All process water would be close-cycled. In addition to discharge water, annual plant wastes would include approximately 3,000 lbs of scale and residue cleaned from process equipment, approximately 1,200 cubic feet of spent zeolite beads from molecular sieves, and routine solid waste. These wastes would be disposed of at the Newton County landfill, a licensed landfill located approximately 17 miles west of the proposed plant (see Section 3.2.5.2). Air emissions are described in Section 3.2.1.2.

*Logistics*

Corn (usually locally grown) would be delivered to the plant primarily by semi-trailer trucks operated by 50 to 60 contract haulers. Unleaded gasoline that would be added to the fuel ethanol as a denaturant would be delivered to the plant by tank truck. All other inbound materials, including chemicals, potable water, and miscellaneous supplies, would also be delivered by truck. Workers, small business vendors, mail carriers, and miscellaneous visitors would access the plant by car or light truck.

Approximately half of the plant's annual production of denatured fuel ethanol would be shipped by truck and half by rail, although the proportion of truck and rail shipments would vary with market factors and destination. The fuel ethanol would be sold primarily to gasoline terminal refiners, blenders, and distributors as an oxygenate and octane-enhancing additive for automotive fuels. Outbound shipments of

fuel ethanol by-products (WDG and DDGS) would be by truck and rail. Shipments of CO2 (see Section 4.0) and solid waste would be by truck.

Pursuant to consultations with and as required by INDOT, IBEC commissioned a traffic impact analysis (Abonmarche Consultants 2005). The analysis recommended the construction of a large commercial driveway with acceleration and deceleration lanes and a "passing blister" on the north side of SR-114 opposite the driveway. INDOT reviewed and concurred with the recommendations. IBEC commits to constructing the driveway, acceleration and deceleration lanes, and passing blister as elements of the Proposed Action.

Rail transport would require that a new 2,000-foot spur to the plant be installed from the CSX main rail line, with three tracks for train car loading and storage. This spur would be used primarily to transport the ethanol and plant by-products to regional markets. However, the plant could receive corn by rail if local supplies were temporarily disrupted. CSX would install the spur and switching equipment. IBEC would design and construct the three-track rail yard.

Major terminals potentially receiving ethanol from the proposed plant are located in Gary, Indiana; Chicago; Indianapolis; Detroit; Cincinnati; Decatur, Illinois; Pekin, Illinois; and Niles, Michigan. By-products would be shipped from the proposed plant by rail or truck for sale as agricultural feed. The DDGS would be sold primarily as protein for cattle feedlots and for swine and poultry feed. If the DDGS was not dried, the co-product would become WDG and would be sold to local dairies and animal feedlots. The WDG market could average 40 to 45 percent of the distillers grains produced. Local farm vehicles would be used to transport WDG to consumers.

Section 3.2.6 and Appendix D contain a more detailed discussion and analysis of projected traffic.

#### *2.1.2.2 Major Plant Components*

The major plant components would be:

- Administration building;
- Corn delivery, storage, and milling equipment;
- Mashing, liquefaction, fermentation, and distillation equipment;
- By-product centrifugation and drying equipment;
- Ethanol and DDGS storage and loadout equipment;
- Utilities, including electrical substation; natural gas connection; emission control equipment; railroad spur and switch, fire protection system; septic system; access roads and parking; and general stores.

The administration building would house plant management; input and output scales, oversight and quality control functions; employee facilities; security; and environment, safety and health operations.

#### *2.1.2.3 Process Description*

This section describes the processes and process streams that would be used in the proposed plant. Figure 2-2 shows the process flow for the proposed plant.

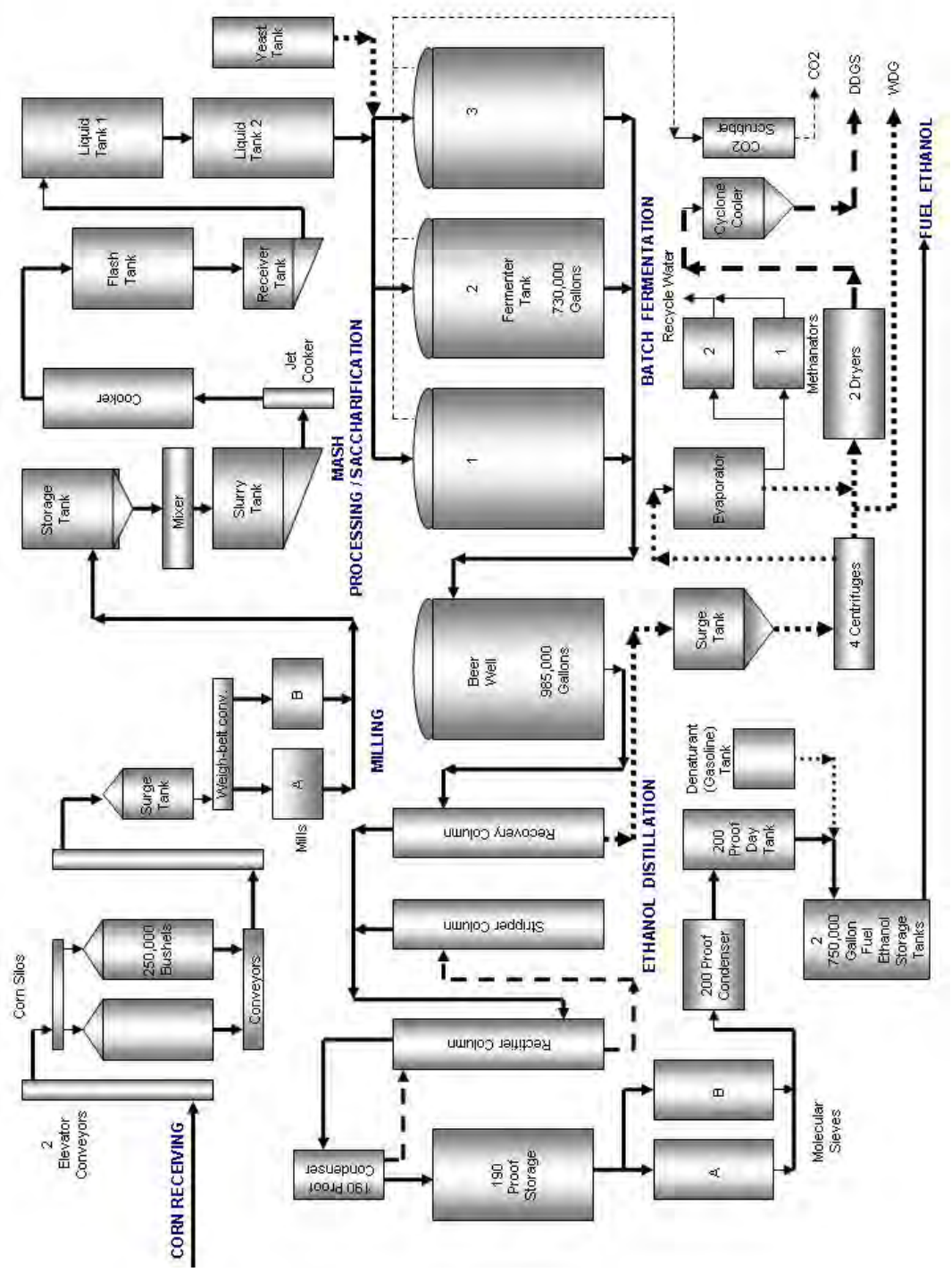


**Figure 2-2. Processes and Process Streams in the Proposed Plant**

*Corn Receiving, Storage, and Milling*

Arriving corn would be driven onto a weigh-scale located near the administration building, weighed, sampled, and then driven to the corn receiving building for dumping. The corn receiving building would be designed to accommodate two end-dump trailers in the corn receiving bays. (The rail receiving bay would be for contingency only. Unless a drought, other disaster, or temporary labor shortage disrupted the local corn supply, all corn deliveries would be by truck.) The estimated maximum truck dump time would be about 10 minutes.

After the corn is dumped, two independent 15,000-bushel-per-hour bucket elevator conveyors would lift the corn for discharge into one of two 250,000–bushel concrete storage silos. A dust collection system would be provided on the grain receiving system to limit particulate emissions. From the corn storage silos, the corn would be conveyed to a 4,000–bushel surge bin equipped with a weigh-belt that would meter the corn to two hammermills for grinding. Another dust collector would be provided to control air and particulate emissions from the hammermills. The milled corn would be conveyed to a combination dust collector and storage tank. The meal would then be fed to a mixer in preparation for transfer into a slurry tank that feeds a jet cooker.

*Mash Processing and Saccharification*

After the milled corn from the storage tank is transferred to the mixer, it would be mixed with hot backset (recycled) water and enzymes, then passed through the steam jet cooker to liquefy the starch. High steam temperatures would sterilize bacteria in the mash. Saccharification is a process whereby the hot mash and enzymes from the cooker would be cooled and a secondary enzyme added to convert the liquefied starch to dextrose, a fermentable sugar. The cooked mash would be flash-cooled, then transferred to a receiver tank and two liquid hold tanks that feed the fermenters. The yeast would be prepared and held in a separate tank for mixing with the mash as it is pumped into the fermenters.

*Batch Fermentation*

Cooked mash and yeast slurry would be pumped through liquefaction tanks and into one of three 730,000-gallon batch fermentation vessels. Each fermentation vessel would have an independent cooler, side-mounted agitator, and dome duct for CO2 removal. The temperature-controlled mash would be pumped into the fermenter along with a prescribed amount of yeast/enzyme slurry. The enzyme breaks down the dextrose into glucose, a simple sugar that is converted by the yeast into ethanol and CO2. The fermenter temperature would be controlled by circulating the mash through individual fermenter coolers. The fermentation cycle would average about 48 hours. During the fermentation cycle, CO2 would be generated and would flow from the tank through an overhead duct to a wet-scrubber. The wet-scrubber would remove any traces of alcohol in the CO2. After scrubbing, the CO2 would be vented to the CO2 plant (see Section 4.0).

The fermented mash, now called beer, would contain the converted sugars and ethanol and would be pumped to a 985,000-gallon distillation feed tank, or “beer well.” The beer well would provide the feed to the distillation system that would separate the ethanol from the stillage (residual solids and liquids). The beer would contain about 11 to 14 percent ethanol, as well as all the non-fermentable solids from the corn and yeast cells. The empty fermenter units would be rinsed and cleaned in place in preparation for the next batch. The hot rinse water used in cleaning the fermenter would be piped to a holding tank and reused for cooking water.

*Ethanol Distillation*

Beer would be continuously pumped from the beer well to the top of the multi-column distillation system. Steam would be injected at the bottom of a stripper/rectifier column, and ethanol would travel up the

column as a vapor. The stillage would flow down and out of the column. The vaporized ethanol would be approximately 93 to 95 percent pure (186- to 190-proof) at the top of the column. The ethanol would then be stored in a 190-proof storage tank or immediately pumped through a vaporizer/superheater and volatilized into a molecular sieve system.

A fuel ethanol distillation molecular sieve is a series of vessels packed with zeolite, a natural or synthetic mineral that dehydrates the ethanol gas (removes all remaining water from the ethanol). The 186- to 190-proof ethanol gas would alternate from one zeolite bed to another every 8 minutes. Essentially pure (99.95 percent) ethanol would pass through the molecular sieve and into a 200-proof condenser and then into a storage tank for analysis before going to the final storage tank in preparation for denaturing and loadout.

Water would be retained by the molecular sieve. When the zeolite in one cell of the molecular sieve becomes saturated with water, the ethanol stream would be redirected into another and the saturated zeolyte would be regenerated by reversing the flow through the bed. Once the water is removed from the zeolite, the sieve would be ready for reuse. The molecular sieve material would be replaced about every 3 to 4 years.

*Ethanol Denaturing and Loadout*

The pure ethanol would be pumped from the day holding tank to the fuel ethanol storage tank, where it would be denatured by the addition of 5 percent unleaded gasoline. The final product would be stored in two 750,000–gallon final storage tanks. Prior to shipment, a corrosion inhibitor additive would be added to remove any trace water from the denatured ethanol. The tank farm would include loading facilities for both truck and rail shipment. The tank farm, which would be contained within lined berms for spill protection, would include one tank for 190-proof storage, one tank for 200-proof storage, one tank for unleaded gasoline storage, and two 750,000–gallon tanks for denatured ethanol (final product) storage.

*By-product Processing and Loadout*

Once the ethanol is removed by distillation, the remaining stillage would be pumped into a surge tank; from there, it would be fed to four centrifuges. After the stillage is centrifuged, the wet product would be either sent to a loadout point for sale to local farms and dairies as WDG or mixed with syrup from the evaporator and dried into DDGS. The DDGS and syrup would be dried to about 10 percent moisture. After drying and cooling, the DDGS would be pneumatically conveyed to the DDGS storage building. From the storage building, the product would be shipped by scooping and pushing it with a front-end loader into an in-floor conveyor system with a loadout pit. The loadout pit would accommodate approximately one semi-trailer load.

*Process and Plant Support Systems*

A 125-million British thermal unit (Btu) per hour, gas-fired, regenerative thermal oxidizer/heat-recovery boiler would provide steam for cooking, distillation, evaporation, and other plant uses. Nominally, the regenerative thermal oxidizer would achieve a minimum of 95 percent efficiency in destroying VOCs and particulate matter generated in the DDGS drying system. The heat required to complete thermal oxidization would then be vented to a waste heat boiler that would produce 100 percent of the plant's steam requirements. Exhaust gases from the waste heat boiler would be vented through stack gas economizers to recover the maximum amount of heat possible from the exhaust gas stream. After passing through the economizers, the gas stream would be vented to the atmosphere through a stack.

Water for boilers, mash cooking, cooling towers, and other processes would be obtained from on-site wells and would be pretreated as necessary on an application-specific basis. Boiler water conditioned in

regenerative softeners would be pumped through a deaerator scrubber and into a deaerator tank. Industry standard boiler water treatment chemicals would be added as preheated water is sent to the boiler.

The plant would require one or two new 69-kilovolt (kV) electrical taps (new lines strung on existing poles) from the Northern Indiana Public Service Company (NIPSCO) system to a new Jasper County Rural Electric Membership Corporation (REMC) capacitor station that would be built on approximately 2 acres of the plant site and enclosed with a security fence. One tap would be approximately 2.5 miles long and the second, if installed, would be about 4 miles long. (The double tap is an option under consideration that would increase reliability of service to the plant and provide a more consistent voltage level during normal or backup service conditions.) REMC would also provide secondary 12.5-kV service.

Plant processes would be cooled by circulating water through heat exchangers, a chiller, and a cooling tower. The plant would be supported by a compressed air system consisting of air compressors, a receiver tank, pre-filter, coalescing filter, and double air dryers. Dual air systems would independently support plant air and instrument/control equipment. Fuel ethanol production by fermentation of hammer-milled whole corn requires the addition of ammonia, or other sources of nitrogen, for proper yeast growth. The proposed plant would use ammonia delivered to the plant by truck and stored in an 18,000-gallon aboveground ammonia storage tank.

The design would incorporate a “clean-in-place” system for cleaning cooking, fermentation, distillation, and evaporation units; centrifuges; and other systems. The system would use 50 percent caustic soda that would be delivered by truck and stored in a tank.

Under normal operating conditions, the proposed plant would not discharge any wastewater that has been in contact with corn, corn mash, cleaning systems, or any process water. An ICM/Phoenix Bio-Methanator would be used to reduce the organic acids in process water, allowing complete reuse within the plant.

The City of Rensselaer and Jasper County do not have drinking water or sewer lines that reach the proposed site. The plant would use a mound-design sanitary waste septic system, and a commercial vendor would provide bottled drinking water.

Most plant processes would be computer-controlled by a Siemens Moore Advanced Process Automation Control System with a graphical user interface and three workstations. The control room console would have dual monitors to facilitate operator interface between two graphics screens. Additional programmable logic controllers would control certain process equipment.

The cooking system would require the use of anhydrous ammonia, and other systems would require the use of sulfuric acid. Therefore, an on-site storage tank for ammonia and a storage tank for sulfuric acid would be installed with provisions to contain and control any spills. The ammonia storage would require that plant management implement and enforce a Process Safety Management program.

A fire lane loop would be installed and equipped with fire hydrants, cannons, and other equipment as required by the State Fire Marshall. The water loop would require connections for hoses, pumps, and water supply from sources such as a fire water pond. A foam system may be required at each tank holding flammable material, with water monitors strategically positioned around each tank; the foam system would be installed in accordance with the State Fire Marshall’s requirements. A dry sprinkler system would be installed in corn receiving and milling areas, DDGS storage and loadout areas, boiler areas, some dust collection systems, and the administration building. Fire extinguishers would be installed throughout the plant.

Figure 2-3 shows the Badger State Ethanol, LLC, Fuel Ethanol Plant in Monroe, Wisconsin, while under construction by Fagen Inc. The plant opened in 2003 and has a capacity and design essentially identical to those of the proposed plant.

**Figure 2-3. Badger State Ethanol, LLC, Fuel Ethanol Plant in Monroe, Wisconsin**

## 2.2 No Action Alternative

Under the No Action Alternative, DOE would not provide partial funding to subsidize the proposed fuel ethanol plant.

## 2.3 Alternative Considered But Not Analyzed

Before selecting the proposed site, IBEC considered an alternate site and commissioned a Phase I and a Phase II Environmental Site Assessment (Environmental Incorporated 2002a and 2002b). The alternate site is a former rock quarry north of SR-114 and northwest of the proposed site (see Figure 3-2). The Environmental Site Assessment concluded that the former rock quarry site had nine recognized environmental conditions with potential environmental liabilities. These included, but were not limited to, the presence of 55-gallon drums with unknown constituents, poor housekeeping, unknown disposal and closure procedures in the quarry, tar disposal areas, possible underground storage tanks, and the potential presence of asbestos. In addition to these potential environmental liabilities, the former rock quarry site offered a less favorable location in terms of gas pipelines, transportation infrastructure, and grain handling facilities. The former rock quarry site is also very close to private residences and a street intersection. For these and other reasons, this site was not pursued as a viable option.

# 3.0 EXISTING ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Section 3.1 provides a general physical description of the site where the fuel ethanol plant would be constructed if the Proposed Action were implemented. For each of 12 specific resource or impact areas, Section 3.2 characterizes the existing environment and the adverse or beneficial environmental consequences that would occur or could reasonably be expected to occur if the Proposed Action were implemented. For comparison purposes as required under NEPA, Section 3.3 describes adverse or beneficial environmental consequences that would occur if the Proposed Action were not implemented (that is, if the No Action Alternative were implemented).

## 3.1 General Site Description

The following description is based primarily on the Phase I Environmental Site Assessment (Environmental Incorporated 2003) of the site commissioned by IBEC and conducted in general conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) Standard E1527-00, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.* The Phase I Environmental Site Assessment is incorporated into this EA by reference. All readily visible general characteristics of the site cited in the Environmental Site Assessment were confirmed during a site visit by DOE in November 2004. Figure 3-1 illustrates the current appearance of the site and its immediate vicinity. Figure 3-2 is an aerial view of the proposed site and the surrounding area.

***Location.*** The address of the proposed site is 751 West SR-114, Rensselaer, Indiana 47978. It is outside the Rensselaer city limits, east of Pleasant Ridge, in Marion Township, Jasper County, Indiana. The proposed site is part of the southwestern quarter of Section 25, Township 29 North, Range 6 West of the Second Principal Meridian. The site plan shown in Figure 2-1 illustrates the shape and location of the proposed site. Title to the proposed site is currently subject to the terms of an escrow agreement between IBEC and Wuethrich Pork & Grain, Inc.

***General Physical Characteristics.*** The site is 68.9 acres of generally flat, open farmland, although the eastern portion is topographically higher than the rest. SR-114 runs immediately north of and parallel to the site's northern border. Grain silos, equipment barns, and aboveground ammonia storage tanks owned by Wuethrich Pork & Grain, Inc. are located directly north of SR-114 on the site's northeast quadrant. Several above ground ammonia storage tanks and other structures owned by the Northwest Indiana Grain Facility, and a grain elevator and other structures owned by the Jasper County Coop are located directly south of SR-114 on the proposed site's western border. The CSX main railroad line and several rail spurs that service the Northwest Indiana Grain Facility and the Jasper County Coop Pleasant Ridge Elevator form the site's southern border. A former rock quarry, which is now flooded, and various abandoned quarry structures and wastes are situated north of SR-114 just northwest of the proposed site. Beyond these structures the site is surrounded by extensive farm fields. A natural gas pipeline right-of-way owned by Truckline Gas Company runs from the site's southwest corner to the approximate middle of its northern border (see Figure 2-1). A pole-mounted electric power distribution line operated by REMC runs partially along the site's northern border parallel to SR-114.

The site is accessed from SR-114 via a gravel entrance road situated along the northeastern portion of the site or via a grass-covered entrance road (located over a steel and concrete culvert) situated in the north-central portion of the site. A gravel drainage ditch trends in an east-west direction, immediately north of the site and south of SR-114. The 2-foot-diameter steel and concrete culvert that runs under SR-114 in a north-south direction connects a drainage ditch north of SR-114 with a drainage ditch located immediately north of the site.

View Facing North from South-Central Part of Site

Former Godlove Sanitary Service Area in Northeast Part of Site

View Facing West along Site's Northern Border Just South of West SR-114

View Facing Northeast from Site's Southwest Corner

View Facing Northwest from Site's Southeast Corner

Drainage Culvert Under West SR-114

**Figure 3-1. Current Appearance of the Site and Immediate Vicinity**

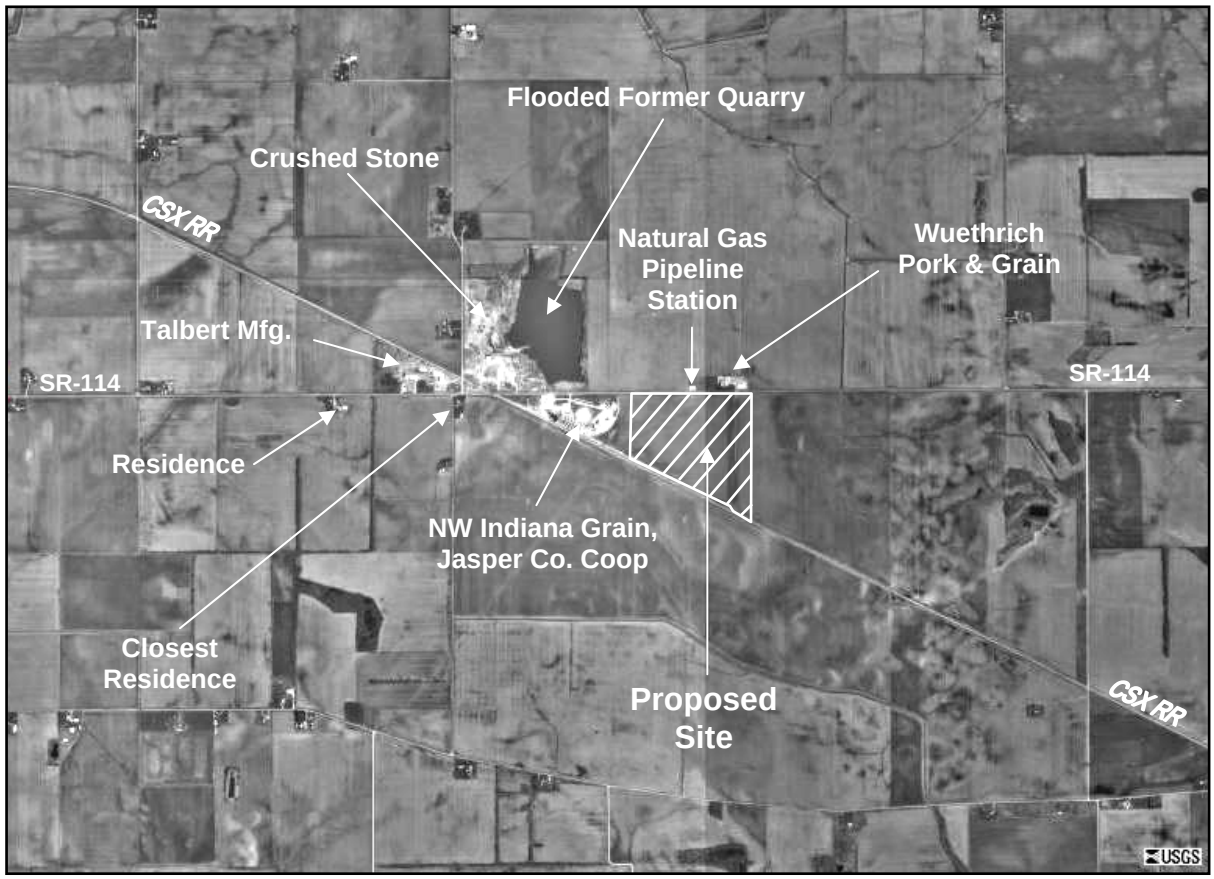


**Figure 3-2. Aerial View of the Proposed Site and the Surrounding Area**

## 3.2 Existing Environment and Consequences of Proposed Action

### *3.2.1 Air Quality and Meteorology*

#### *3.2.1.1 Existing Environment*

*Air Quality*

The National Ambient Air Quality Standards established by the EPA define the allowable concentration of criteria air pollutants that may be reached but not exceeded in a given time period. These standards were established to protect human health (primary standards) and welfare (secondary standards) with a reasonable margin of safety. The criteria pollutant standards establish maximum concentrations for ozone, carbon monoxide, nitrogen oxides, sulfur dioxide, lead, and particulate matter with a diameter of 10 microns or less ($PM_{10}$). Ozone is formed by the photo-oxidation of reactive hydrocarbons in the presence of nitrogen oxide. Emissions of VOCs that participate in atmospheric photochemical reactions also result in ozone formation.

Jasper County is in attainment for all criteria air pollutants, including the new 8-hour ozone standard (EPA 2004b). (All 92 Indiana counties are in attainment for carbon monoxide, nitrogen dioxide, and $PM_{10}$. However, part or all of Lake County, Portier County, and La Porte County, located north of Jasper County, are nonattainment areas for ozone and sulfur dioxide due to the influence of Chicago, Gary, and neighboring urban areas.) Because the proposed plant would not be built in a criteria air pollutant

nonattainment or maintenance area, a full CAAA conformity determination is not required. More generally, the EPA AIRData Air Quality Index Summary Report indicates that for all days in 2003 and all days in 2004 for which data have been reported, the air quality index in Jasper County was "good," the best rating that is given by the index (EPA 2004c).

In areas that are in criteria air pollutant attainment status, the maintenance of air quality is mandated by the Prevention of Significant Deterioration (PSD) provisions of the CAAA. In general, these provisions include (1) a permit review process applicable to the construction and operation of new and modified stationary sources in attainment areas, (2) a requirement that a new source obtain a preconstruction permit demonstrating that the source will implement the required technologies to control future emissions of pollutants, and (3) a demonstration that the new source will not exceed the PSD increment (that is, the maximum increase in concentration that is allowed to occur above the baseline concentration for a pollutant).

*Meteorology*

The proposed plant would be built in the south-central Kankakee River Basin, which is part of the Illinois River Basin. The climate of the Kankakee River Basin is classified as temperate continental, which describes areas with warm summers, cool winters, and the absence of a pronounced dry season. The proposed site is south of the portion of the Kankakee River Basin that is generally subject to lake-effect weather from Lake Michigan. Table 3-1 shows monthly meteorological data recorded for Rensselaer.

**Table 3-1. Monthly Meteorological Data for Rensselaer, Indiana**

| Data | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avg. Temp. ($^{o}$ F) | 22.4 | 27.1 | 38.3 | 49.5 | 61.2 | 70.5 | 74.0 | 71.8 | 64.5 | 52.2 | 40.2 | 28.2 |
| High Temp. ($^{o}$ F) | 30.4 | 35.7 | 47.4 | 60.0 | 72.3 | 81.4 | 84.5 | 82.5 | 76.2 | 63.5 | 48.6 | 35.6 |
| Low Temp. ($^{o}$ F) | 14.4 | 18.5 | 29.2 | 39.0 | 50.1 | 59.6 | 63.5 | 61.1 | 52.7 | 40.8 | 31.8 | 20.8 |
| Precipitation (inches) | 2.4 | 1.7 | 3.1 | 3.5 | 4.2 | 4.3 | 3.8 | 3.5 | 3.3 | 3.0 | 3.2 | 2.7 |
| Snowfall (inches) | 14.2 | 10.7 | 7.6 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 4.5 | 12.1 |
| Wind Speed (mph) | 11.7 | 11.3 | 11.8 | 11.7 | 10.3 | 9.2 | 8.2 | 7.9 | 8.7 | 9.7 | 11.0 | 11.1 |

Source: City-Data 2004.

The weather station with historical prevailing wind direction data most representative of that at the proposed site is at South Bend, Indiana, 70 miles northeast of Rensselaer. Except for March and April, when prevailing winds are from the north-northwest, the prevailing winds at South Bend are consistently from the southwest or south-southwest (TVA 2004a).

Fifty-five violent tornadoes rated Fujita Scale 4 (devastating) and Fujita Scale 5 (incredible) have been identified in Indiana for the expanded time period of 1880 to 1989, 24 of them occurring since 1953. Northern Indiana counties, such as Jasper County, experience over 50 percent more tornadoes than do southern Indiana counties. Seventeen tornados affected Jasper County from 1953 to 1989. Indiana ranks 15$^{th}$ among the states for overall frequency of tornadoes, 6$^{th}$ for number of deaths, 7$^{th}$ for injuries, and 2$^{nd}$ for cost of damages. Compared to other states by event occurrence per square mile, Indiana ranks 7$^{th}$ for frequency, 3$^{rd}$ for fatalities, 4$^{th}$ for injuries per area, and 3$^{rd}$ for costs per area (Disaster Center 2004).

### *3.2.1.2 Consequences of Proposed Action*

***Plant Emissions.*** The Proposed Action would result in emissions of criteria air pollutants and hazardous air pollutants. Emissions would occur from the nine emission points shown in Table 3-2.

**Table 3-2. Air Emission Points at the Proposed Plant**

| ID | Operation / Equipment | Stack Height (feet) | Stack Diameter (feet) | Flow Rate (acfm) | Discharge Temperature ($^{o}$F) |
|---|---|---|---|---|---|
| EP-1 | Grain Receiving | 15 | 1.5 | 5,100 | 70 |
| EP-3 | Surge Bin and Grinding Mills (per bag house) | 35 | 1.0 | 2,200 | 122 |
| EP-4 | Boilers | 35 | 3.8 | 26,000 | 502 |
| EP-6 | Ethanol Absorption | 40 | 2.0 | 5,000 | 70 |
| EP-7 | Volatile Organic Liquid Storage | - | - | - | 70 |
| EP-8 | Ethanol Truck Loadout | - | - | - | 70 |
| EP-9 | Dried Distiller's Grain Dryer | 56 | 4.4 | 63,000 | 320 |
| EP-10 | Dried Distiller's Grain Truck Loadout | - | - | - | 70 |
| EP-11 | Process Cooling Towers (per cell) | 15 | 14.0 | 286,600 | 150 |

Source: IDEM 2004a.
acfm = actual cubic feet per minute.
Dashes denote fugitive emission points without stacks.

On January 8, 2004, the Indiana Department of Environmental Management, Office of Air Quality, issued a Federally Enforceable State Operating Permit (FESOP) to IBEC in accordance with requirements of the CAAA (IDEM 2004a). The FESOP is incorporated into this EA by reference. The FESOP requires the installation of specific best available control technology (BACT) at the proposed plant and imposes specific emission testing, monitoring, and reporting requirements, all of which are Federally enforceable.

Tables 3-3 and 3-4 profile air emissions data for regulated air pollutants at the proposed plant, including the potential to emit before and after controls and the enforceable limits under the FESOP.

**Table 3-3. Attainment Pollutant Emissions Profile**

| Pollutant | Potential to Emit before Controls | Potential to Emit after Controls | PSD Significant Level | Limit under FESOP |
|---|---|---|---|---|
| | (tons per year) | | | |
| PM | 490.0 | 98.5 | 250 | Less than 100 |
| $PM_{10}$ | 326.1 | 68.4 | 250 | Less than 100 |
| SO3 | 0.6 | 0.6 | 250 | Less than 100 |
| VOC | 116.0 | 41.7 | 250 | Less than 100 |
| CO | 78.8 | 78.8 | 250 | Less than 100 |
| NOx | 93.6 | 32.7 | 250 | Less than 100 |

**Table 3-4. Hazardous Air Pollutant Emissions Profile**

| Hazardous Air Pollutant | Potential to Emit before Controls | Potential to Emit after Controls | Limit under FESOP |
|---|---|---|---|
| | (tons per year) | | |
| Formaldehyde | 9.3 | -- | -- |
| Methanol | 0.67 | -- | -- |
| Acetaldehyde | 20.46 | -- | -- |
| Acrolein | 2.76 | -- | -- |
| **TOTAL** | 33.19 | -- | -- |
| Any Single Pollutant | -- | 9.7 | Less than 10 |
| **TOTAL** | -- | 23.0 | Less than 25 |

Because the after-controls potential to emit attainment air pollutants is less than the PSD significant levels, the Indiana PSD requirements do not apply. The plant would instead be subject to the provisions of 326 Indiana Administrative Code 2-8 (Federally Enforceable State Operating Permit Program) as a minor source. Because the after-controls potential to emit any single hazardous air pollutant is less than 10 tons per year and the potential to emit total hazardous air pollutants is less than 25 tons per year, the proposed plant would not be subject to the provisions of 326 Indiana Administrative Code 2-4.1-1 (New Source Toxics Control). However, as seen in Table 3-4, after-control emissions of any single hazardous air pollutant and total hazardous air pollutants would be extremely close to levels that would require more stringent regulation. Similarly, as seen in Table 3-3, the after-controls emissions of particulate matter, while well below the PSD significant level, would be extremely close to the enforceable limit specified in the FESOP.

The use of BACT would minimize the potential for adverse air quality impacts, including offensive odors and adverse health and visibility impacts. VOCs generated by the plant would be vented through a gas-fired regenerative thermal oxidizer unit rated at 95 percent efficiency. Three baghouses, each rated at 99.9 percent efficiency for $PM_{10}$, would control emissions of particulate matter to the lowest achievable levels. The FESOP stipulates that the permit holder shall not allow fugitive dust emissions to escape beyond the property boundaries in a manner that would violate Indiana's fugitive dust emissions requirements.

Older fuel ethanol plants that do not employ BACT commonly produce highly offensive odors. Even with the use of BACT, the possibility of complaints from neighboring businesses and residences cannot be entirely eliminated. However, there are very few residences near the proposed plant site (see Figures 3-1 and 3-2). Moreover, the direction of the prevailing winds would blow air emissions away from Rensselaer and from the residences that are closest to the proposed plant.

***Construction***. Some short-term fugitive dust and vehicle emissions from construction-related activities would occur. Reasonable precautions to prevent fugitive dust from becoming airborne in quantities sufficient to become a nuisance would be implemented.

***Traffic***. Shipments of materials to and from the proposed plant and commuting workers would result in increased traffic along interstate, state, and county roads, especially SR-114. This would result in comparable increases in vehicle exhaust emissions. Based on INDOT's 2001 estimate of annual average daily traffic on SR-114 near the proposed plant (that is, 1,370 vehicles per day [INDOT 2004]), and on DOE's estimate of up to 312 vehicles entering and leaving the plant site per day (see Section 3.2.6.1), there could be up to a 23-percent increase in average daily vehicle use on SR-114 and therefore a commensurate increase in vehicle-related emissions. However, for the reasons delineated in Section 3.2.6.1, DOE considers this to be an upper bound and probably a high estimate of new traffic over existing levels.

***Summary Assessment of Air Quality Consequences:*** The Proposed Action would result in unavoidable, long-term, continuous emissions of criteria air pollutants and hazardous air pollutants in amounts that would be limited by a FESOP that stipulates the use of BACT. The possibility of occasional complaints due to plant odors cannot be entirely eliminated, but the use of BACT combined with the advantageous direction of the prevailing winds away from the City of Rensselaer would minimize the possibility of adverse impacts to human health or the environment from air emissions. There would be increased vehicle emissions commensurate with the increased volume of truck traffic on SR-114.

### *3.2.2 Geology and Soils*

#### *3.2.2.1 Existing Environment*

*Geology*

The proposed plant would be built in the south-central Kankakee River Basin in the Iroquois River Watershed, which is part of the larger Illinois River Basin. The physiography and soils in this region are similar to those in most of the Illinois River Basin. Geological characteristics at the proposed site and the surrounding area are detailed and documented in the Phase I Environmental Site Assessment (Environmental Incorporated 2003). The following discussion summarizes the reported existing geologic and soil environment.

Jasper County is largely a till plain that has been modified slightly by stream action. The county is relatively level to gently rolling. A number of hills and ridges were formed from the coarser materials and large boulders of the glacial drift. The only significant moraine, the Iroquois Moraine, is 1 mile north of Rensselaer, trending southwest to northeast. In this region, the till is nearly 200 feet thick. South of the Iroquois Moraine, the surface is comparatively level and the till depth gradually diminishes to only a few feet in the vicinity of Rensselaer. The northwestern extension of the Cincinnati Arch passes through Jasper County, and the strata in the southern portion of the county dip in the opposite direction to those in the northern part of the county. The geological formations (mainly limestone with intermittent beds of shale) underlying the glacial drift belong to the Silurian, Devonian, Mississippian, and Pennsylvanian periods. Glacial material overlies limestone bedrock extending to a minimum of 230 feet below ground level in the vicinity of the site.

*Soils*

The Phase I Environmental Site Assessment included a review of the *Soil Survey of Jasper County, Indiana* (SCS 1990). The review indicated the existence of three identifiable soil types at the site. The Rockton fine sandy loam is present in the northwest corner and eastern one-third of the site. The Darroch loam is located in two portions of the site (southwestern corner and south-central portion) and is divided by the Rensselaer loam (located in the approximate center of the site). The Phase I Environmental Site Assessment provides detailed descriptions of these three soil types. Soil characteristics at the site that would bear most directly on potential impacts of the proposed plant are as follows:

- The Rockton fine sandy loam is moderately deep, has moderate available water capacity, and is moderately permeable. Surface runoff is medium. Limestone bedrock lies at depths of 20 to 40 inches. Organic matter content in the surface layer of the soil is moderate. This soil unit has severe limitations with regard to septic tank absorption fields.
- The Darroch loam is deep and somewhat poorly drained. In some locations, the lower part of the soil is more clay and underlain by moderately permeable loam till. The available water capacity is high with a moderate permeability. Surface runoff is very slow. The organic matter content is moderate. The water table is at a depth of 1 to 3 feet below ground level during winter and early spring.
- The Rensselaer loam is deep and very poorly drained. In some areas, bedrock is within 60 inches of the surface. The available water capacity is high with a moderate permeability. Surface runoff is very slow or ponded. The organic matter content is high in the surface layer. The water table is near or above the ground surface during winter and spring. This soil unit is generally unsuitable for dwellings and septic tank absorption fields.

*Seismology*

The proposed site is in a seismically stable region. The U.S. Geologic Survey Seismic Hazard Mapping project classifies all of northern Indiana and northern Illinois as having the second lowest seismic hazard level (USGS 2004).

#### *3.2.2.2 Environmental Consequences of Proposed Action*

In response to a request for an opinion, the Natural Resources Conversation Service indicated that all three of the soil types at the site are classified as prime agricultural soils. Construction of the proposed plant would disturb and displace prime soil over an area of up to 35 acres (half the site). This acreage would include the 15-acre site footprint, construction staging areas, new rail spurs, and the CO2 plant discussed in Section 4.0. These would not constitute disturbances to previously undisturbed soils because the entire site has been extensively worked as agricultural land for decades. Farmland protection is discussed in Section 3.2.8.3.

***Summary Assessment of Geology and Soil Consequences:*** There would be long-term, unavoidable disturbance to up to 35 acres (half the site) of prime agricultural soils. The geology of the area would not pose any hazards.

### *3.2.3 Biological Resources*

#### *3.2.3.1 Existing Environment*

*Listed Species*

Two Federally listed species are known to occur in Jasper County: the endangered Indiana bat (M*yotis sodalist*) and the threatened bald eagle *(Haliaeetus leucocephalus)* (FWS 2004a). The Indiana bat hibernates in caves and mines and forages in small stream corridors with well-developed riparian woods and upland forests.

There are no reported Indiana endangered, threatened, or rare species at the proposed site, but four state-listed species and one habitat type have been documented near the Pleasant Ridge area (Table 3-5), which is less than a mile northwest of the proposed site (IDNR 2004a).

**Table 3-5. Indiana Listed Species and Habitat Documented Near Pleasant Ridge, Indiana**

| Type | Technical Name | Common Name | State Status | Date Documented |
|---|---|---|---|---|
| Mammal | *Geomys bursarius* | Plains Pocket Gopher | Special Concern | 1988 |
| Mammal | *Reithrodontomys megalotis* | Western Harvest Mouse | Special Concern | 1974 |
| Mammal | *Taxidea taxus* | American Badger | Endangered | 1982 |
| Reptile | *Liochorophis Vernalis* | Smooth Green Snake | Endangered | 1972 |
| Habitat | *Prairie-mesic* | Mesic Prairie | Significant | 1981 |

Source: IDNR 2004a

*Common Species*

The proposed site is devoid of trees, ground cover, or flowing water and is disturbed annually by planting and harvesting; therefore, it provides limited mammalian habitat, even for common species. Hunting does not occur at the site; however, the CSX right-of-way provides a corridor for transient species to access the site. Common mammalian species that could reside at or visit the site include deer, raccoon, skunk, fox, coyote, rabbit, and small rodents. Corn fields provide seasonal habitat for a variety of common bird species. During fall bird migrations, large corn fields are notable for the thousands of waterfowl that occasionally gather to forage on stubble. When these fields are wet or flooded in the

spring, they can sometimes attract cranes and shorebirds by the thousands. However, noise from passing trains would tend to discourage large assemblies of these species from using the proposed site. During autumn, large mixed flocks of blackbirds forage in grain fields and, where weeds follow commercial harvests, large concentrations of migrant sparrows are common. Resident plant species at the site are limited due to its dedication to corn and soybean production. However, the common milkweed (*Asclepias syriaca*), which often grows in or near corn fields, provides a primary source of food for the monarch butterfly (*Danaus plexippus*).

#### *3.2.3.2 Environmental Consequences of Proposed Action*

In response to a request for consultation under the Endangered Species Act, the FWS stated that the Proposed Action is not likely to adversely affect either of the two Federally listed species known to occur in Jasper County (Indiana bat and bald eagle) due to the lack of suitable habitat for these species. FWS stated that no further consultation for the project is required under Section 7 of the Endangered Species Act (FWS 2004b). Similarly, the Proposed Action is unlikely to affect Indiana listed species due to the lack of suitable habitat at the site (IDNR 2004a).

***Summary Assessment of Biological Resource Consequences:*** There is no critical habitat for Federally listed or state-listed species that would be impacted by the Proposed Action. Short-term adverse impacts to common species could occur during construction, and up to 35 acres of habitat for common species would be destroyed. Disturbed common species would be expected to quickly acclimatize to plant operations.

### *3.2.4 Water Resources*

#### *3.2.4.1 Existing Environment*

*Surface Water*

The proposed plant would be built in the south-central Kankakee River Basin. The surface water resources of the Kankakee River Basin include the Iroquois River, which flows through Rensselaer, and an extensive network of drainages ditches. No streams or surface waters other than a drainage ditch occur on the proposed site because the area surrounding the site was entirely drained by a network of ditches when the area was settled in the late 1800s. There are no natural lakes in Jasper County. The former rock quarry just northwest of the proposed site is classified as a man-made lake and has no surface outlet. The Iroquois River lies about 3.5 miles west of the proposed site.

The Iroquois River has little potential for water supply development, primarily because of limited base flow from surrounding tills. Surface water quality is generally good in the Kankakee, Yellow, and Iroquois Rivers, although iron and manganese concentrations commonly are high and the rivers are often turbid. Available data for the Kankakee River show that concentrations of toxic substances in streambed sediments and fish tissues are negligible (IDNR 1990).

*Groundwater*

The proposed site would be located above the far eastern extreme of the Iroquois Basin Aquifer System, one of 10 distinct aquifer systems in the Kankakee River Basin. Intratill sand and gravel lenses characterize the till-dominated Iroquois Basin Aquifer System. The aquifer is a mostly clay-rich deposit having scattered intratill sand or gravel lenses and isolated surface sands. The thickness of the system, which is largely controlled by the underlying bedrock topography, ranges from 12 to 120 feet. A few flowing wells have been reported in stream valleys. Well yields from the aquifer are adequate for domestic use, and the few thick intratill deposits may yield up to 400 gpm. The surficial sand deposits are highly susceptible to contamination, but the intratill deposits are moderately susceptible (IDNR 1990).

As part of the Environmental Site Assessment, an environmental database report for the proposed site was prepared by Environmental Data and Resources Inc. of Southport, Connecticut. The report, which is included in the Environmental Site Assessment as Appendix C, identified 12 wells in the U.S. Geological Survey (USGS) well database and 1 additional well in the state of Indiana well database as being near the proposed site. None of these are public water supply wells. The 13 identified wells were all located between 0.25 mile and 1 mile from the proposed site and consist of 4 domestic wells, 3 industrial wells, 2 farm wells, and 4 wells of unknown use. The wells are set at depths ranging from 20 to 150 feet, and the depth to groundwater ranges from 8 to 10 feet below ground level. Most of these wells have a reported test rate of less than 50 gpm, although one industrial well has a test rate of 600 gpm, significantly greater than the 400 gpm required for the wells at the proposed plant.

One of these wells is located on the site of the proposed plant and is believed by local residents to have provided drinking water to a homestead formerly located in the northeast corner of the site. The exact location of this well is now unknown, but local residents believe it was filled and capped by the property's former owner prior to 1983 (TVA 2004b). If the location of this well were discovered during site grading, capping by a qualified water well driller in a manner consistent with Indiana Administrative Code Title 312, Article 13, Rule 10, *Landowner Responsibility for Abandonment and Plugging of Wells*, would be required.

The overall groundwater availability in much of the Kankakee River Basin is considered moderate to good; however, the Indiana Department of Natural Resources (IDNR) has published an executive summary from a 1987 report that raised concerns about groundwater availability in northern Jasper and Newton counties (IDNR 1990).

Groundwater in the Kankakee River Basin is hard, neutral to slightly alkaline, and dominated by calcium and bicarbonate. It generally meets drinking water standards, although iron commonly exceeds the Secondary Maximum Contaminant Level. Detectable levels of pesticides have been found in isolated cases in both unconsolidated and bedrock wells. VOCs were not detected in private wells sampled in 1986 but have been present in the raw water of some public supplies, including Jasper County. The thick clay deposits overlying the intratill aquifers in the Iroquois Basin Aquifer Systems afford some protection from surface contamination (IDNR 1990).

*Wetlands and Floodplains*

In response to a comment on the draft EA submitted by the Indiana Department of Environmental Management (IDEM), a formal wetlands determination was conducted at the site on March 12, 2005, by American Consulting, Inc., of Indianapolis, Indiana. Based on an examination of vegetation, hydrology, and site soils, American Consulting concluded that the site is an active farm with no wetlands or waters. Appendix F contains the full text of IDEM's comment and the wetlands determination report that American Consulting submitted to the U.S. Army Corps of Engineers on March 17, 2005.

DOE's review of Federal Emergency Management Administration floodplain data showed the proposed site to be well beyond the Iroquois River 100-year floodplain (Figure 3-3).

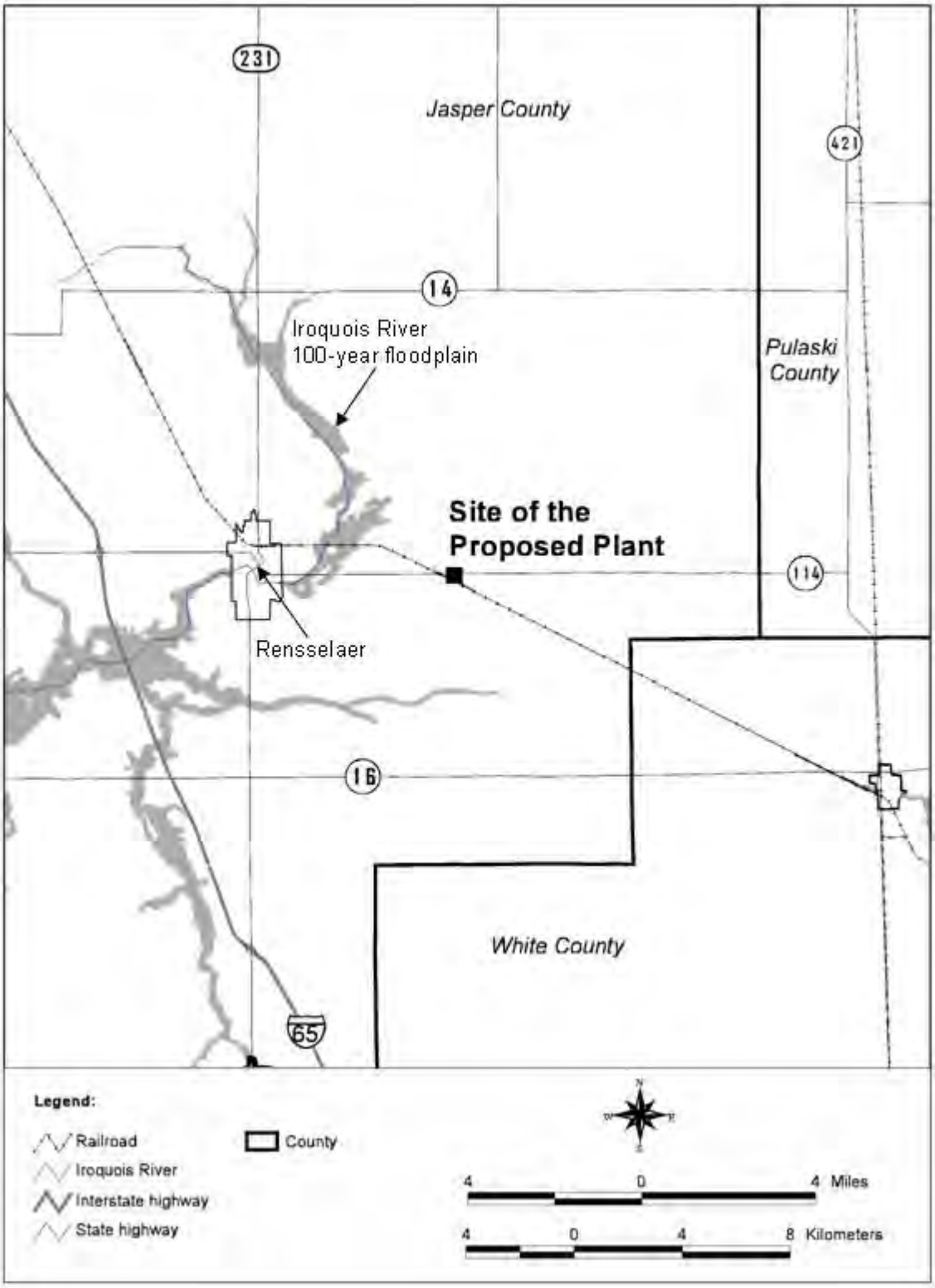


**Figure 3-3. Floodplain Map, Iroquois River**

### *3.2.4.2 Environmental Consequences of Proposed Action*

*Surface Water*

IBEC has prepared an NPDES permit application for state approval to discharge non-process wastewater and to apply cooling water and boiler water treatment additives. The NPDES application would be submitted to the state 8 months prior to anticipated plant start-up, as specified in state filing requirements.

Assuming the Proposed Action were implemented and the NPDES permit issued, the operation of the fuel ethanol plant would result in the discharge of non-process wastewater and water treatment additives pursuant to the terms of the NPDES permit. Water would be discharged from a single outfall at a rate of approximately 100 gpm into an existing drainage ditch in the northeast part of the site. The effluent would merge with water in downstream ditches and travel approximately 3 miles before reaching the Iroquois River. Effluent discharge temperature would be at or slightly above ambient and it would have a slightly alkaline pH of approximately 8.0.

The discharge ditch would feed into the Pinkamink Ditch (also know as the Sage Ditch), then the Ryan Ditch, which feeds into the Iroquois River. None of these ditches are lined. The plant's receiving drainage ditch would typically be dry, but downstream ditches typically have flow throughout the year. The discharge would, in effect, create an artificial perennial stream in the drainage ditch. No residential areas would be impacted. Table 3-6 summarizes the chemicals cited in the NPDES permit application that would be discharged. The data in the far right column are derived from data provided in the NPDES permit application and are the quotient of the calculated chronic aquatic criterion (CAC) in milligrams per liter (mg/l) (less than 400:1 dilution) divided by the outfall concentration.

To meet Indiana water quality standards, the receiving water concentration (outfall concentration) shall not exceed the calculated CAC. For each discharged chemical, the right-hand column in Table 3-6 shows the factor by which the calculated CAC exceeds the outfall concentration, and thereby provides a rough indicator of the margin of safety for that chemical. With the exception of sodium hypochlorite/sodium hydroxide, all effluent discharge concentrations are at least two orders of magnitude below the calculated CAC. In contrast, the margin of safety for sodium hypochlorite/sodium hydroxide is less than a factor of 2.

*Groundwater*

The Proposed Action would require the withdrawal of approximately 400 gpm of groundwater (about 576,000 gallons per day or 645 acre-feet annually). As previously discussed, approximately one-quarter of this drawdown (100 gpm) would be discharged from the plant as non-process wastewater. The rest would be evaporated; incorporated into plant by-products; used for sanitation, cleaning, and emergencies; or recycled into plant process streams.

The IDNR has stated that the groundwater availability issues discussed in Section 3.2.4.1 likely would not pose a serious concern at the site of the proposed plant and that the groundwater resource at the proposed site would likely be adequate to support the demand (IDNR 2004b). Most of the reported groundwater availability issues (IDNR 1990) have since been resolved; moreover, most of the availability problems were confined to western Jasper County and La Porte County. However, it is possible that the addition of two new high-capacity wells at the proposed site, combined with the drawdown from existing high-capacity wells near the proposed site, could result in a local cone of depression that would adversely impact the operation of nearby, shallower wells.

**Table 3-6. Discharge Water Constituents Cited in NPDES Permit Application**

| Chemical | Use | Outfall Conc. (mg/l) | $LD_{50}$ (mg/l) | CAC/ Outfall Conc |
|---|---|---|---|---|
| Continuum AEC3155:<br><br>Chlorotolyltriazole sodium salt<br>Sodium hydroxide<br>Sodium molybdate | Scale inhibitor<br><br>(Cooling water treatment) | 0.00318 | 920 Daphnia (48 hrs)<br>340 Fathead minnow (96 hrs) | 238 |
| Spectrus DT1404:<br><br><br>Sodium Bisulfite | Halogen eliminator<br><br>(Cooling water treatment) | 0.00005 | 175 Daphnia (48 hrs)<br>175 Fathead minnow (96 hrs)<br>330 Rainbow trout (96 hrs) | 15,400 |
| Spectrus NX1100:<br><br>2-bromo-2-nitropropane-1,3-diol<br>Magnesium nitrate<br>5-chloro-2-methyl-4-isothiaxolin-3-one | Anti-microbial<br><br>(Cooling water treatment) | 0.000063 | 5 Daphnia (48 hrs)<br>3.5 Fathead minnow (96 hrs) | 122 |
| Sulfuric acid | pH Control<br><br>(Cooling water treatment) | 0.0056 | pH dependent<br>Lethal below pH 5.0<br>Estimated pH at outfall = 8.0 | NA |
| Sodium hypochlorite<br>Sodium hydroxide | Biocide | 0.0046 | 1.6 Daphnia (48 hrs)<br>5.3 Bluegill (96 hrs)<br>1.9 Rainbow trout (96 hrs) | 1.5 |
| Klaraid PC1192<br><br>Proprietary | Coagulant<br><br>(Cooling water treatment) | 0.0000026 | 17.5 Daphnia (48 hrs)<br>1.65 Fathead minnow (96 hrs)<br>0.49 Rainbow trout (96 hrs) | 835 |
| Optisepenge APO520<br><br>Proprietary | Scale inhibitor<br><br>(Boiler additive) | 0.000107 | 1,730 Daphnia (48 hrs)<br>4,720 Fathead minnow (96 hrs) | 35,888 |
| Cortral 5300<br><br><br>Sodium bisulfite | Oxygen scavenger<br><br>(Boiler additive) | 0.000157 | 210 Fathead minnow (96 hrs) | 2,968 |
| Steamate NA9680<br><br>Morpholine<br>Cyclohexamine<br>Diethylaminoethanol | Anti-corrosive<br><br>(Boiler additive) | 0.000011 | 35 Daphnia (48 hrs)<br>100 Fathead minnow (96 hrs) | 7,091 |

$LD_{50}$ (lethal $dose_{50}$) = the dose of a substance that will kill 50 percent of test organisms.

INDR regulations do not require the issuance of a permit for a new well. However, state regulations define a "significant water withdrawal facility" as "any combination of wells, surface water intakes, and pumping apparatus that supply, or can supply, at least 100,000 gallons of water per day to a common collection or distribution point." Any person who owns such a combination must register those facilities with the IDNR Division of Water within 3 months after it is completed. The proposed plant would withdraw 567,000 gallons per day and therefore would require registration as a significant water withdrawal facility.

*Wetlands*

The Proposed Action would not impact any wetlands. Due to the continuous discharge of non-process wastewater, the proposed plant may have the potential to create new wetlands. However, because the

discharge would follow well-established drainage ditches, the creation of new wetlands appears to be unlikely.

***Summary Assessment of Water Resource Consequences:*** The proposed plant would consume substantial groundwater (approximately 645 acre-feet annually for the life of the plant). However, the IDNR believes the area where the proposed plant would be located has an adequate groundwater supply to support this demand. The plant's non-process wastewater discharge would create an artificial stream that would contain chemicals known to be toxic to aquatic organisms. Discharges would be permitted under an NPDES permit. The concentrations of individual toxic constituents at the plant outfall would be at least a thousand times below the acute $LD_{50}$ concentrations (the concentrations that would cause the short-term death of 50 percent of test organisms in a controlled laboratory experiment). The outfall concentration of all toxic constituents listed in the NPDES permit application except sodium hypochlorite/sodium hydroxide would be less than the calculated CAC by at least a factor of 100. The projected concentrations of sodium hypochlorite/sodium hydroxide at the outfall, while not exceeding the Indiana water quality standards, would not provide a similarly robust margin of safety. The concentrations of hazardous or toxic constituents and the discharge temperature appear to be at levels below those that would be hazardous to aquatic receptors.

### *3.2.5 Waste Management*

#### *3.2.5.1 Existing Environment*

The site of the Proposed Action currently does not generate any solid waste other than biodegradable agricultural by-products, such as corn cobs, that are left on the ground after harvest and plowed under. Seasonal agricultural workers generate minimal sanitary waste. Solid waste generated at surrounding businesses is typically delivered by contract haulers to the Newton County landfill.

#### *3.2.5.2 Environmental Consequences of Proposed Action*

The Proposed Action would result in the short-term generation of sanitary waste by the estimated 30 to 80 construction workers during the approximately 13-month construction period. Waste would be collected in portable toilets that would be transported from the site to a sanitary waste facility, probably in Lake County. After start-up, approximately 30 to 35 plant employees would generate sanitary waste that would be managed using a mound design septic tank system constructed on the site.

Operationally, essentially all of the corn received at the plant would be converted into ethanol and ethanol production by-products that would be sold as plant output. Other than cleaning waste, no continuous process waste from ethanol production operations would be generated. The molecular sieve material (zeolite beads) used for final ethanol drying would require periodic replacement. The volume of the beads would be approximately 1,200 cubic feet. Annual cleaning would generate approximately 3,000 lbs of primarily calcium carbonate scale that would be disposed of at the Newton County landfill by contract haulers. Construction waste would also be disposed of at this landfill. The capacity of this landfill has recently increased with the issuance of a permit for a major modification for a lateral expansion. The recently permitted 75-acre expansion will provide a net disposal capacity of approximately 19 million cubic yards (11.5 million tons). The operating permit for the landfill was renewed on November 5, 2004, and must be renewed every 5 years. Newton County landfill is permitted to accept out-of-county, nonhazardous waste (IDEM 2004b). The Newton County landfill is permitted to accept, and appears capable of accepting, the volume of solid waste that would be generated by the proposed plant.

***Summary Assessment of Waste Management Consequences:*** Management of the sanitary and solid waste resulting from the Proposed Action would not adversely impact local or regional waste management capacities.

### *3.2.6 Infrastructure*

#### *3.2.6.1 Existing Environment*

*Utilities*

REMC and NIPSCO provide electric service to the area. However, there is no service at the proposed site, although a distribution line is located immediately north of the site along the SR-114 right-of-way. A natural gas pipeline right-of-way transects the site in a southwest to northeast direction. The pipeline owner, Truckline Gas Company of Houston, Texas, has stated that there are two high-pressure natural gas pipelines approximately 3 feet below grade level and that it is not aware of any leaks in the pipelines at the site (Environmental Incorporated 2003). There is no water or sewer utility service at the site.

*Vehicular Traffic*

An exchange onto the main interstate route serving the area, Interstate 65 (I-65), is approximately 10 miles west of the proposed site. The most direct route to the proposed site from I-65 would be via SR-114 through Rensselaer. However, alternate routes that bypass the city are available. For 2001, the average annual daily traffic count on SR-114 between 250 West Road and the Pulaski County line was 1,370. The highest traffic count on SR-114 in Rensselaer was 6,590 vehicles per day, similar to the 6,220 vehicles per day at the SR-114/I-65 interchange. Traffic on SR-231 north and south of Rensselaer is somewhat higher than on SR-114 (INDOT 2004).

Based on recent field observations and conversations with local residents, the current truck traffic level on SR-114 could exceed 300 trucks per day. According to the INDOT Design Manual (INDOT 2005), truck traffic in excess of 200 trucks per day warrants a pavement width of 24 feet. However, sections of SR-114, including the section adjacent to the proposed plant, are currently only 22 feet wide (Abonmarche Consultants 2005). This indicates that SR-114 should be widened to accommodate the current truck traffic level, regardless of additional traffic from the proposed plant.

*Rail Traffic*

The CSX main line forms the southern boundary of the site. Several existing spurs adjacent to the site service the Northwest Indiana Grain Facility and the Jasper County Coop Pleasant Ridge Elevator. Daily use of the track consists of an Amtrak train into and out of Chicago, eight through freight trains and two local freight trains.

*Public Safety*

Fire emergency service at the proposed plant would be provided by the Rensselaer Volunteer Fire Department, which has merged with the Marion Township Fire Department. All firefighting equipment is housed at the Rensselaer Fire Department in Rensselaer, approximately 5 miles from the proposed plant. The department's equipment includes an 85-foot platform aerial unit. The department provides fire emergency service to five townships and the City of Rensselaer. Police service at the proposed plant would be provided by the Jasper County Sheriff's Office in Rensselaer. Medical service is available at the Jasper County Hospital, approximately 4 miles from the proposed plant.

### *3.2.6.2 Environmental Consequences of Proposed Action*

*Utilities*

Regionally, the existing power infrastructure is adequate to support the requirements of the proposed plant; however, site-specific electric upgrades would be required and NIPSCO has raised a question regarding a possible impact of the required electric load on local 69-kV systems.

In 2003, in response to a request from the Wabash Valley Power Association, Inc., NIPSCO conducted a system analysis of REMC's proposal for electrical service for a new customer, IBEC (NIPSCO 2003). Providing electric power to service the proposed plant would require installation of one new 69-kV capacitor station in the area of SR-114 and CR-150. The systems study cites the demand from the proposed plant as 8,000 kilowatts (kW). Normal service for the new capacitor station would be from Monticello substation circuit 6918. Providing electrical service for the proposed plant would also require installation of 69-kV capacitors and upgrades to approximately 2.5 miles of existing pole-mounted distribution line. NIPSCO's report cautioned that the recommendations it provided for service to the proposed plant do not address the effects of any large motor loads on 69-kV systems in the area and that it would be REMC's responsibility to evaluate its ability to supply the new substation. NIPSCO stipulated that it would need to be informed of the results of any large motor studies to ensure no negative effects to other substations and customers on the 69-kV systems. This implies that the electrical load of the proposed plant could adversely impact the local grid and require additional upgrades.

In November 2004, REMC advised IBEC that there are no environmental statements or issues that could arise as a result of construction of the 2.5 miles of electric line that would be required to service the proposed plant (REMC 2004).

Natural gas service would require a new tap to the Truckline Gas Company gas line. Because the right-of-way runs under the proposed site, environmental impacts associated with establishing gas service would be minimal and localized on or near the site. The proposed plant would not impact drinking water or sewer utility service because drinking water would be provided by a commercial bottled water vendor and the plant would not be hooked up to city or county sewer lines.

*Vehicular Traffic*

Shipments of materials to and from the proposed plant and commuting workers would result in increased traffic along state and county roads, especially SR-114. To quantify and further characterize this impact, DOE estimated the projected volume and types of traffic, their cargoes, and their destinations. These estimates are shown in Appendix D and are summarized below. In addition, pursuant to consultations with and as required by INDOT as a requirement for issuance of a new driveway permit, IBEC commissioned an independent traffic impact analysis (Abonmarche Consultants 2005). The analysis was based in part on the traffic estimates shown in Appendix D. The findings and recommendations of the analysis are incorporated into this EA by reference.

On average, the Proposed Action would result in approximately 312 turnarounds (156 vehicles entering and 156 vehicles leaving the plant) per day. Assuming that plant operations were ongoing 260 days per year, approximately 2.4 million vehicles would enter and leave the plant over a 30-year plant operating life. Most (probably 75 percent or more) of this traffic would enter and leave the plant between 7:30 a.m. and 6 p.m. Approximately 50 percent of the traffic would be for corn deliveries, 25 percent would be from commuters and miscellaneous vendors, 15 percent would be CO2 shipments, and the balance would be vehicle shipments of plant by-products and deliveries of process chemicals.

Based on INDOT's 2001 estimate of annual average daily traffic on SR-114 near the proposed plant (that is, 1,370 vehicles per day [INDOT 2004]) and on DOE's estimate of 312 turnarounds per day, there could be up to a 23-percent increase in annual average daily traffic on SR-114, if all traffic associated with the proposed plant were new traffic. Clearly, all truck trips associated with plant output (ethanol and plant by-products) and process chemical deliveries would be new traffic. This is less certain for shipments of corn to the plant, especially during harvest, and for commuters. The local corn crop would be harvested and shipped by truck to silos or other collection or distribution points regardless of the existence of the proposed plant. It is reasonable to assume that a significant percentage of the average annual traffic on SR-114 reflects use of the road during planting and harvest. Consequently, DOE considers a 23-percent increase in traffic on SR-114 as an upper bound, and probably a high estimate, because some of the traffic hauling corn to the plant during harvest would be using SR-114 to haul locally grown corn somewhere, with or without the proposed plant, and therefore would not represent an increase over current levels. Moreover, a new interchange at I-65 and SR-114 that is currently under construction will provide some existing truck traffic with an alternative to using SR-114 and could reduce current truck traffic on SR-114 by 128 to 200 trucks per day (Abonmarche Consultants 2005).

Based on its examination of current and projected traffic levels and current and projected road infrastructure in this EA, DOE does not anticipate that traffic due to the Proposed Action would represent a significant environmental impact, provided IBEC coordinates plant traffic management and control with county and state transportation authorities.

*Rail Traffic*

In response to a request for an opinion, CSX indicated that it is aware of the proposed plant and that once a new mainline switch was approved by CSX Engineering and Operations departments, no known upgrades to CSX mainline property would be required (CSX 2004).

*Public Safety*

The existing public safety infrastructure for Rensselaer and Jasper County would be adequate to support the requirements of the proposed plant. No enhancements would be required, but mutual cooperation between plant and public safety officials would be desirable to ensure that an appropriate safety plan for the plant was developed and implemented.

***Summary Assessment of Infrastructure Consequences:*** The regional electric infrastructure is adequate to support the Proposed Action. However, as suggested by a NIPSCO system analysis, the electric demand at the plant could strain the existing local 69-kV service and could require additional studies and upgrades. Natural gas service is readily available. The Proposed Action would result in an increase of vehicle traffic by as much as 23 percent on the main artery leading to the plant and an increase in traffic on feeder roads. Enhancements to SR-114 adjacent to the plant would be required consistent with the results of a recently completed traffic impact study and pursuant to INDOT's subsequent recommendations. No enhancements to the existing rail infrastructure would be required other than installation of dedicated new rail spurs. The existing public safety infrastructure is adequate to accommodate the Proposed Action, but the plant would pose a new fire hazard, as described in Section 3.2.12, Plant Safety.

### *3.2.7 Cultural Resources*

#### *3.2.7.1 Existing Environment*

Cultural resources are sites, places, objects, buildings, structures, or districts that are of cultural, historical, archaeological, ethnohistorical, architectural, or scientific importance. Federal laws and statutes protect such resources and must be addressed when Federally-sponsored, -funded, or -licensed

projects threaten cultural resources. DOE's scoping letter to the SHPO (see Appendix A) requested an opinion regarding the presence or absence of cultural or historic sites that could be impacted by the Proposed Action and advice on any additional information needed in order for the SHPO to provide an opinion. The SHPO's response (see Appendix B) requested additional information that would be needed for the SHPO to identify and analyze potentially impacted historic properties. However, an enclosure to the SHPO's response included guidance for the Federal agency (in this case, DOE) to implement in lieu of the SHPO making and documenting a determination regarding the presence or absence of potentially impacted historic properties (*Summary of the Key Steps for Carrying Out the Section 106 Review Process in Indiana).* Pursuant to and consistent with this guidance, DOE made a reasonable and good faith effort to identify any cultural resources that could be adversely impacted by DOE's Proposed Action. This section describes those efforts and their results.

DOE visited the site of the proposed plant in November 2004 and observed no visible structures or remains of structures on the site. An agricultural homestead that once existed in the site's northeast corner has been razed and the foundation backfilled. No visible trace of the homestead remains. Local historians with first-hand knowledge of the proposed site have stated that they are unaware of any cultural resources at the site (Arnott 2004, Meyer 2004). DOE also contacted the Historic Preservation Association of Jasper County and requested assistance in identifying any historical or cultural resources that could be impacted by DOE's proposed action. In response to DOE's request, a representative of the association examined the site in December 2004 and advised DOE that in his opinion, there are no apparent features of historic or cultural significance at this location (HPAJC 2004).

For purposes of analyzing potential adverse impacts to historic properties, DOE defined the area of potential effects (APE) as the entire proposed site and SR-114 extending 2 miles east and west of the proposed site. DOE included this 4-mile stretch of SR-114 in the APE because traffic impacts would be most pronounced here. Six places in Jasper County three in Rensselaer, two in Remington, and one in Wheatfield are listed in the National Register of Historic Places. None of these historic places is located in the APE.

The Historic Landmarks Foundation of Indiana is compiling an ongoing inventory of historic sites and structures in Indiana and has published an interim report for Jasper County. DOE reviewed this interim report to identify any catalogued sites or structures in the APE. Two were identified: (1) a house dating from approximately 1890 (circa [c.] 1890), located on SR-114 approximately 1 mile west of the proposed site, and (2) the Lefler Cemetery (c. 1876-c. 1921), located approximately 1 mile east of the proposed site (HLFI 2003). Neither of these two sites is listed in the National or State Register of Historic Places. DOE consulted the eligibility criteria for inclusion in the National Register of Historic Places to determine if they might be eligible for inclusion. Based on these criteria, DOE believes these two places would not be eligible for inclusion in the National Register of Historic Places. Moreover, DOE does not believe that traffic associated with the Proposed Action would directly or indirectly alter any characteristic of these two places in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

There are no Federally recognized Native American reservations in the State of Indiana (NPS 2004). Consequently, no tribal lands or dependent Indian communities as defined in 36 CFR Part 800 (Protection of Historic Properties) would be affected by DOE's Proposed Action.

#### *3.2.7.2 Environmental Consequences of Proposed Action*

Based on a review of national, state, and local sources of information, DOE finds that there are no known cultural resources at or near the site of the proposed plant that would be affected by DOE's Proposed Action. DOE advised the SHPO of these findings and, in a letter dated March 23, 2005, the SHPO

advised DOE that the SHPO concurs with DOE's finding that no historic buildings, structures, districts, objects, or archaeological resources listed in or eligible for inclusion in the National Register of Historic Places would be affected by DOE's Proposed Action.

### *3.2.8 Land Use*

#### *3.2.8.1 Existing Environment*

Although Indiana is primarily a manufacturing state, about three-quarters of the land is utilized for agriculture. In 1997, approximately 80 percent of Jasper County's land area was in farms, producing predominantly corn, soybeans, and oats. There has been a gradually decreasing trend in the county's total land in farms since 1990, when farmland accounted for over 94 percent of the land. Pasture and woodland accounted for less than 5 percent of the county in 1997. However, the county's total harvested cropland has increased since 1930 (DOA 1999).

Existing title records for the site are consistent with primarily agricultural use going back a century. The site was briefly (1934-1937) owned by a coal and construction company. The entire site is now zoned "I-1: Open Industrial" (Jasper County 2004). The land immediately surrounding the site is primarily agricultural with a few neighboring parcels zoned and used for light industry. The closest residence is approximately 3,000 feet west of the site on SR-114. There are no schools, hospitals, churches, retail establishments, or recreational facilities near the site.

Approximately 10 acres of the eastern portion of the site was formerly used by Godlove Sanitation Service for land disposal of residential septic waste and restaurant grease. The Indiana Department of Environmental Management conducted a review of records for Land Application Site Number 473-03—that is, the Godlove Sanitation Service site—for the years 1997-2002. The records indicate that a total of 1,388,260 gallons of wastewater (human excreta, water scum, sledge and sewage from sewage septic tank systems and grease, fats, and retained waste from grease traps) was applied to the 10-acre site. The allowable application rate was 200,000 gallons per acre. Department records show that "the site was not over applied and there were no environmental issues or problems during the period of permitted use" (IDEM 2004c).

Although not required at the time, Godlove Sanitary Service conducted post-closure soil sampling at this location. The sampling detected several metals, including cadmium, chromium, copper, lead, mercury, and zinc. However, the detected concentrations were all below the default closure concentrations specified as policy in the Indiana Department of Environmental Management Risk Integrated System of Closure for both residential and industrial scenarios (Environmental Incorporated 2003). (Note: Effective in 2003, Department of Environmental Management pre-closure requirements for land application facilities stipulate that soils be sampled for polychlorinated biphenyls (PCBs) and cadmium. Because no post-closure sampling for PCBs was conducted at the Godlove Sanitation Service site, such an analysis may now be required or advisable.)

#### *3.2.8.2 Environmental Consequences of Proposed Action*

Approximately 50 percent of the 70-acre site would remain in agricultural use even though the entire site would be zoned for industrial use. The Proposed Action would result in most or all of the remaining 50 percent of the site being converted from prime farmland to industrial use, including the 15-acre plant footprint, the new rail spurs, access roads, septic system, and the CO2 plant discussed in Section 4.0. Quantitatively, this would be a negligible impact on the overall land use characteristics of Jasper County, where approximately 286,400 acres (80 percent of the county) is farmland. In Indiana, land use is a local issue. However, the preservation of farmland within a balanced and well-planned growth and economic framework is a statewide concern in Indiana and nationally. The final report of the Hoosier Farmland

Preservation Task Force provides an in-depth discussion of and recommendations for farmland preservation in Indiana (ILRC 1999).

#### *3.2.8.3 Farmland Protection*

The Farmland Protection Policy Act, which is administered by the U.S. Department of Agriculture, Natural Resources Conservation Service, is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses and to ensure that—to the extent possible—Federal programs are administered so as to be compatible with state, local units of government, and private programs and policies to protect farmland. The Natural Resources Conservation Service uses a land evaluation score (0 to 100) and a site assessment score (0 to 160) system to establish a combined farmland conversion impact rating score on proposed sites of Federally-funded and -assisted projects. This score is used as an indicator for the project sponsor (in this case, DOE) to consider alternative sites if the potential adverse impacts on the farmland would exceed the recommended allowable level.

In response to DOE's scoping letter (see Appendix A), the Natural Resources Conservation Service conducted a land evaluation of the proposed site and assigned it a relative value score of 72 out of a possible 100 points (NRCS 2004). Concurrently, and pursuant to procedures specified in the Farmland Protection Policy Act, DOE conducted a site evaluation using the 12 assessment criteria defined in the Act. Based on this assessment, DOE assigned the site a site evaluation score of 86 out of a possible 160 points. The combined relative value and site assessment score is therefore 158 points. The Farmland Protection Policy Act states that proposed sites receiving a combined score of less than 160 need not be given further consideration for protection and that no additional sites need to be evaluated.

***Summary Assessment of Land Use Consequences:*** Up to 35 acres of prime farmland (half the site) would be converted from prime farmland to industrial use. Based on the results of a farmland conversion impact rating conducted by the Natural Resources Conservation Service and DOE, neither mitigation measures at the proposed site nor consideration of alternate sites is required.

### *3.2.9 Noise*

#### *3.2.9.1 Existing Environment*

Noise can be defined as any sound that is undesirable because it interferes with speech, communication, or hearing; is intense enough to damage hearing; or is otherwise loud, discordant, or disagreeable to some receptors. Depending upon the loudness and the duration of a noise, its effects can range from temporary annoyance to permanent hearing impairment or loss. Ambient noise is the collective sound resulting from the omnipresent background noise associated with a given environment. It is usually a composite of many sounds from many sources. An environment's ambient noise serves as a point of departure and comparison for analyzing the impact of a new or additional noise on a sensitive environment.

Noise is generally considered to be low when its ambient levels are below 45 A-weighted decibels (dBA), moderate in the 45- to 60-dBA range, and high above 60 dBA. Typical wilderness area ambient sound is about 35 dBA, typical rural residential levels are about 40 dBA, and typical urban residential sound levels on a busy street are about 68 dBA (outdoor day-night average sound levels) (Suter 1991). Noise levels above 45 dBA at night can result in the onset of sleep interference; above 70 dBA, sleep interference effects become considerable.

Different environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial, industrial, or construction zones. The proposed plant would be constructed near a cluster of

industrially-zoned parcels and enterprises that include Northwest Indiana Grain Facility, Jasper County Coop Pleasant Ridge Elevator, Wuethrich Pork and Grain, Talbert Manufacturing, CSX railroad, and the former rock quarry. These are surrounded by agricultural areas where ambient noise levels are dominated by seasonally variable noises associated with agricultural activities: planting, cultivation, pesticide and fertilizer application, and harvesting. Where and when agricultural operations are not in progress, ambient noise levels in surrounding area would be typical of average outdoor noise levels in rural areas. Background sounds are produced mostly by natural phenomena (wind, rain, and common wildlife) and by light to moderate traffic on SR-114. The ambient noise associated with intermittent traffic can be highly variable in that it is significantly influenced by vehicle and engine type, number of tires, road-surface conditions, and the condition of exhaust systems. The loudest noise associated with operations at the adjacent Northwest Indiana Grain Facility and Jasper County Coop Pleasant Ridge Elevator would occur during rail car loading operations. In the immediate vicinity of the proposed plant, there are no sustained outdoor ambient noise levels above 85 dBA, the level considered harmful by the Occupational Safety and Health Administration (OSHA) (OSHA 2004).

#### *3.2.9.2 Environmental Consequences of Proposed Action*

*Construction*

Construction of the proposed plant would result in temporary increases in noise in the vicinity of the project construction area. Noise-generating activities would include excavation, grading, and scraping. Vehicle traffic traveling to and from the construction area would contribute to construction noise but to a lesser degree. The magnitude of construction noise impacts would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, the duration of the activity, the distance between the activity and noise-sensitive receptors, and any shielding effects provided by local barriers and topography. Table 3-7 shows noise levels for various types of construction equipment. A reasonable worst-case assumption is that three pieces of loud equipment would operate simultaneously and continuously for an hour or more. The combined sound level of three pieces of the loudest equipment listed in Table 3-8 (scraper, truck, and bulldozer) is 92 dBA measured at 50 feet. Table 3-8, which assumes this combined source level, summarizes predicted noise levels at various distances from an active construction site. These estimates assume a basic noise drop rate of 6.0 dBA per doubling of distance to receptor, a commonly applied attenuation factor. The nearest residence is approximately 3,000 feet from the proposed site. At that distance, noise levels from project construction would be moderate and limited to daylight hours.

**Table 3-7. Noise Levels of Typical Construction Equipment**

| Equipment | Typical Noise Level (dBA) 50 Feet from Source |
|---|---|
| Backhoe | 80 |
| Grader | 85 |
| Loader | 85 |
| Roller | 75 |
| Bulldozer | 85 |
| Truck | 88 |
| Scraper | 89 |

Source: FTA 1995

**Table 3-8. Estimated Construction Noise Levels**

| Distance Attenuation | |
|---|---|
| **Distance to Receptor (feet)** | **Sound Level at Receptor (dBA)** |
| 50 | 92 |
| 100 | 86 |
| 200 | 80 |
| 400 | 73 |
| 600 | 69 |
| 800 | 67 |
| 1,000 | 64 |
| 2,000 | 57 |
| 3,000 | 51 |

Source: FTA 1995

*Operations*

Operations in the milling rooms and boilers of the proposed plant would result in a new source of occupational noise above the OSHA 8-hour noise threshold limit. Personnel entering these areas would be required to wear hearing protection. Current design plans include noise insulation on all milling room walls and ceilings. The intention is to reduce noise levels outside the milling rooms to levels that would not require hearing protection. Operational noise levels would be tested after installation to determine whether the requirements of the OSHA Hearing Conservation Program apply. The sound levels from the milling and boiler rooms would be minor to workers in adjacent buildings and indistinguishable from current ambient plant noise at the plant site boundaries.

***Summary Assessment of Noise Consequences:*** During plant construction, noise would be loud in the immediate area and moderate at the closest residence. However, the closest residence is located in an industrially zoned area where ambient noise levels would be higher than surrounding rural areas. Thus, operational noise would probably not be noticeable beyond the plant site boundary. Milling room and boiler room noise would exceed OSHA limits and would require hearing protection for workers.

### *3.2.10 Aesthetics*

#### *3.2.10.1 Existing Environment*

The post-harvest visual setting at the proposed site is seen in Figure 3-1. The landscape is flat and generally featureless to the horizon or to distant tree lines. The Northwest Indiana Grain Facility and the grain elevator and other structures owned by the Jasper County Coop (Figure 3-1, left column, second photograph) are the dominant features visible from the proposed site.

#### *3.2.10.2 Environmental Consequences of Proposed Action*

The proposed plant would be readily visible to travelers passing it on SR-114 and to workers at three neighboring businesses: Northwest Indiana Grain Facility, the Jasper County Coop Pleasant Ridge Elevator, and Wuethrich Pork and Grain. It would be in sharp relief from the surrounding terrain but would be similar in form to structures at those three businesses. The proposed plant would not be readily visible from the closest residences, which are west of the proposed site on SR-114, because the Northwest Indiana Grain Facility and the Jasper County Coop Pleasant Ridge Elevator would partially or completely obstruct the line-of-sight from these residences. Due to the flatness of the terrain, the proposed plant's stacks would be visible from some sections of Rensselaer, but they would appear extremely small due to the distance. Use of the combination regenerative thermal oxidizer/waste heat boiler would minimize visible plumes. Plumes would be most readily visible on very cold days. The proposed plant would

operate around the clock. Facility and security lighting and two flared vents would be a long-term, unavoidable, adverse impact to views of the night sky in the vicinity of the proposed plant.

***Summary Assessment of Aesthetic Consequences:*** The proposed plant would be a readily visible, new feature from SR-114 and from neighboring businesses. It would be larger but similar in form to neighboring business, the closest of which also support agriculture. It would generally not be visible from the closest residences or from Rensselaer. Plant lighting would adversely impact the view of the night sky in the immediate vicinity of the plant.

### *3.2.11 Socioeconomics and Environmental Justice*

#### *3.2.11.1 Existing Environment*

*Socioeconomics*

The U.S. Census Bureau estimated the 2003 population for Jasper County to be 31,078, a 3.4 percent increase from 2000. From 1990 to 2000, the county population grew by 21 percent, compared to 9.7 percent statewide. Net domestic migration into Jasper County was ranked 15th among Indiana's 92 counties. The home ownership rate was 77.5 percent in 2000, compared with 71.4 percent statewide. The median value of owner-occupied homes in 2000 was $105,700, 12 percent higher than the statewide value. Median household income in Jasper County in 1999 was $43,369 compared to $41,567 statewide and $41,994 nationally (U.S. Census Bureau 2000). In 2002, the county's $132.9 million in agricultural sales represented 2.8 percent of the state total and placed the county second among Indiana's top five counties in agricultural sales (DOA 2004).

Jasper County's average labor force for September 2003 through September 2004 was approximately 14,800. Unemployment rates have shown a generally increasing trend since 1998, when unemployment stood at 3.9 percent. Through September 2004, the year-to-date average unemployment rate for 2004 was 6.2 percent in Jasper County compared to 5.2 percent statewide and 5.7 percent nationally (IDWD 2004).

*Environmental Justice*

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. "Fair treatment" means that no group, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the adverse environmental consequences resulting from industrial, municipal, or commercial operations or the execution of Federal, state, local, and tribal programs and policies.

In February 1994, President Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Fed. Reg. 7629 (1994)). This order directs Federal agencies to incorporate environmental justice as part of their missions. Federal agencies are specifically directed to identify and, as appropriate, to address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.

The CEQ has issued guidance to Federal agencies to assist them with their NEPA procedures so that environmental justice concerns are effectively identified and addressed (CEQ 1997). In this guidance, the Council encouraged Federal agencies to supplement the guidance with their own specific procedures tailored to particular programs or activities of an agency. DOE has prepared a document titled *Draft Guidance on Incorporating Environmental Justice Considerations into the Department of Energy's National Environmental Policy Act Process* (DOE 2000). The draft guidance is based on Executive Order 12898 and the CEQ environmental justice guidance. Among other things, the DOE draft guidance states

that even for actions that are at the low end of the sliding scale with respect to the significance of environmental impacts, some consideration (which could be qualitative) is needed to show that DOE considered environmental justice concerns. DOE needs to demonstrate that it considered apparent pathways or uses of resources that are unique to a minority or low-income community before determining that, even in light of these special pathways or practices, there are no disproportionately high and adverse impacts on the minority or low-income population.

Racially, Jasper County is highly homogenous. In the 2000 census, 98 percent of individuals reporting to be of only one race reported being White. The largest minority group, Hispanic or Latino, accounted for 2.4 percent of the county population. Statewide, 87.5 percent of the population was reported as White, and 3.5 percent as Hispanic or Latino. The overall poverty rate for individuals in Jasper County was 6.7 percent, compared to 9.5 percent statewide and 12.4 percent nationally (U.S. Census Bureau 2000).

Census data are compiled at a variety of levels corresponding to geographic areas. In order of decreasing size, the areas used are states, counties, census tracts, block groups, and blocks. A block group is a subdivision of a census tract and is the smallest geographic unit for which the Census Bureau tabulates sample data. A block group consists of all the blocks within a census tract with the same beginning number.

Demographic maps were prepared using block group data for minority (Figure 3-4) and low-income populations. Low income is defined as annual income of less than $18,660, the U.S. Census Bureau national poverty threshold for a family of four (U.S. Census Bureau 2004). Figure 3-4 shows one contiguous block group area within 5 miles of the proposed plant where the population is more than 10 percent minority. Examination of census data indicates that approximately 4 percent of the population living within a 10-mile radius of the proposed site and approximately 3 percent of the population living within a 20-mile radius identify themselves as members of minority populations. Examination of block group data for low-income households indicated that there are no households with annual incomes below the annual poverty level within 10 miles of the proposed plant.

#### *3.2.11.2 Environmental Consequences of Proposed Action*

*Socioeconomics*

The Renewable Fuels Association, a national trade association for the ethanol industry, commissioned a study of the economic impacts of a new fuel ethanol plant on local communities (Urbanchuk and Kapell 2002). The study reported that building and operating a hypothetical 40-million-gallon-per-year fuel ethanol plant would:

- Cost approximately $60 million to build and equip;
- Provide a one-time boost of $142 million to the local economy during construction;
- Expand the local economic base of the community by $110.2 million each year through the direct spending of $56 million;
- Create 41 full-time jobs at the plant and a total of 694 jobs throughout the entire economy;
- Increase the local price of corn by an average of 5 to 10 cents a bushel, adding significantly to farm income in the general area surrounding the plant;
- Increase household income for the community by $19.6 million annually;

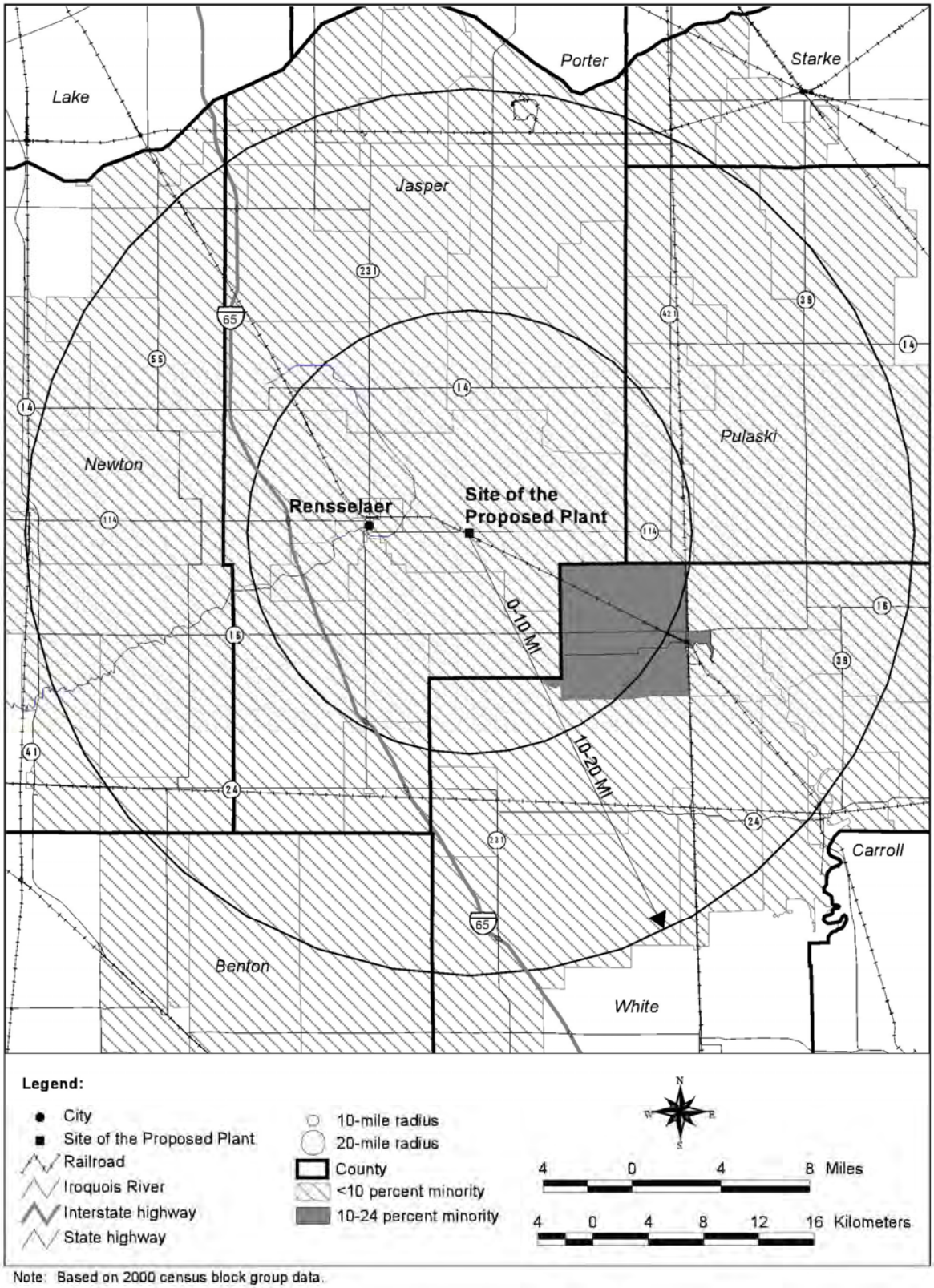


**Figure 3-4. Minority Populations Near the Proposed Plant**

- Boost state and local sales tax receipts by an average of $1.2 million (varies depending on local rates); and

- Provide an average 13.3 percent annual return on investment over 10 years to a farmer who invests $20,000 in an ethanol production facility.

It should be noted in the context of the socioeconomic impacts of the proposed plant that the macroeconomics of fuel ethanol production has been the subject of debate. However, a recent preliminary study that employed ASPEN Plus, a process simulation program, to allocate total energy used to produce ethanol and ethanol by-products concluded that corn ethanol has a positive energy balance, even before subtracting the energy allocated to by-products. The net energy balance of corn ethanol adjusted for by-product credits is 27,729 and 33,196 Btu per gallon for wet- and dry-milling, respectively, and 30,528 Btu per gallon for the industry. The study results suggest that corn ethanol is energy efficient, as indicated by an energy output/input ratio of 1.67 (Shapouri et al. 2004).

*Environmental Justice*

Based on an application of CEQ and DOE guidance, any adverse impacts potentially resulting from the proposed plant would not disproportionately impact minority or low-income populations.

***Summary Assessment of Socioeconomic and Environmental Justice Consequences:*** The proposed plant would be a positive economic stimulus to Jasper County and the local economy. Any adverse human health and environment consequences from DOE's Proposed Action would not be borne disproportionately by minority or low-income groups.

### *3.2.12 Plant Safety*

#### *3.2.12.1 Existing Environment*

Nationally, 85 fuel ethanol plants have a current capacity to produce 3.6 billion gallons of product annually. Sixteen plants currently under construction and one expansion will add another 739 million gallons of capacity (RFA 2004). All of these plants have inherent environment, safety, and health risks associated with them. If spilled or leaked, fuel ethanol is not likely to result in long-term environmental damage because it is readily biodegradable over a reasonably short period of time. However, there are health and safety hazards associated with the product and its manufacture.

Ethanol vapors are highly flammable over a wide range of concentrations. Several older fuel ethanol plants have experienced catastrophic explosions; as recently as October 2003, a worker was killed in Benson, Minnesota, when a 40,000-gallon mash holding tank exploded due to unsafe welding. Toxicologically, ethanol is classified as a harmful and irritating substance and, being heavier than air, ethanol vapors pose unique health and safety concerns. Due to the large quantities of ethanol that would be generated, stored, and transported daily, the proposed plant, like any fuel ethanol plant, would be inherently dangerous to workers and the public. Safe operations would require the development, implementation, and enforcement of stringent OSHA-compliant safety protocols. The presence of denaturant gasoline, sulfuric acid, ammonia, lye, and other dangerous chemicals would contribute to the inherent hazards. OSHA regulations (29 CFR 1910.119) require that a Process Safety Management program be instituted where quantities of designated chemicals exceed certain limits. The proposed plant would be within these limits and therefore would require a Process Safety Management program.

Truckline Gas Company, the owner of the gas pipeline right-of-way located on the proposed site (see Figure 2-1) has requested that the tank farm for ethanol and gasoline storage be located as far as possible from the right-of-way (Panhandle Energy 2004). As seen in Figure 2-1, the tank farm would be located

approximately 250 feet from the right-of-way. An aboveground station for this pipeline is located immediately north of the proposed site across SR-114 (see Figure 3-2).

Nationwide Agribusiness, a subsidiary of Nationwide and a major insurer of fuel ethanol plants (including numerous modern plants designed and built by Fagen Inc. and other firms), reports that losses that have occurred at fuel ethanol plants do not exceed those experienced by plants engaged in comparable operations with comparably dangerous chemicals. Accidents that have occurred at fuel ethanol plants have typically been associated with nonroutine operations such as plant modifications or expansions, rather than with daily operations. Modern Fagen Inc. designed-built fuel ethanol plants such as the proposed plant have very acceptable loss ratios. The key discriminator to safe operations at modern fuel ethanol plants is the rigor with which plant management implements and enforces existing OSHA requirements (Nationwide Agribusiness 2004).

#### *3.2.12.2 Environmental Consequences of Proposed Action*

DOE analyzed the impacts of a hypothetical accident (four scenarios) at the proposed plant. The full analysis is provided in Appendix E. The following discussion summarizes the assumptions and results of the analysis. DOE assumed that during routine operations, no significant releases of hazardous or toxic materials would occur; therefore, only the results of an accidental release were analyzed.

In addition to ethanol, the bulk hazardous materials that would be stored at the plant would include a 100,000-gallon gasoline storage tank, an 18,000-gallon anhydrous ammonia tank, a 14,000-gallon tank of 50-percent sodium hydroxide solution, and a 7,000-gallon tank of sulfuric acid. From the standpoint of public exposures, an accidental release of anhydrous ammonia represents the greatest risk. For the accident analysis, DOE assumed that the anhydrous ammonia tank would be filled to 87.5 percent capacity. Thus, the material at risk for a release would be 15,750 gallons, or 81,000 pounds, of liquid anhydrous ammonia.

DOE considered four ammonia release scenarios. The first two considered the catastrophic failure of the ammonia storage tank. All the ammonia in the tank would be released in both of these scenarios. In the first scenario, the release duration was 10 minutes, and in the second, the release duration was 3 minutes. While catastrophic failures of vessels pressurized to 130 psig (the nominal storage pressure for the anhydrous ammonia) have occurred, they are very rare. Based on published data (AIChE 1989), DOE estimates that a well-maintained anhydrous ammonia tank would be expected to catastrophically fail no more than once in 10,000 to once in 1 million years of operation. The third scenario considered the catastrophic failure of the piping associated with the ammonia tank. Because there are more components to fail, in a well-maintained system such a release, while still rare, was estimated to occur at a rate of no more than once in 1,000 to once in 100,000 years of operation. Because the ammonia storage tank is assumed to not rupture in this scenario, a failure in the piping would depressurize the tank but the depressurization would leave a liquid in the tank at its normal boiling point of -28 °F. The release of ammonia would be limited to 16,400 pounds. The fourth scenario is a release of 100 pounds of anhydrous ammonia that occurs as a result of improperly connecting the cargo tank truck to the piping that charges ammonia into the storage tank. Because this accident is controlled by human error and not a mechanical failure, it is considered more likely but would still be expected to occur no more than once during the operating life of the facility.

When estimating the consequences of an industrial accidental, the American Industrial Hygiene Association's Emergency Response Planning Guidelines (ERPG) values are normally used to characterize exposure concentrations. The guidelines for ammonia are shown in Table 3-9.

**Table 3-9. ERPG Concentrations for Ammonia**

| Term | Ammonia Limit | Definition |
|---|---|---|
| ERPG-1 | 25 ppm | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor. |
| ERPG-2 | 150 ppm | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action. |
| ERPG-3 | 750 ppm | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing life-threatening health effects. |

ppm = parts per million.

The downwind dispersion of the releases was modeled in EPA's *Areal Locations of Hazardous Atmospheres* (ALOHA) computer modeling program (EPA 2004d) assuming a direct release to the atmosphere (i.e., no liquid pool formed as a result of the release). This maximizes the downwind concentration. Average meteorology was used to model the downwind dispersion of the release plume. Specifically, the time of the accident was assumed to be noon on June 30th on a day when the cloud cover was 80 percent and the relative humidity was 50 percent. The wind speed was assumed to be 3 meters/second measured at 2 meters (6.8 miles per hour measured at 6.6 feet), and the temperature at the time of the accident was assumed to be 77 °F. The atmospheric stability at the time of the accidents was assumed to be Pasquill D, and the height of the inversion layer was assumed to be 500 meters (1,640 feet). The analysis assumed the wind was from the east, which would carry a released plume toward Rensselaer.

A summary of the results of the ALOHA modeling for the four accident scenarios is shown in Table 3-10. For each accident scenario, Table 3-10 shows the distance in miles from the accident site where ALOHA predicts that outdoor ammonia concentrations corresponding to the three ERPG concentrations would end and where indoor concentrations exceeding ERPG-2 would end.

**Table 3-10. Distance (Miles) To ERPG Concentration Endpoints**

| Scenario | ERPG-3 | ERPG-2 | ERPG-1 | ERPG-2 Exceeded Indoors |
|---|---|---|---|---|
| 1 | 1.3 | 3.8 | > 6 | 0.9 |
| 2 | 2.1 | 4.0 | > 6 | 0.9 |
| 3 | 0.5 | 1.5 | 4.1 | 0.3 |
| 4 | Too close to estimate | 0.08 | 0.2 | Too close to estimate |

If the wind were blowing from the east, the ERPG-2 concentration would be exceeded at some locations on the eastern side of Rensselaer for Scenarios 1 and 2 for a short period of time, far less than the 1-hour exposure required to fully meet the definition of ERPG-2.

The Bethany Evangelical Free Church is an estimated 3.1 miles distant, the Rensselaer Care Center 3.8 miles, the Rensselaer High School 3.8 miles, and the Jasper County Hospital 4.0 miles. At these locations, at the proposed plant, and at residences and businesses located between the proposed plant and Rensselaer, if deemed necessary, *notification* followed by either *evacuation* or *sheltering in place* could be used as mitigation strategies. Because of the relatively short plume duration (assumed to be

10 minutes), the environmental consequences of postulated releases would be small and if the decision were made to further mitigate them, a mitigation strategy would be fully manageable. Any mitigation strategies would be specified in a risk management plan required by the EPA (40 CFR Part 68) because the proposed plant would have an ammonia inventory that is greater than 10,000 pounds.

IBEC has initiated pre-construction implementation of emergency mitigation measures through ongoing discussions with the Jasper County Emergency Management Coordinator. As specified and required by the Emergency Management Coordinator, the plant's emergency plan would include a list of residences, businesses, and other places that would be notified and instructed in the event of an accidental release or other emergency requiring public notification. The plan also would include coordination with the Rensselaer Volunteer Fire Department and fire training.

## 3.3 Environmental Consequences of the No Action Alternative

Under the No Action Alternative, DOE would not provide partial funding for the design and construction of the proposed fuel ethanol plant. For purposes of comparing environmental consequences, DOE assumes that under the No Action Alternative, the proposed fuel ethanol would not be built. DOE recognizes, however, that IBEC could pursue alternate sources of construction capital. Under the No Action Alternative, the general site description and the descriptions of the existing environment would be identical to those described above for the Proposed Action. Under the No Action Alternative, none of the adverse impacts (for example, emissions of criteria air pollutants and hazardous air pollutants, discharge of aquatic toxins, and increased heavy truck traffic and traffic fatalities) or beneficial impacts (for example, increased employment and other local economic stimulants) discussed above for the Proposed Action would occur.

# 4.0 CUMULATIVE IMPACTS – CARBON DIOXIDE LIQUEFACTION PLANT

## 4.1 Introduction

Approximately one-third of the mass of a bushel of corn that is fermented to produce ethanol is converted to CO2. This CO2 is often considered a low value by-product and as such is vented directly to the atmosphere. It is neither a criteria air pollutant nor a hazardous air pollutant. However, EPA now views CO2 as a pollution concern. It does not directly impair human health, but it is a greenhouse gas that traps the earth's heat and contributes to global warming.

As an alternative to atmospheric venting, CO2 from the proposed plant would be sold to a third party for liquefaction and resale to the food industry. This configuration simultaneously avoids emission of a greenhouse gas and increases the revenue generated by the fuel ethanol plant. To maximize the efficient transfer of CO2 from the proposed plant to the CO2 plant, the CO2 plant would be built on the same site directly adjacent to the fuel ethanol plant.

CEQ regulations are directed at avoiding improper segmentation in NEPA documents, wherein the significance of the environmental impacts of a proposed action as a whole would not be evident if the action were to be broken into its component parts and the impact of those parts analyzed separately. CEQ's regulations direct agencies to consider connected actions, cumulative actions, or similar actions in defining the scope of an environmental impact statement, but not an EA (40 CFR 1508.25). However, DOE has determined that it is appropriate to consider the impacts from such actions in this EA.

The CO2 plant is not a component of DOE's Proposed Action, the scope of which is limited to subsidizing the design and construction of a fuel ethanol plant. The CO2 plant is neither a necessary component of nor integral to the operation of the proposed plant. However, it can reasonably be considered an action that would have additive impacts on particular environmental resources.

Section 1508.7 of NEPA defines a cumulative impact as the impact on the environment which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Consequently, to ensure that DOE's decision-making with regard to the Proposed Action (the fuel ethanol plant) is fully informed, this section describes the CO2 plant and potential impacts from the CO2 plant that would have a cumulative impact on environmental resources and areas of impact.

## 4.2 Existing Environment

The CO2 plant would be built on and enclosed in an approximately 5-acre area located in the northwest portion of the ethanol plant site. Because the CO2 plant would be located on the same 70-acre site as the proposed fuel ethanol plant, the description of the existing environment is identical to that in Section 3.0.

## 4.3 CO2 Plant Description

The location of the CO2 plant in relation to the proposed fuel ethanol plant is shown in Figure 2-1. It would share a common entrance from SR-114 with the proposed fuel ethanol plant and be physically connected to it by a CO2 transfer duct. The CO2 plant would be of a prefabricated design. Construction would take approximately 12 months and the plant would employ 10 to 15 people.

The plant would include CO2 recovery compressors and CO2 purification, liquefaction, drying, and condensing equipment. The storage yard would house three to four 200,000-lb capacity liquefied CO2 storage tanks. Each tank would be approximately 13 feet in diameter and 132 feet long. The plant would be powered exclusively by electricity from the same on-site capacitor station as the fuel ethanol plant.

The plant would be capable of liquefying approximately 400 tons of CO2 per day, slightly more than the approximate daily output of CO2 from the fuel ethanol plant. The plant would be served by a fleet of fifteen to sixteen 20-ton tank trucks. Parking would be available for five to seven trucks. It would take approximately an hour and a quarter to load out an empty truck. DOE estimates that 23 tanker trucks loaded with CO2 would leave the plant per day. CO2 plant traffic is discussed in Appendix D (Traffic Analysis).

## 4.4 Additive Consequences

### *4.4.1 Air Quality*

The CO2 plant would result in some air emissions of fugitive CO2. However, because the plant would be powered exclusively by electricity, it would not require a state air emission permit, even as a minor source. Air emissions would not represent an added consequence.

### *4.4.2 Infrastructure*

*Utilities*

The electric demand represented by the CO2 plant would not add to the impacts on infrastructure because the 8,000-kW load analyzed by NIPSCO (NIPSCO 2003) included the load for the CO2 plant (see Section 3.2.6.2).

*Traffic*

DOE estimates that 47 heavy tank trucks per day could enter and leave the CO2 plant. All vehicle traffic to and from the fuel ethanol plant and the CO2 plant would use a common entrance to and from SR-114. This additional truck traffic would be a cumulative impact when added to truck traffic to and from the

fuel ethanol plant. The CO2 plant traffic impacts are discussed under the vehicular traffic impacts in Section 3.2.6.2 and in Appendix D.

### *4.4.3 Other Resource Areas*

The CO2 plant would result in the loss of an additional 5 acres of farmland. The plant's 10 to 15 employees would increase sanitary waste and commuter traffic at the site by approximately 30 to 45 percent. The 10 to 15 additional permanent workers at the CO2 plant would increase the positive socioeconomic benefits that the fuel ethanol plant would provide to the local economy.

## 5.0 SHORT-TERM USES AND COMMITMENT OF RESOURCES

As identified in Section 1.1, NEPA requires Federal agencies to (1) describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity, and (2) characterize any irreversible and irretrievable commitments of resources that would be involved should a proposed action be implemented.

The Proposed Action would commit approximately one-half of the proposed site (that is, approximately 35 acres of prime farmland); approximately 14 million bushels of corn annually; and approximately 645 acre-feet of groundwater annually. In addition, there would be a commitment of small amounts of construction material and the fuel and energy resources required to run the plant and transport plant input and output. These commitments would result in approximately 40 million gallons of fuel ethanol and ethanol distillation by-products. In addition to the fuel ethanol and by-products, the Proposed Action would partially meet the need to reduce or eliminate the use of MTBE, a serious and persistent threat to groundwater quality, by furthering production of a viable alternate gasoline oxygenate, ethanol.

There would be a generally consistent relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. Approximately 35 acres of land would be withdrawn from corn production. However, the Proposed Action would support a commercial venture that is directly related to and contingent upon sustained local corn production. The proposed plant would increase the demand for and price of locally grown corn. Because corn production is one to the primary current land uses, the Proposed Action is consistent with the maintenance and enhancement of the land's current and long-term productivity.

The corn that would be committed is a renewable resource; therefore, its commitment is not irreversible. The land that would be withdrawn from agricultural production would be a reversible commitment. The groundwater commitment would be irreversible, although approximately one-quarter of the groundwater used would be discharged from the plant as surface water.

Upon decommissioning of the proposed plant, it would be possible to recycle or reuse some of the committed construction materials and plant components. Any remaining materials that could not be recycled or reused would be disposed of in a landfill or abandoned, making their use an irreversible commitment. The fuel, oil, and maintenance costs committed to growing, harvesting, storing, transporting, and processing the corn and transporting plant output would be irreversibly committed.

## 6.0 REFERENCES

Abonmarche Consultants, 2005. *Proposed Ethanol Plant on State Road 114 Jasper County, Indiana, Traffic Impact Analysis*. February 2005.

AIChE (American Institute of Chemical Engineers), 1989. *Chemical Process Quantitative Risk Analysis*, New York, New York, 1989, p. 359; citing T.A. Smith and R.G. Warwick, "A survey of defects in pressure vessels in the UK for the period 1962-1978 and its relevance to nuclear primary circuits," in *International Journal of Pressure Vessels and Piping*, 1983, v. 11, pp. 127-166.

Arnott, B., 2004. Personal communication, telephone conversation. Mr. William E. Fallon, Battelle, and Ms. Beulah Arnott, Jasper County Historian. December 10, 2004.

ASTM (American Society for Testing and Materials), no date. *Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process.* Standard E1527-00, ASTM International.

CEQ (Council on Environmental Quality), 1997. *Guidance for Considering Environmental Justice Under the National Environmental Policy Act*. December 10, 1997.

City-Data 2004. *Rensselaer, Indiana.* Online at http://www.city-data.com/city/Rensselaer - Indiana.html

CSX 2004. E-mail communication dated November 29, 2004, from Mr. David P. Kennedy, CSX, to Mr. Keith Gibson, IBEC.

Disaster Center, 2004. *Indiana Tornadoes*. Online at http://www.disastercenter.com/indiana/tornado.html

DOA (U.S. Department of Agriculture), 1999. *Indiana Agriculture Statistics Service. Indiana Farm Land Use History – Jasper County, Indiana*. Online at http://www.nass.usda.gov/in/historic/h97jaspe.pdf.

DOA (U.S. Department of Agriculture), 2004. *Economic Research Service, Indiana State Fact Sheet.* Online at http://www.ers.usda.gov/statefacts/IN.HTM

DOE (U.S. Department of Energy), 2000. *Draft Guidance on Incorporating Environmental Justice Considerations into the Department of Energy's National Environmental Policy Act Process*. April 2000.

DOT (U.S Department of Transportation), 2004. *Large Truck Crash Facts 2002.* Online at http://ai.volpe.dot.gov/CarrierResearchResults/HTML/2002Crashfacts/profile02_VpToc.htm

Environmental Incorporated, 2002a. *Phase I Environmental Site Assessment, Former Rock Quarry.* August 2002.

Environmental Incorporated, 2002b. *Phase II Environmental Site Assessment, Former Rock Quarry.* October 2002.

Environmental Incorporated, 2003. *Phase I Environmental Site Assessment, Wuethrich Pork and Grain, Inc.*, March 2003.

EPA (U.S. Environmental Protection Agency), 2004a. *Blue Ribbon Panel for Reviewing Use of MTBE*. Online at http://www.epa.gov/otaq/consumer/fuels/oxypanel/blueribb.htm#Recommendation

EPA (U.S. Environmental Protection Agency), 2004b. *AirData, Nonattainment Areas , Indiana*. Online at http://www.epa.gov/air/data/nonat.html?st~IN~Indiana

EPA (U.S. Environmental Protection Agency), 2004c. *AirData, Air Quality Index Summary Report – Indiana (2003 and 2004)*. Online at http://oaspub.epa.gov/pls/airsdata/ADAQS.aqi?geotype=st&geocode=IN&geoinfo=%3Fst%7EIN%7EIndiana&pol=&year=2004&sumtype=co&fld=gname&fld=gcode&fld=stabbr&fld=regn&rpp=25&page=2&sort=d9&fmt=

EPA (U.S. Environmental Protection Agency), 2004d. *Areal Locations of Hazardous Atmospheres (ALOHA) User's Manual*, Version 5.3.1, U.S. Environmental Protection Agency and National Oceanic and Atmospheric Administration, March 2004.

FTA (U.S. Federal Transit Administration), 1995. *Transit Noise and Vibration Impact Assessment*. FTA Report DOT-T-95-16. Washington, DC:

FWS (U.S. Fish and Wild life Service), 2004a. *County Distribution of Indiana's Federally-Listed Threatened, Endangered, Proposed, and Candidate Species.* Online at http://midwest.fws.gov/Endangered/lists/indiana-cty.html

FWS (U.S. Fish and Wild life Service), 2004b. Letter dated November 2, 2004, from Mr. Scott E. Pruit, USFWS, to Mr. Keith Gibson, IBEC.

HLFI (Historic Landmarks Foundation of Indiana), 2002. *Indiana Historic Sites and Structures Inventory*, Jasper County Interim Report. May 2002.

HPAJC (Historic Preservation Association of Jasper County), 2004. E-mail communication from Mr. Robert G. Lewis, HPAJC, to Mr. William E. Fallon, Battelle, December 21, 2004, citing results of examination of the proposed site for cultural or historical resources.

IBEC (Iroquois Bio-energy Corporation), 2004. E-mail communication from Mr. Keith Gibson, IBEC, to Mr. William E. Fallon, Battelle, November 5, 2004, citing results of IBEC meeting with Jerry Hill, INDOT.

IDEM (Indiana Department of Environmental Management), 2004a. *Federally Enforceable State Operating Permit (Air Emissions Permit) and Technical Addendums*. Issued January 8, 2004.

IDEM (Indiana Department of Environmental Management), 2004b. E-mail communication dated November 23, 2004, from Ms. Melessia Hawkins, IDEM Permit Manager for the Newton County Landfill, to Mr. William E. Fallon, Battelle.

IDEM (Indiana Department of Environmental Management) 2004c. Letter from Mr. James F. McCurdy, IDEM, to Mr. William E. Fallon, Battelle, dated December 8, 2004, re: Godlove Enterprises, Inc.

IDNR (Indiana Department of Natural Resources), 1990. *Water Resource Availability in the Kankakee River Basin, Indiana – Executive Summary*. Online at http://www.in.gov/dnr/water/water_availability/basinsums/pdf/kankakee.pdf

IDNR (Indiana Department of Natural Resources), 2004a. Letter dated August 16, 2004, from Mr. Ronald P. Hellmich, Indiana Natural Heritage Center, to Mr. Keith Gibson, IBEC.

IDNR (Indiana Department of Natural Resources), 2004b. Personal communication, telephone conversation. Mr. William E. Fallon, Battelle, and Mr. Mark Busch, Section Head, Indiana Department of Natural Resources, Water Rights and Use Section. November 9, 2004.

IDWD (Indiana Department of Workforce Development), 2004. *Historical Labor Force/Unemployment Data.* Online at http://nidataplus.com/lfeja1.htm

ILRC (Indiana Land Resource Council), 1999. *The Hoosier Farmland Preservation Task Force Final Report.* Online at http://www.in.gov/oca/ilrc/reports/press.html

INDOT (Indiana Department of Transportation) 2004. *2001 Annual Average Daily Traffic, Jasper County*. Online at http://www.in.gov/dot/div/traffic/count/01/jasper.pdf

INDOT (Indiana Department of Transportation), 2005. *The Indiana Design Manual*. Online at http://www.in.gov/dot/div/contracts/standards/dm/

Jasper County 2004. *Jasper County Zoning Map.*

Meyer, L., 2004. Personal communication, telephone conversation. Mr. William E. Fallon, Battelle, and Mr. LaVerne Meyer, President, Jasper County Historical Society. December 10, 2004.

Nationwide Agribusiness, 2004. Personal communications, telephone conversations. Mr. William E. Fallon, Battelle, with Mr. Glen Baker and Mr. Art Moeller, Nationwide Agribusiness. December 2004.

NIPSCO (Northern Indiana Public Service Company), 2003. Letter report on Pleasant Ridge Circuit Analysis from Mr. Arthur W. Beem, NIPSCO, to Mr. Gary Stein, Wabash Valley Power Association, March 4, 2003.

NPS (National Park Service), 2004. *Indian Reservations in the Continental United States*. Online at http://www.cr.nps.gov/nagpra/DOCUMENTS/ResMAP.HTM

NRCS (Natural Resources Conservation Service), 2004. Letter from Ms. Jane E. Hardisty, NRCS State Conservationist, to Mr. William E. Fallon, Battelle, December 15, 2004, transmitting NRCS Farmland Conversion Impact Rating.

OSHA (Occupational Safety and Health Administration), 2004. *Regulations (Standards - 29 CFR) Occupational Noise Exposure. - 1910.95*. Online at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9735&p_table=STANDARDS

Panhandle Energy, 2004. E-mail communication from Mr. Gary Steward, Panhandle Energy, to Mr. Keith Gibson, IBEC, December 13, 2004.

REMC (Jasper County Rural Electric Membership Corporation), 2004. Letter from Mr. William F. Hodnett, CEO and General Manager, REMC, to Mr. Keith Gibson, IBEC. November 11, 2004.

RFA (Renewable Fuels Association), 2004. *Ethanol Production Facilities.* Online at http://www.ethanolrfa.org/eth_prod_fac.html

SCS (Soil Conservation Service), 1990. *Soil Survey of Jasper County, Indiana.* March 1990.

Shapouri et al. (H. Shapouri, J. Duffield, A. McAloon, M. Wang), 2004. *The 2001 Net Energy Balance of Corn-Ethanol (Preliminary).* Online at http://www.bioproducts-bioenergy.gov/pdfs/net%20energy%20balance.pdf.

Suter, A.H., 1991. *Noise and Its Effects*, report prepared for the Administrative Conference of the United States, November 1991. Online at http://www.nonoise.org/library/suter/suter.htm .

TVA (Tennessee Valley Authority), 2004a. E-mail communication from Mr. Norris Nielsen, TVA Meteorologist, forwarded to Mr. William E. Fallon, Battelle, November 9, 2004. Data source: National Climate Data Center, Asheville, North Carolina.

TVA (Tennessee Valley Authority), 2004b. Personal communication, telephone conversation. Mr. Gene Young, TVA, and Mr. Mark Wuethrich, December 6, 2004.

Urbanchuk, J.M., 2000. *Ability of the U.S. Ethanol Industry to Replace MTBE.* Online at http://www.ethanol-gec.org/ability.html

Urbanchuk, J.M., and J. Kapell, 2002. *Ethanol and the Local Community.* Online at http://www.ethanolrfa.org/Ethanol_Local_Community.pdf

U.S. Census Bureau, 2000. *Profiles of General Demographic Characteristics, Indiana*. Online at http://factfinder.census.gov/servlet/QTTable?_bm=y&-geo_id=05000US18073&-qr_name=DEC_2000_SF1_U_DP1&-ds_name=DEC_2000_SF1_U&-_lang=en&-redoLog=false&-_sse=on.

U.S. Census Bureau, 2004. *Poverty Thresholds 2003.* Online at (http://www.census.gov/hhes/poverty/threshld/thresh03.html)

USGS (U.S. Geological Survey), 2004. *National Seismic Hazard Mapping Project*. Online at http://eqhazmaps.usgs.gov/index.html.

USGS (U.S. Geological Survey), 1962. McCoysburg, Indiana Quadrangle 7.5 Minute Series Topographic Map.

This page intentionally left blank.

# APPENDIX A

# SCOPING LETTERS

This page intentionally left blank.

## Generic Scoping Letter

November 8, 2004

TO: DISTRIBUTION LIST

SUBJECT: Notice of Scoping – Iroquois Bio-Energy Company, Proposed Fuel Ethanol Plant, Rensselaer, Indiana

The U.S. Department of Energy (DOE) is proposing to provide partial funding to Iroquois Bio-Energy Company (IBEC), a private limited liability corporation incorporated in the State of Indiana, for the design and construction of a fuel ethanol plant. Pursuant to the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE is preparing a draft Environmental Assessment (EA) to:

- Identify any adverse environmental effects that cannot be avoided should this proposed action be implemented.
- Evaluate viable alternatives to the proposed action, including a no action alternative.
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
- Characterize any irreversible and irretrievable commitments of resources that would be involved should this proposed action be implemented.

The proposed plant would be located on a 68.9 acre site located immediately south of West SR 114 approximately three miles east of the City of Rensselaer in Jasper County, Indiana. (Attachment 1 is a project location map). The West SR 114 right-of-way would form the northern border of the site and the CSX mainline right-of-way would form the southern border. The northwestern quadrant of the site would be transected by existing buried, twin, high-pressure interstate gas transmission lines, which could be tapped for natural gas service. Electric power would be provided by the Jasper County Rural Electric Membership Corp (REMC) utilizing a drop from the existing transmission line that parallels West SR 114. Process water would be provided from captive wells that
would be drilled on the proposed site. The following is a summary legal description of the site:

The site would be located at 751 West SR 114 in Rensselaer (east of Pleasant Ridge), Marion Township, Jasper County, Indiana 47978. More specifically, the site is a part of the southwestern quarter of Section 25, Township 29 North, Range 6 West of the Second Principal Meridian. Attachment 2 is a map showing the general location of the site copied from the McCoysburg, Indiana United States Geological Survey (USGS) Quadrangle 7.5 Minute Series Topographic Map (USGS, 1962).

Historically the proposed site has been used for agriculture; however, it has been zoned for industrial use by Jasper County. All surrounding property is currently zoned for agricultural or industrial use. The closest residential property is approximately 3000 feet from the proposed site.

Annually, the proposed facility would process approximately 15 million bushels of locally grown corn and would produce approximately 40 million gallons of denatured ethanol, approximately 109,000 tons of distiller's grains, and approximately 109,000 tons of carbon dioxide. The total footprint of the proposed plant would be approximately 15 acres.

All requisite state air emission permits have been issued. All requisite state water discharge permit applications have been prepared and are ready for submission. Attachment 3 is a conceptual rendition of the proposed plant. The following is a summary description of the process that the plant would use:

- Locally grown corn would be received by truck at the proposed plant, dry-milled, and converted to fermentable sugars by enzyme hydrolysis. The resulting mash would be fermented in batch fermentors, and then transferred to a continuous distillation column that would be designed to yield 95 plus percent pure ethanol.

- The ethanol would then be further refined by dehydration to 99.9 percent water-free ethanol in a molecular sieve bed.

- The anhydrous ethanol would be denatured by adding five percent unleaded gasoline or a gasoline blendstock for shipment to markets throughout the United States. Production of denatured ethanol, would increase to as much as 10% above the plant's annual name-plate capacity of 40 mgpy after several years of performance.

- The syrup from the continuous distillation column would be pumped through a centrifuge where it would be separated into wet or dried distiller's grains.

- Ethanol wet distiller's grains and dried distiller's grains will be shipped from the plant by rail and truck. The distillers grains would be sold locally as agricultural feedstock. Carbon dioxide would be sold to a third party who would build a prefabricated carbon dioxide liquefaction plant adjacent to the proposed fuel ethanol plant.

More detailed information about IBEC is available online at http://www.ibecethanol.com.

**Please provide any comments on or before November 24, 2004 to:**

Joyce Beck
NEPA Document Manager
DOE Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393
(303) 275-4774
(303) 275- 4790 (fax)
1-800-644-6735, extension 4474
joyce.beck@go.doe.gov

We look forward to hearing from you.

Sincerely,

John H. Kersten
Manager

Attachment: As Stated

Response Date: November 24, 2004

Concur _____SPB _____DGP

File#

# Special Scoping Letters

November 8, 2004

Mr. Jerry Hill
Indiana Department of Transportation
Maple and Scott Street
Rensselaer, IN 47978

Dear Mr. Hill:

SUBJECT: Notice of Scoping – Iroquois Bio-Energy Company, Proposed Fuel Ethanol Plant, Rensselaer, Indiana

The U.S. Department of Energy (DOE) is proposing to provide partial funding to Iroquois Bio-Energy Company (IBEC), a private limited liability corporation incorporated in the State of Indiana, for the design and construction of a fuel ethanol plant. Pursuant to the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE is preparing a draft Environmental Assessment (EA) to:

- Identify any adverse environmental effects that cannot be avoided should this proposed action be implemented.
- Evaluate viable alternatives to the proposed action, including a no action alternative.
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
- Characterize any irreversible and irretrievable commitments of resources that would be involved should this proposed action be implemented.

The proposed plant would be located on a 68.9 acre site located immediately south of West SR 114 approximately three miles east of the City of Rensselaer in Jasper County, Indiana. (Attachment 1 is a project location map). The West SR 114 right-of-way would form the northern border of the site and the CSX mainline right-of-way would form the southern border. The northwestern quadrant of the site would be transected by existing buried, twin, high-pressure interstate gas transmission lines, which could be tapped for natural gas service. Electric power would be provided by the Jasper County Rural Electric Membership Corp (REMC) utilizing a drop from the existing transmission line that parallels West SR 114. Process water would be provided from captive wells that would be drilled on the proposed site. The following is a summary legal description of the site:

The site would be located at 751 West SR 114 in Rensselaer (east of Pleasant Ridge), Marion Township, Jasper County, Indiana 47978. More specifically, the site is a part of the southwestern quarter of Section 25, Township 29 North, Range 6 West of the Second Principal Meridian. Attachment 2 is a map showing the general location of the site copied from the McCoysburg, Indiana United States Geological Survey (USGS) Quadrangle 7.5 Minute Series Topographic Map.

Historically the proposed site has been used for agriculture; however, it has been zoned for industrial use by Jasper County. All surrounding property is currently zoned for agricultural or industrial use. The closest residential property is approximately 3000 feet from the proposed site.

Annually, the proposed facility would process approximately 15 million bushels of locally grown corn and would produce approximately 40 million gallons of denatured ethanol, approximately 109,000 tons of distiller's grains, and approximately 109,000 tons of carbon dioxide. The total footprint of the proposed plant would be approximately 15 acres.

All requisite state air emission permits have been issued. All requisite state water discharge permit applications have been prepared and are ready for submission. Attachment 3 is a conceptual rendition of the proposed plant. The following is a summary description of the process that the plant would use:

- Locally grown corn would be received by truck at the proposed plant, dry-milled, and converted to fermentable sugars by enzyme hydrolysis. The resulting mash would be fermented in batch fermentors, and then transferred to a continuous distillation column that would be designed to yield 95 plus percent pure ethanol.

- The ethanol would then be further refined by dehydration to 99.9 percent water-free ethanol in a molecular sieve bed.

- The anhydrous ethanol would be denatured by adding five percent unleaded gasoline or a gasoline blendstock for shipment to markets throughout the United States. Production of denatured ethanol, would increase to as much as 10% above the plant's annual name-plate capacity of 40 mgpy after several years of performance.

- The syrup from the continuous distillation column would be pumped through a centrifuge where it would be separated into wet or dried distiller's grains.

- Ethanol wet distiller's grain and dried distiller's grains will be shipped from the plant by rail and truck. The distiller's grains would be sold locally as agricultural feedstock. Carbon dioxide would be sold to a third party who would build a prefabricated carbon dioxide liquefaction plant adjacent to the proposed fuel ethanol plant.

More detailed information about IBEC is available on line at http://www.ibectethanol.com.

On November 4, 2004, the Indiana Department of Transportation informed the plant proponent, IBEC, that currently approximately 1,370 vehicles per day use West SR 114. IBEC estimates that the Proposed Action would result in a maximum of 100 heavy truck trips per day on West SR 114 to deliver corn to the proposed plant and transport ethanol and wet or dried distiller's grain from it. Would you please provide us with an IDOT opinion on whether West SR 114 could handle the projected increase in traffic, any needed upgrades to West SR 114 near the entrance to the proposed plant, and whether any additional traffic control infrastructure on West SR -114 would be necessary.

More detailed information about IBEC is available online at http://www.ibecethanol.com. **Please provide any comments on the Proposed Action on or before November 24, 2004 to:**

Joyce Beck
NEPA Document Manager
DOE Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393
(303) 275-4774
(303) 275- 4790 (fax)
1-800-644-6735, extension 4474
joyce.beck@go.doe.gov

We look forward to hearing from you.

Sincerely,

John H. Kersten
Manager

Enclosure: As Stated

cc: Steve Blazek /w address list
NEPA Compliance Office
DOE, Golden Field Office

Concur _____SPB _____DGP

Response Date: November 24, 2004
File #

November 8, 2004

Ms. Julie McLemore
District Conservationist
USDA Natural Resources Conservation Service
Rensselar Service Center
800 S. College Ave.
Rensselaer, IN 47978-3054

Dear Ms. McLemore:

SUBJECT: Notice of Scoping – Iroquois Bio-Energy Company, Proposed Fuel Ethanol Plant, Rensselaer, Indiana

The U.S. Department of Energy (DOE) is proposing to provide partial funding to Iroquois Bio-Energy Company (IBEC), a private limited liability corporation incorporated in the State of Indiana, for the design and construction of a fuel ethanol plant. Pursuant to the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE is preparing a draft Environmental Assessment (EA) to:

- Identify any adverse environmental effects that cannot be avoided should this proposed action be implemented.
- Evaluate viable alternatives to the proposed action, including a no action alternative.
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
- Characterize any irreversible and irretrievable commitments of resources that would be involved should this proposed action be implemented.

The proposed plant would be located on a 68.9 acre site located immediately south of West SR 114 approximately three miles east of the City of Rensselaer in Jasper County, Indiana. (Attachment 1 is a project location map). The West SR 114 right-of-way would form the northern border of the site and the CSX mainline right-of-way would form the southern border. The northwestern quadrant of the site would be transected by existing buried, twin, high-pressure interstate gas transmission lines, which could be tapped for natural gas service. Electric power would be provided by the Jasper County Rural Electric Membership Corp (REMC) utilizing a drop from the existing transmission line that parallels West SR 114. Process water would be provided from captive wells that would be drilled on the proposed site. The following is a summary legal description of the site:

The site would be located at 751 West SR 114 in Rensselaer (east of Pleasant Ridge), Marion Township, Jasper County, Indiana 47978. More specifically, the site is a part of the southwestern quarter of Section 25, Township 29 North, Range 6 West of the Second Principal Meridian. Attachment 2 is a map showing the general location of the site copied from the McCoysburg, Indiana United States Geological Survey (USGS) Quadrangle 7.5 Minute Series Topographic Map (USGS, 1962).

Historically the proposed site has been used for agriculture; however, it has been zoned for industrial use by Jasper County. All surrounding property is currently zoned for agricultural or industrial use. The closest residential property is approximately 3000 feet from the proposed site.

Annually, the proposed facility would process approximately 15 million bushels of locally grown corn and would produce approximately 40 million gallons of denatured ethanol, approximately 109,000 tons of distiller's grains, and approximately 109,000 tons of carbon dioxide. The total footprint of the proposed plant would be approximately 15 acres.

All requisite state air emission permits have been issued. All requisite state water discharge permit applications have been prepared and are ready for submission. Attachment 3 is a conceptual rendition of the proposed plant. The following is a summary description of the process that the plant would use:

- Locally grown corn would be received by truck at the proposed plant, dry-milled, and converted to fermentable sugars by enzyme hydrolysis. The resulting mash would be fermented in batch fermentors, and then transferred to a continuous distillation column that would be designed to yield 95 plus percent pure ethanol.

- The ethanol would then be further refined by dehydration to 99.9 percent water-free ethanol in a molecular sieve bed.

- The anhydrous ethanol would be denatured by adding five percent unleaded gasoline or a gasoline blendstock for shipment to markets throughout the United States. Production of denatured ethanol, would increase to as much as 10% above the plant's annual name-plate capacity of 40 mgpy after several years of performance.

- The syrup from the continuous distillation column would be pumped through a centrifuge where it would be separated into wet or dried distiller's grains.

- Ethanol wet distiller's grain and dried distiller's grains will be shipped from the plant by rail and truck. The distillers grains would be sold locally as agricultural feedstock. Carbon dioxide would be sold to a third party who would build a prefabricated carbon dioxide liquefaction plant adjacent to the proposed fuel ethanol plant.

More detailed information about IBEC is available online at http://www.ibecethanol.com.

We would welcome learning of any issues or comments that you might have in regard to our Proposed Action so that we can consider them for the EA we are preparing. In particular, would

you please provide us with an opinion as to whether our proposed action would represent an adverse impact to prime and unique farmland. Please provide any comments or opinions by November 24, 2004 to

Joyce Beck
NEPA Document Manager
DOE Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393
(303) 275-4774
(303) 275- 4790 (fax)
1-800-644-6735, extension 4474
joyce.beck@go.doe.gov

We look forward to hearing from you.

Sincerely,

John H. Kersten
Manager

Attachment: As Stated

Response Date: November 24, 2004

cc: Steve Blazek /w address list
NEPA Compliance Office
DOE, Golden Field Office

Concur _____SPB _____DGP

File#

November 8, 2004

John Charles Smith
State Historic Preservation Office
Room W 274
402 W. Washington St.
Indianapolis, IN 46204-2739

Dear Mr. Smith:

SUBJECT: Notice of Scoping – Iroquois Bio-Energy Company Proposed Fuel Ethanol Plant, Rensselaer, Indiana

The U.S. Department of Energy (DOE) is proposing to provide partial funding to Iroquois Bio-Energy Company (IBEC), a private limited liability corporation incorporated in the State of Indiana, for the design and construction of a fuel ethanol plant. Pursuant to the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE is preparing a draft Environmental Assessment (EA) to:

- Identify any adverse environmental effects that cannot be avoided should this proposed action be implemented.
- Evaluate viable alternatives to the proposed action, including a no action alternative.
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
- Characterize any irreversible and irretrievable commitments of resources that would be involved should this proposed action be implemented.

The proposed plant would be located on a 68.9 acre site located immediately south of West SR 114 approximately three miles east of the City of Rensselaer in Jasper County, Indiana. (Attachment 1 is a project location map). The West SR 114 right-of-way would form the northern border of the site and the CSX mainline right-of-way would form the southern border. The northwestern quadrant of the site would be transected by existing buried, twin, high-pressure interstate gas transmission lines, which could be tapped for natural gas service. Electric power would be provided by the Jasper County Rural Electric Membership Corp (REMC) utilizing a drop from the existing transmission line that parallels West SR 114. Process water would be provided from captive wells that would be drilled on the proposed site. The following is a summary legal description of the site.

The site would be located at 751 West SR 114 in Rensselaer (east of Pleasant Ridge), Marion Township, Jasper County, Indiana 47978. More specifically, the site is a part of the southwestern quarter of Section 25, Township 29 North, Range 6 West of the Second Principal Meridian. Attachment 2 is a map showing the general location of the site copied from the McCoysburg, Indiana United States Geological Survey (USGS) Quadrangle 7.5 Minute Series Topographic Map (USGS, 1962).

Historically the proposed site has been used for agriculture; however, it has been zoned for industrial use by Jasper County. All surrounding property is currently zoned for agricultural or industrial use. The closest residential property is approximately 3000 feet from the proposed site.

Annually, the proposed facility would process approximately 15 million bushels of locally grown corn and would produce approximately 40 million gallons of denatured ethanol, approximately 109,000 tons of distiller's grains, and approximately 109,000 tons of carbon dioxide. The total footprint of the proposed plant would be approximately 15 acres.

All requisite state air emission permits have been issued. All requisite state water discharge permit applications have been prepared and are ready for submission. Attachment 3 is a conceptual rendition of the proposed plant. The following is a summary description of the process that the plant would use:

- Locally grown corn would be received by truck at the proposed plant, dry-milled, and converted to fermentable sugars by enzyme hydrolysis. The resulting mash would be fermented in batch fermentors, and then transferred to a continuous distillation column that would be designed to yield 95 plus percent pure ethanol.

- The ethanol would then be further refined by dehydration to 99.9 percent water-free ethanol in a molecular sieve bed.

- The anhydrous ethanol would be denatured by adding five percent unleaded gasoline or a gasoline blendstock for shipment to markets throughout the United States. Production of denatured ethanol, would increase to as much as 10% above the plant's annual name-plate capacity of 40 mgpy after several years of performance.

- The syrup from the continuous distillation column would be pumped through a centrifuge where it would be separated into wet or dried distiller's grains.

- Ethanol wet distiller's grain and dried distiller's grains would be shipped from the plant by rail and truck. The distillers grains would be sold locally as agricultural feedstock. Carbon dioxide would be sold to a third party who would build a prefabricated carbon dioxide liquefaction plant adjacent to the proposed fuel ethanol plant.

More detailed information about IBEC is available online at http://www.ibecethanol.com.

Because there are records of the proposed site being used for agriculture for the last hundred years, we do not believe our Proposed Action would disturb or discover any cultural or

historical resources. However, we wish to confirm this with your office and provide you with an opportunity to comment on our Proposed Action. Would you please provide us with a SHPO opinion regarding the presence or absence of cultural or historic sites that could be impacted by our Proposed Action, or advise us of any additional information your office would need in order to provide an opinion.

**Please provide any comments on or before November 24, 2004 to:**

Joyce Beck
NEPA Document Manager
DOE Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393
(303) 275-4774
(303) 275- 4790 (fax)
1-800-644-6735, extension 4474
joyce.beck@go.doe.gov

We look forward to hearing from you.

Sincerely,

John H. Kersten
Manager

Enclosure: As Stated

Response Date: November 24, 2004

cc: Steve Blazek /w address list
NEPA Compliance Office
DOE, Golden Field Office

Concur: _____SPB _____DGP

File #

**IROQUOIS BIO-ENERGY COMPANY, LLC**
6317 E. 181ST AVE., HEBRON, IN 46341-9302
PHONE & FAX: 219-996-4925
Email Board Secretary: bryant@netnitco.net
General Manager-Keith Gibson, 219-866-5990
P.O. Box 218, Rensselaer, IN 47978
Email: kgibson@jasperctycoop.com
Website: IBECethanol.com Information: 877-647-CORN

October 22, 2004

Ms. Elizabeth McCloskey
U.S. Fish and Wildlife Service
P.O. Box 2616
1000 W. Oak Hill Road
Chesterton, IN 46304-2616

Dear Ms. McCloskey;

Iroquois Bio-Energy Company is constructing a fuel ethanol plant to the East of Rensselaer, Indiana (Jasper County). We are preparing and Environmental Assessment in compliance with the Department of Energy grant we received. Would you please provide any relevant (NEPA) information you may have as it applies to our site?

Enclosed are several maps locating the site and a conceptual footprint of the plant layout. Please call me at 219-866-5990 if you have any questions or further information would be helpful.

Sincerely,

Keith Gibson
General Manager
Iroquois Bio-Energy Co.

**IROQUOIS BIO-ENERGY COMPANY, LLC**
6317 E. 181ST AVE., HEBRON, IN 46341-9302
PHONE & FAX: 219-996-4925
Email Board Secretary: bryant@netnitco.net
General Manager-Keith Gibson, 219-866-5990
P.O. Box 218, Rensselaer, IN 47978
Email: kgibson@jasperctycoop.com
Website: IBECethanol.com Information: 877-647-CORN

Mr. Ron Hellmich
Indiana Department of Natural Resources

August 16, 2004

Dear Mr. Hellmich,

I am preparing a response to the U.S. Department of Energy concerning any endangered plant and animal species or potential cultural disturbances related to the site IBEC plans to use for manufacturing purposes. The site has been in cultivation for over 100 years.

I have enclosed the legal description and a map of the site. I would appreciate any information you might have that would relate to the above.

Thank you for your help.

Sincerely,

Keith Gibson
IBEC

# APPENDIX B

# RESPONSES TO SCOPING LETTERS

# United States Department of the Interior
## Fish and Wildlife Service

Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273
November 2, 2004

Mr. Keith Gibson
General Manager
Iroquois Bio-Energy Company, LLC
P.O. Box 218
Rensselaer, Indiana 47978

Project: Ethanol Fuel Plant Construction
Location: Rensselaer, Jasper County, Indiana

Dear Mr. Gibson:

This responds to your letter dated October 22, 2004, requesting our comments on the aforementioned project.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

The site of the proposed ethanol plant is currently utilized for row crops. No wetlands, streams, or other significant natural habitats would be affected by the proposed project.

ENDANGERED SPECIES

The proposed project is within the range of the Federally endangered Indiana bat (Myotis sodalis) and the threatened bald eagle (Haliaeetus leucocephalus). However, the proposed project is not likely to adversely affect these endangered and threatened species due to the lack of suitable habitats for these species.

This precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. However, should new information arise pertaining to project plans or a revised species list be published, it will be necessary for the Federal agency to reinitiate consultation.

We appreciate the opportunity to comment at this early stage of project planning. If you have any questions, please contact Elizabeth McCloskey at (219) 983-9753 or elizabeth_mccloskey@fws.gov.

Sincerely yours,

Elizabeth S. McCloskey

Scott E. Pruitt
for Supervisor

cc: Christie Kiefer, Environmental Coordinator, Division of Water, Indianapolis, IN

DNR Indiana Department of Natural Resources

John R. Goss, Director

Division of Nature Preserves
402 W. Washington St., Rm W267
Indianapolis IN 46204

August 16, 2004

Mr. Keith Gibson
Iroquois Bio-Energy Company, LLC
6317 E. 181st Avenue
Hebron, IN 46341-9302

Dear Mr. Gibson:

I am responding to your request for information on the endangered, threatened, or rare (ETR) species, high quality natural communities, and natural areas documented from a site near Pleasant Ridge, Jasper County, Indiana. The Indiana Natural Heritage Data Center has been checked and there are no ETR species documented from the project site. For your information, enclosed you will find information on the ETR species documented from the Pleasant Ridge area.

For more information on the animal species mentioned, please contact Katie Smith, Nongame Supervisor, Division of Fish and Wildlife, 402 W. Washington Room W273, Indianapolis, Indiana 46204, (317)232-4080.

The information I am providing does not preclude the requirement for further consultation with the U.S. Fish and Wildlife Service as required under Section 7 of the Endangered Species Act of 1973. You should contact the Service at their Bloomington, Indiana office.

U.S. Fish and Wildlife Service
620 South Walker St.
Bloomington, Indiana 47403-2121
(812)334-4261

At some point, you may need to contact the Department of Natural Resources' Environmental Review Coordinator so that other divisions within the department have the opportunity to review your proposal. For more information, please contact:

John Goss, Director
Department of Natural Resources
attn: Christie Kiefer
Environmental Coordinator
Division of Water
402 W. Washington Street, Room W264
Indianapolis, IN 46204
(317)232-4160

Please note that the Indiana Natural Heritage Data Center relies on the observations of many individuals for our data. In most cases, the information is not the result of comprehensive field surveys conducted at particular sites. Therefore, our statement that there are no documented significant natural features at a site should not be interpreted to mean that the site does not support special plants or animals.

Due to the dynamic nature and sensitivity of the data, this information should not be used for any project other than that for which it was originally intended. It may be necessary for you to request updated material from us in order to base your planning decisions on the most current information.

Thank you for contacting the Indiana Natural Heritage Data Center. You may reach me at (317)232-8059 if you have any questions or need additional information.

Sincerely,

Ronald P. Hellmich

Ronald P. Hellmich
Indiana Natural Heritage Data Center

enclosure: data sheet
invoice

August 16, 2004

ENDANGERED, THREATENED AND RARE SPECIES,
HIGH QUALITY NATURAL COMMUNITIES, AND SIGNIFICANT NATURAL AREAS DOCUMENTED
NEAR THE PLEASANT RIDGE AREA, JASPER COUNTY, INDIANA

| TYPE | SPECIES NAME | COMMON NAME | STATE | FED | LOCATION | DATE | COMMENTS |
|---|---|---|---|---|---|---|---|
| MCCOYSBURG | | | | | | | |
| Mammal | GEOMYS BURSARIUS | PLAINS POCKET GOPHER | SSC | ** | T29NR05W 30 SWQ SWQ NEQ | 1988 | |
| Mammal | REITHRODONTOMYS MEGALOTIS | WESTERN HARVEST MOUSE | SSC | ** | T29NR06W 35 | 1974 | |
| Mammal | TAXIDEA TAXUS | AMERICAN BADGER | SE | ** | T29NR06W PLEASANT RIDGE | 1982 | |
| Prairie | PRAIRIE - MESIC | MESIC PRAIRIE | SG | ** | T29NR06W 31 NWQ | 1981 | |
| Reptile | LIOCHLOROPHIS VERNALIS | SMOOTH GREEN SNAKE | SE | ** | T29NR06W 36 | 1972 | |

STATE: SX=extirpated, SE=endangered, ST=threatened, SR=rare, SSC=special concern, WL=watch list, SG=significant,** no status but rarity warrants concern

FEDERAL: LE=endangered, LT=threatened, LELT=different listings for specific ranges of species, PE=proposed endangered, PT=proposed threatened, SA=appearance similar to LE species,**=not listed

DNR Indiana Department of Natural Resources

Division of Historic Preservation & Archaeology•402 W. Washington Street, W274 · Indianapolis, IN 46204-2739
Phone 317-232-1646•Fax 317-232-0693 · dhpa@dnr.state.in.us

Joseph E. Kernan, Governor
John R. Goss, Director

HISTORIC PRESERVATION AND ARCHAEOLOGY

November 18, 2004

NOV 23 REC'D

John H. Kersten
Golden Field Office
Department of Energy
1617 Cole Boulevard
Golden, Colorado 80401-3393

Federal Agency: Department of Energy

Re: General information regarding Iroquois Bio-Energy Company's construction of a fuel ethanol plant

Dear Mr. Kersten:

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated November 8, 2004, and received on November 12, 2004, for the above indicated project in Rensselaer, Marion Township, Jasper County, Indiana.

A complete analysis of the submitted project is not possible, as the information provided is incomplete. Please provide the indicated information to facilitate the identification and analysis of historic properties in the project area:

1) Provide an overall description of the project and its location.
   - Include address, city, township, and county.
   - Detail any construction, demolition, and earthmoving activities.
2) Define the area of potential effects[1].
3) Provide the relevant portion of a town, city, county, U.S. Geological Survey quadrangle, or Interim Report map containing the following:
   - Clearly mark the precise location of the proposed project.
   - In dark ink, clearly mark the boundaries of the area of potential effects.
   - Clearly label the names of nearby landmarks (e.g., major streets, roads, highways, railroads, rivers, lakes).
4) Give the precise location of any buildings, structures, and objects *within the area of potential effects* (e.g., addresses and a site map with properties keyed to it).
5) Give the known or approximate date of construction for buildings, structures, objects, and districts *within the area of potential effects*.
6) Submit historical documentation for buildings, structures, objects, and districts *within the area of potential effects*.

[1] Area of potential effects means the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (see 36 C.F.R § 800. 16[d]).

7) List all sources checked for your historical research of the *area of potential effects*.

8) Provide clear, recent photographs or good quality computer-generated images (not photocopies), keyed to a site plan, showing the exterior (and interior, if feasible) of any buildings, structures, objects, or land *that could be affected in any way by the project*.

Once the indicated information is received, the Indiana SHPO will resume identification and evaluation procedures for this project. Please keep in mind that additional information may be requested in the future.

For future reference, it is currently taking the Indiana SHPO 45 - 60 days to review submissions and initial submittals may not provide enough information to facilitate the identification and analysis of historic properties in the project area. Therefore, it would be advisable to submit project information at least several weeks prior to any deadlines for completing environmental reviews or project commencement dates.

*A copy of the revised 36 C.F.R. Part 800 that went into effect on January 11, 2001, may be found on the Internet at www.achp.gov for your reference.* If you have questions, please contact Shana Kelso of our office at (317) 232-1646.

Very truly yours,

Shana Kelso

for: Jon C. Smith
Deputy State Historic Preservation Officer

JCS:SNK:snk

Enclosures (4)

**United States Department of Agriculture**

NRCS

Natural Resources Conservation Service
6013 Lakeside Blvd.
Indianapolis, IN 46268

December 15, 2004

William Fallon
Battelle Gaithersburg
822 Jonker Ct.
Gaithersburg, MD 20878

Dear Mr. Fallon:

The proposed project to construct a fuel ethanol plant in the City of Rensselaer, Jasper County, Indiana, as referred to in your letter dated November 8, 2004, will cause a conversion of prime farmland.

The attached packet of information is for your use in completing Parts VI and VII of the AD-1006. After completion the federal funding agency needs to forward one copy to NRCS for our records.

If you need additional information, please contact Lisa Bolton at 317-290-3200, extension 342.

Sincerely, ACTING FOR

Michael A. Cox

JANE E. HARDISTY
State Conservationist

Enclosures

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

U.S. Department of Agriculture

# FARMLAND CONVERSION IMPACT RATING

| | |
|---|---|
| **PART I** *(To be completed by Federal Agency)* | Date Of Land Evaluation Request |
| Name Of Project: Iroquois Bio Engergy Corp | Federal Agency Involved: Dept of Energy |
| Proposed Land Use: Ethanol plant | County And State: Jasper Co, IN |
| **PART II** *(To be completed by NRCS)* | Date Request Received By NRCS: 12-14-04 |

| | | | |
|---|---|---|---|
| Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).* | Yes ☑ | No ☐ | Acres Irrigated: | Average Farm Size: 322 Ac |
| Major Crop(s): Corn | Farmable Land In Govt. Jurisdiction Acres: 346,271 | % 96 | Amount Of Farmland As Defined in FPPA Acres: 215,905 | % 60 |
| Name Of Land Evaluation System Used: LESA | Name Of Local Site Assessment System: | | Date Land Evaluation Returned By NRCS: 12-15-04 | |

| **PART III** *(To be completed by Federal Agency)* | Alternative Site Rating Site A | Site B | Site C | Site D |
|---|---|---|---|---|
| A. Total Acres To Be Converted Directly | 68.9 | | | |
| B. Total Acres To Be Converted Indirectly | | | | |
| C. Total Acres In Site | 68.9 | 0.0 | 0.0 | 0.0 |
| **PART IV** *(To be completed by NRCS)* Land Evaluation Information | | | | |
| A. Total Acres Prime And Unique Farmland | 68.9 | | | |
| B. Total Acres Statewide And Local Important Farmland | 0.0 | | | |
| C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted | 0.02 | | | |
| D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value | 41.0 | | | |
| **PART V** *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)* | 72 | | | 0 |

| **PART VI** *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)* | Maximum Points | Site A | Site B | Site C | Site D |
|---|---|---|---|---|---|
| 1. Area In Nonurban Use | 15 | 15 | | | |
| 2. Perimeter In Nonurban Use | 10 | 10 | | | |
| 3. Percent Of Site Being Farmed | 20 | 20 | | | |
| 4. Protection Provided By State And Local Government | 20 | 0 | | | |
| 5. Distance From Urban Builtup Area | 15 | 15 | | | |
| 6. Distance To Urban Support Services | 15 | 10 | | | |
| 7. Size Of Present Farm Unit Compared To Average | 10 | 9 | | | |
| 8. Creation Of Nonfarmable Farmland | 10 | 0 | | | |
| 9. Availability Of Farm Support Services | 5 | 5 | | | |
| 10. On-Farm Investments | 20 | 2 | | | |
| 11. Effects Of Conversion On Farm Support Services | 10 | 0 | | | |
| 12. Compatibility With Existing Agricultural Use | 10 | 0 | | | |
| TOTAL SITE ASSESSMENT POINTS | 160 | ~~0~~ 86 | 0 | 0 | 0 |
| **PART VII** *(To be completed by Federal Agency)* | | | | | |
| Relative Value Of Farmland *(From Part V)* | 100 | 72 | | | 0 |
| Total Site Assessment *(From Part VI above or a local site assessment)* | 160 | ~~0~~ 86 | 0 | 0 | 0 |
| TOTAL POINTS *(Total of above 2 lines)* | 260 | ~~72~~ 158 | 0 | 0 | 0 |

| | | |
|---|---|---|
| Site Selected: A | Date Of Selection 12-22-04 | Was A Local Site Assessment Used? Yes ☐ No ☑ |

Reason For Selection:

Site A was selected because based on combined score of less than 160 consideration of alternate sites is not required.

*(See Instructions on reverse side)* **Form AD-1006 (10-83)**

This form was electronically produced by National Production Services Staff

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
*We make Indiana a cleaner, healthier place to live.*

*Joseph E. Kernan*
Governor

*Lori F. Kaplan*
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

DEC 2 2 2004

December 14, 2004

Joyce Beck
U.S. Department of Energy
1617 Cole Boulevard
Golden, CO 80401-3393

Dear Joyce Beck:

RE: Jasper County; Notice of Scoping - Iroquois Bio-Energy Company, Proposed Fuel Ethanol Plant, in Rensselaer

The Indiana Department of Environmental Management (IDEM) has reviewed the above-noted project with respect to applicable environmental rules, law and standards. Our review did not raise any specific comment regarding the environmental requirements for your proposed project. IDEM recommends that you consider the following issues as you move forward:

## WATER AND BIOTIC QUALITY

1. Section 404 of the Clean Water Act requires that you obtain a permit from the U.S. Army Corps of Engineers (USACE) before dredging and/or filling in any wetlands or other waters of the state of Indiana, such as rivers, lakes, streams, and ditches. Thus, as a project owner or sponsor, it is your responsibility to ensure that no wetlands are disturbed without the proper permit. Although you may initially refer to the U.S. Fish and Wildlife Service National Wetland Inventory maps as a means of identifying potential areas of concern, please be mindful that those maps do not depict jurisdictional wetlands.

   A valid jurisdictional wetlands determination can only be made by the Corps of Engineers, using the 1987 Wetland Delineation Manual. Much of northern Indiana is served by the Corps of Engineers District Office in Detroit, while the central and southern portions of the state are served by their Louisville District Office. Contacts for these offices can be found at: www.in.gov/idem/water/planbr/401/reglinks.html. IDEM recommends that, to the extent possible, impacts to wetlands and other resources simply be avoided.

2. In the event a Section 404 wetlands permit is required from the Corps of Engineers, you also must obtain a Section 401 Water Quality Certification from the IDEM Office of Water

Quality. Even if the Corps of Engineers determines that the activity or area associated with your project is not under their jurisdiction, you may still need to obtain authorization for the project from this office. The relocation, channelization, widening, or other such alteration of a stream would also require a 401 Water Quality Certification. Contact the Office of Water Quality at 317-233-8488 for additional information. In general, IDEM is opposed to such changes to streams, and would require additional information in order to provide more project specific comments.

3. If your project will involve over a 0.5 acre of wetland impact, stream relocation, or other large-scale alterations to waterbodies such as the creation of a dam or a water diversion, you should seek additional input from Section 401 Water Quality Certification staff. Consult this web site: www.in.gov/idem/water/planbr/401/staff.html for the appropriate staff contact to discuss your project further.

4. The physical disturbance of the stream and riparian vegetation, especially large trees overhanging any affected waterbodies should be limited to only that which is absolutely necessary to complete the project. The shade provided by the large overhanging trees helps maintain proper stream temperatures and dissolved oxygen for aquatic life.

5. For projects involving construction activity (which includes clearing, grading, excavation and other land disturbing activities) that result in the disturbance of one (1), or more, acres of total land area, contact the Office of Water Quality - Permits Branch (317/233-1864) regarding the need for of a Rule 5 Storm Water Permit. Visit the following Web pages:
   - http://www.in.gov/idem/guides/permit/water/stormwaterconstruction.html
   - http://www.in.gov/idem/water/npdes/permits/wetwthr/storm/rule5.html
   - http://www.in.gov/idem/water/npdes/permits/wetwthr/storm/rule5defs.html#compliance

6. Regardless of the size of your project, IDEM recommends that appropriate structures and techniques be utilized both during the construction phase, and after completion of the project, to minimize soil erosion. The use of straw bale barriers, silt fencing, earthen berms or other appropriate techniques around disturbed areas are recommended to prevent soil from leaving the construction site. Information and assistance regarding control of construction-related soil erosion are available from the Soil and Water Conservation District (SWCD) offices, co-located with the local field office of the USDA Natural Resource Conservation Service (NRCS) in each county. (To find a SWCD office: www.agry.purdue.edu/swq/swcd.htm)

7. For projects involving work within floodways of waterbodies, contact the Department of Natural Resources - Division of Water (317/232-4160) regarding the need for permits.

8. For projects involving impacts to fish and botanical resources, contact the Department of Natural Resources - Division of Fish and Wildlife (317/232-4080) for addition project input.

9. For projects involving water main construction, water main extensions, and new public water supplies, contact the Office of Water Quality - Drinking Water Branch (317-308-3299) regarding the need for permits. (www.in.gov/idem/guides/permit/water/drinkingwater.html)

10. For projects involving effluent discharges to waters of the State of Indiana, contact the Office of Water Quality - Permits Branch (317-233-0468) regarding the need for a National Pollutant Discharge Elimination System (NPDES) permit.

11. For projects involving the construction of wastewater facilities and sewer lines, contact the Office of Water Quality - Permits Branch (317-232-8675) regarding the need for permits. (www.in.gov/idem/guides/permit/water/wwconstructionpermits.html)

## AIR QUALITY

The above-noted project should be designed to minimize any impact on ambient air quality in, or near, the project area. The project must comply with all federal and state air pollution regulations. Consideration should be given to the following:

1. Regarding open burning, and disposing of organic debris generated by land clearing activities; some types of open burning are allowed (www.in.gov/idem/guides/permit/air/openburning.html#maintenance) under specific conditions (www.in.gov/idem/guides/permit/air/openburning.html#conditionsallowed). You also can seek an open burning variance from IDEM. See:www.in.gov/idem/guides/permit/air/openburning.html#variances).

   However, IDEM generally recommends that you take vegetative wastes to a registered yard waste composting facility or that the waste be chipped or shredded with composting on site (you must register with IDEM if more than 2,000 pounds is to be composted; contact 317/232-0066). The finished compost can then be used as a mulch or soil amendment. You also may bury any vegetative wastes (such as leaves, twigs, branches, limbs, tree trunks and stumps) onsite, although burying large quantities of such material can lead to subsidence problems, later on.

2. Reasonable precautions must be taken to minimize fugitive dust emissions from construction and demolition activities. For example, wetting the area with water, constructing wind barriers, or treating dusty areas with chemical stabilizers (such as calcium chloride or several other commercial products). Dirt tracked onto paved roads from unpaved areas should be minimized. See: www.in.gov/idem/guides/permit/air/fugitivedust.html.

   Additionally, if construction or demolition is conducted in a wooded area where blackbirds have roosted or abandoned buildings or building sections in which pigeons or bats have roosted for 3-5 years precautionary measures should be taken to avoid an outbreak of histoplasmosis. This disease is caused by the fungus Histoplasma capsulatum, which stems from bird or bat droppings that have accumulated in one area for 3-5 years. The spores from this fungus become airborne when the area is disturbed and can cause infections over an entire community downwind of the site. The area should be wetted down prior to cleanup or demolition of the project site. For more detailed information on histoplasmosis prevention and control, please contact the Acute Disease Control Division of the Indiana State Department of Health at (317) 233-7272.

3. The U.S. EPA and the Surgeon General recommend that people not have long-term exposure to radon at levels above 4 pCi/L. (For a county-by-county map of predicted radon levels in Indiana, visit: http://www.in.gov/idem/radon/health.html.)

The U.S. EPA further recommends that all homes (and apartments within three stories of ground level) be tested for radon. If in-home radon levels are determined to be 4 pCi/L, or higher, EPA recommends a follow-up test. If the second test confirms that radon levels are 4 pCi/L, or higher, EPA recommends the installation of radon-reduction measures. (For a list of qualified radon testers and radon mitigation (or reduction) specialists visit: http://www.in.gov/isdh/regsvcs/radhealth/pdfs/radon_testers_mitigators_list.pdf.) It also is recommended that radon reduction measures be built into all new homes, particularly in areas like Indiana that have moderate to high predicted radon levels. To learn more about radon, radon risks, and ways to reduce exposure visit: http://www.in.gov/isdh/regsvcs/radhealth/radon.htm, http://www.in.gov/idem/radon/, or http://www.epa.gov/iaq/radon/index.html.

4. With respect to asbestos removal: all facilities slated for renovation or demolition (except residential buildings that have (4) four or fewer dwelling units and which will not be used for commercial purposes) must be inspected by an Indiana-licensed asbestos inspector prior to the commencement of any renovation or demolition activities. If regulated asbestos-containing material (RACM) that may become airborne is found, any subsequent demolition, renovation, or asbestos removal activities must be performed in accordance with the proper notification and emission control requirements.

   If no asbestos is found where a renovation activity will occur, or if the renovation involves removal of less than 260 linear feet of RACM off of pipes, less than 160 square feet of RACM off of other facility components, or less than 35 cubic feet of RACM off of all facility components, the owner or operator of the project does not need to notify IDEM before beginning the renovation activity.

   For questions on asbestos demolition and renovation activities, you can also call IDEM's Lead/Asbestos section at 1-888-574-8150.

   However, in all cases where a demolition activity will occur (even if no asbestos is found), the owner or operator must still notify IDEM 10 working days prior to the demolition, using the form found at www.in.gov/icpr/webfile/formsdiv/44593.pdf.

   Anyone submitting a renovation/demolition notification form will be billed a notification fee based upon the amount of friable asbestos containing material to be removed or demolished. Projects that involve the removal of more than 2,600 linear feet of friable asbestos containing materials on pipes, or 1,600 square feet or 400 cubic feet of friable asbestos containing material on other facility components, will be billed a fee of $150 per project; projects below these amounts will be billed a fee of $50 per project. All notification remitters will be billed on a quarterly basis.

   For more information about IDEM policy regarding asbestos removal and disposal, visit: www.in.gov/idem/guides/permit/waste/asbestosremoval.html.

5. With respect to lead-based paint removal: IDEM encourages all efforts to minimize human exposure to lead-based paint chips and dust. IDEM is particularly concerned that young children exposed to lead can suffer from learning disabilities. Although lead-based paint abatement efforts are not mandatory, any abatement that is conducted within housing built before January 1, 1978, or a child-occupied facility is required to comply with all lead-based paint work practice standards, licensing and notification requirements. For more information

about lead-based paint removal visit: www.in.gov/idem/guides/permit/waste/leadabatement.html.

6. Ensure that asphalt paving plants are permitted and operate properly. The use of cutback asphalt, or asphalt emulsion containing more than seven percent (7%) oil distillate, is prohibited during the months April through October. See 326 IAC 8-5-2, Asphalt Paving Rule (www.ai.org/legislative/iac/t03260/a00080.pdf)

7. If your project involves the construction of a new source of air emissions or the modification of an existing source of air emissions or air pollution control equipment, it will need to be reviewed by the IDEM Office of Air Quality (OAQ). A registration or permit may be required under 326 IAC 2 (View at: www.ai.org/legislative/iac/t03260/a00020.pdf.) New sources that use or emit hazardous air pollutants may be subject to Section 112 of the Clean Air Act and corresponding state air regulations governing hazardous air pollutants.

8. For more information on air permits visit: www.in.gov/idem/guides/permit/air/index.html, or to initiate the IDEM air permitting process, please contact the Office of Air Quality Permit Reviewer of the Day at (317) 233-0178 or OAMPROD@dem.state.in.us.

## LAND QUALITY

In order to maintain compliance with all applicable laws regarding contamination and/or proper waste disposal, IDEM recommends that:

1. If the site is found to contain any areas used to dispose of solid or hazardous waste, you need to contact the Office of Land Quality (OLQ) at 317-308-3103.

2. If any contaminated soils are discovered during this project, they may be subject to disposal as either special or hazardous waste. Please contact the OLQ at 317-308-3103 to obtain information on proper disposal procedures.

3. If PCBs are subsequently found at this site, please contact the Industrial Waste Section of OLQ at 317-308-3103 for information regarding management of any PCB wastes from this site.

4. If there are any asbestos disposal issues related to this site, please contact the Industrial Waste Section of OLQ at 317-308-3103 for information regarding the management of asbestos wastes." (Asbestos removal is addressed above, under Air Quality.)

The IDEM Office of Land Quality reserves the right to provide additional comments, or to undertake other appropriate actions, if additional information becomes available that reveals potential waste disposal or contamination problems at the site.

## FINAL REMARKS

Should you need to obtain any environmental permits in association with this proposed project, please be mindful that IC 13-15-8 requires that you notify all adjoining property owners and/or

occupants within ten days your submittal of each permit application. However, if you are seeking multiple permits, you can still meet the notification requirement with a single notice if all required permit applications are submitted with the same ten day period. For additional information and forms: www.in.gov/idem/guides/permit/landdevelopment/notification.html.

IDEM reserves the right for further review if the scope of the project, or any of its aspects, should change significantly from that which has been proposed, or we are made aware of factors which could have detrimental environmental effects.

Please note that this letter does not constitute a permit, license, endorsement or any other form of approval on the part of either the Indiana Department of Environmental Management or any other Indiana state agency.

The IDEM makes all information pertaining to environmental reviews available to the public. During regular business hours these files are accessible in the IDEM file room is located in Room N1201, Indiana Government Center North, 100 North Senate Avenue, Indianapolis.

Should you have any questions relating to our review or recommendations, please feel free to contact me at 317-233-4638 or at dparry@dem.state.in.us.

Sincerely,

David Parry

David Parry
Environmental Review Coordinator
Office of Planning and Assessment

Project No. 5012

This page intentionally left blank.

# APPENDIX C

# SCOPING LETTER DISTRIBUTION LISTS

## Scoping Letter Mailing List

### Distribution

Howard Jones
Jasper County Coop
2530 N. McKinley Ave.
Rensselaer, IN 46204

The Honorable Herbert H. Arihood, Mayor
122 S. Van Rensselaer
Rensselaer, IN 46204

Ronald P. McIlwain
President
Jasper County Council
1130 W. Wood Rd.
Rensselaer, IN 46204

David Wuethrich
Wuethrich Pork & Grain Inc.
5547 E. 200 St.
Rensselaer, IN 46204

Roger E. Ward
15558 W. 500 St.
Francesville, IN 47946

Sierra Club
Hoosier Chapter Office
1915 W. 18th Street, Suite D
Indianapolis, IN 46202-1016

Amos W. Butler
Audubon Society
P. O. Box 80024
Indianapolis, IN 46280

Dunes Calumet
Audubon Society
P. O. Box 1232
Crown Point, IN 46308-1232

Indiana State NEPA Point of Contact
Mr. David Parry
Permit Coordinator
Indiana Department of Environmental Management
Indiana Government Center North, Room 1315
100 North Senate Avenue
P. O. Box 6015
Indianapolis, IN 46204

Steve Rothblatt, Director
Air and Radiation Division
U.S. Environmental Protection Agency
77 West Jackson Blvd. (A-18J)
Chicago, IL 60604

## Special

Ms. Elizabeth McCloskey
U. S. Fish and Wildlife Service
P. O. Box 2616
1000 W. Oak Hill Rd.
Chesterton, IN 46304

John Charles Smith
State Historic Preservation Office
Room W-274
402 W. Washington St.
Indianapolis, IN 46204-2739

Mr. Jerry Hill
Indiana Department of Transportation
Maple and Scott Street
Rensselaer, IN 47978

This page intentionally left blank.

# APPENDIX D

# TRAFFIC ANALYSIS

**Assumptions:**

1. Plant would receive corn and other materials 260 days per year.
2. Plant would operate a minimum of 350 days per year.
3. Ethanol production would total 38 million gallons per year.
4. Denatured fuel ethanol production would total 40 million gallons per year or name-plate capacity.
5. Plant would use 2 million gallons of gasoline as a denaturant per year, not including rust inhibitor.
6. DWG would contain 50% water, 50% dried materials or solids.

**Table D-1. Plant Production**

| Products | Annual Production | Monthly Production | Daily Production |
|---|---|---|---|
| Fuel Ethanol | 40,000,000 gallons | 334,000 gallons | 114,286 gallons |
| Distillers Dried Grains with Solubles (DDGS) | 126,600 tons | 10,717 tons | 495 tons |
| CO2 | 121,000 tons | 10,000 tons | 465 tons |

**Table D-2. Vehicle Characteristics**

| Vehicles | Products In Transit | Size | Capacity | Normal Load Capacity | Load Capacity In Tons |
|---|---|---|---|---|---|
| Semi-Trailer Truck | Corn | 8' W x 55' L x 13.5' H | 2,327 cubic feet | 1,000 bu. x 56 lbs. | 28 |
| | DDGS (bulk) | | | | 25 |
| Straight Body Truck | Corn | 8' W x 35' L x 13.5' H | 1,564 cubic feet | 500 bu. x 56 lbs. | 14 |
| | DDGS (bulk) | | | | 23 |
| Tanker Truck | Fuel ethanol, gasoline, CO2, chemicals | 8' W x 55' L x 13.5' H | 8,000 gallons | 8,000 gal. x 6.58 lbs. | 26 |
| General Delivery Truck | Various | Custom design | Various | Various | Various |
| | | | | | |
| Car | Employees, customers | 4 wheels | 4- to 6-passenger | NA | NA |
| Trucks | Employees, etc. | 4 to 6 wheels | 1.5 ton to 3 ton | NA | NA |

NA = not applicable.

## Table D-3. Estimated Traffic Volume

| Loaded Vehicles Inbound | | | Vehicle Description | | | | Number of Vehicles Required | | | Vehicle Estimates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Load** | **Measure-ment** | **Purpose** | **Vehicle Type** | **Delivery Load** | **Normal Capacity** | **Annual Cargo Volume** | **Year** | **Month** | **Day (260)** | **Low** | **High** | **Expected Daily** |
| Corn | Bushels | Feedstock | Semi-trailer truck | 28 tons | 1,000 bushels | 10,000,000 bushels | 10,000 | 833 | 39 | 39 | | 39 |
| Corn | Bushels | Feedstock | Straight truck | 14 tons | 500 bushels | 4,300,000 bushels | 8,600 | 717 | 33 | 33 | | 33 |
| Gasoline | Gallons | Denaturant | Tanker truck | 8,000 gallons | 8,000 gallons | 2,000,000 gallons | 250 | 21 | 1 | | 1 | 1 |
| Chemicals | Gallons | Process | Tanker truck | various | various | various | 38 | 2 | NA | | | NA |
| Potable Water | Gallons | Drinking | Straight truck | NA | NA | | 52 | 4 | NA | | | NA |
| Misc. | NA | Parts, supplies | General | NA | NA | NA | 104 | 8 | 2 | | 2 | 2 |
| Sub-Totals, Inbound | | | | | | | 19,044 | 1,585 | 75 | 72 | 3 | 75 |
| | | | | | | | | | | | | |
| **Loaded Vehicles Outbound** | | | **Vehicle Description** | | | | **Vehicles Required** | | | **Vehicle Estimates** | | |
| Fuel Ethanol | Gallons | Product | Tanker truck | 8,000 gal. | 8,000 gallons. | 20,000,000 gallons | 2,500 | 208 | 10 | 10 | | 10 |
| DWG | Tons | Co-product | Straight truck | | 23 tons | 82, 671 tons | 3,594 | 300 | 14 | | 14 | 7 |
| CO2 | Tons | Third Party | Tanker truck | 20 tons | 20 tons | 121,000 tons | 6,050 | 505 | 23 | | 23 | 23 |
| Sub-Totals, Outbound | | | | | | | 12,144 | 1,013 | 47 | | | 47 |
| | | | | | | | | | | | | |
| **Normal Vehicles (4 wheels)** | | | **Vehicle Description** | | | | **Vehicles Required** | | | **Vehicle Estimates** | | |
| Employees | NA | Work | 4-wheel | NA | 1 passenger | NA | 7,280 | 607 | 28 | 28 | | 28 |
| Mail | NA | Delivery | 4/6-wheel | NA | 1 passenger | NA | 312 | 26 | 1 | 1 | | 1 |
| Vendors | NA | Business | 4-wheel | NA | NA | NA | 1,300 | 108 | 5 | 5 | | 5 |
| Sub-Totals, Normal Vehicles | | | | | | | 8,892 | 741 | 34 | 34 | | 34 |
| | | | | | | | | | | | | |
| Total Inbound Vehicles | | | | | | | | | | | | 75 |
| Total Outbound Vehicles | | | | | | | | | | | | 47 |
| Normal Vehicle Traffic | | | | | | | | | | | | 34 |
| Total Vehicles Estimated per day | | | | | | | | | | | | 156 |
| Total Turnaround (x2) | | | | | | | | | | | | 312 |

NA = not applicable.

**Table D-4. Primary Traffic Routes**

| Rensselaer To: | | | | | | |
|---|---|---|---|---|---|---|
| **Customer Locations** | **State Road 114 Miles** | **State Road 231 Miles** | **Interstate 65/74/90/94 Miles** | **Total Miles** | **Vehicle Types** | **Type Loads** |
| Gary, IN | 9 | | 60 | 69 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| Chicago, IL | 9 | | 80 | 89 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| Indianapolis, IN | 5 | 10 | 105 | 120 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| South Bend, IN | 9 | | 112 | 121 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| Milwaukee, WI | 9 | | 171 | 180 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| Cincinnati, OH | 5 | 10 | 215 | 231 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| Detroit, MI | 9 | | 255 | 264 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| Cleveland, OH | 9 | | 275 | 284 | Semi, Straight, Tanker Trucks | Fuel ethanol, DDGS, CO2 |
| | | | | | | |
| Local Traffic | Radius from plant | Radius from plant | Radius from plant | 50 | Cars/Trucks | Employees, Vendors, Customers |

**Table D-5. Estimated Rail Volume**

| Train Car Type | Size | Load Capacity | Product | Volume Shipped | No. of Cars per Year |
|---|---|---|---|---|---|
| Tank | 10'-6" W x 48'-4" L x 14'-10" H | 29,000 gallons (2% freeboard) | Fuel ethanol | 20,000,000 gallons year (50% of production) | 690 |
| | | | DWG | Variable | Variable |
| Covered Hopper | 10'-7" W x 59'-3" L x 15'-1" H | 85 tons | DDGS | 94,950 tons per year (75% of production) | 1,117 |

This page intentionally left blank.

# APPENDIX E

# ACCIDENT ANALYSIS

## E.1 Chemicals

The proposed fuel ethanol plant in Jasper County, Indiana, would have four large storage tanks for chemicals used in the fuel ethanol manufacturing process:

- A 100,000-gallon gasoline storage tank
- An 18,000-gallon anhydrous ammonia tank
- A 14,000-gallon tank containing 50 weight percent sodium hydroxide solution
- A 7,000-gallon sulfuric acid tank

Of these chemicals, anhydrous ammonia is the most hazardous because of its volatility and toxicity.

Anhydrous ammonia is the compound formed by the combination of the two gaseous elements, nitrogen and hydrogen, in the proportion of one part of nitrogen to three parts of hydrogen by volume. Because one volume of nitrogen weighs 14 times as much as one volume of hydrogen, on a weight basis, the ratio is fourteen parts of nitrogen to three parts of hydrogen, or about 82 percent nitrogen and 18 percent hydrogen.

At atmospheric temperature and pressures, anhydrous ammonia is a pungent colorless gas. Anhydrous ammonia boils at -28 °F and freezes to a white crystalline mass at -108 °F. When heated above its critical temperature of 270.3 °F, ammonia exists only as a vapor regardless of the pressure. Between the melting and critical points, liquid ammonia exerts a vapor pressure that increases with rising temperature. When liquid ammonia is in a closed container, it is in equilibrium with ammonia vapor and the pressure within the container bears a definite relationship to the temperature. At 77 °F, the pressure exerted by the liquid ammonia is 0.1 megapascal (MPa), or 145 pounds per square inch absolute (psia). Thus, under normal storage conditions, it is assumed that the tank would be pressurized to about 130 pounds per square inch (psi) above atmospheric pressure.

The common metals are not affected by dry ammonia. Moist ammonia will not corrode iron or steel, but it will react rapidly with copper, brass, zinc and many alloys, especially those containing copper. Only steel or ductile iron should be used for ammonia containers, valves, fittings, and piping.

Under normal conditions, ammonia is a very stable compound. It takes excessive temperatures (about 840 to 930 °F) to cause it to dissociate slightly at atmospheric pressure. When this happens, the dissociated products are nitrogen and hydrogen. Ammonia gas burns in a mixture with air within a limited range. The flammable limits at atmospheric pressure are 15 percent to 28 percent by volume of ammonia in air. Experiments conducted by Underwriters Laboratories indicate that an ammonia-air mixture in a standard quartz test container will not ignite at temperatures below 1,562 ºF. When an iron test container, which has a catalytic effect, was used, the ignition temperature dropped to 1,204 ºF.

An anhydrous ammonia storage tank is usually considered to have an 85 percent usable capacity. For the accident analysis, DOE assumed the tank was filled to 87.5 percent, or slightly above normal capacity.

The physical constants of anhydrous ammonia are shown in Table E-1.

**Table E-1. Physical Constants of Anhydrous Ammonia**

| | |
|---|---|
| Molecular symbol | $NH_3$ |
| Molecular weight | 17.032 |
| Boiling point at one atmosphere pressure | -28 ºF |
| Freezing point at one atmosphere pressure | -108 ºF |
| Vapor density at -28 °F and one atmosphere pressure | 0.056697 $lb/ft^3$ |
| Liquid density at 15 ºC (60 °F) | 5.14 lb/gallon |

## E.2 Computer Modeling Methodology

Releases of hazardous chemicals are modeled using EPA's *Areal Locations of Hazardous Atmospheres* (ALOHA) computer modeling program (EPA 2004). ALOHA utilizes both a straight-line Gaussian model and a heavy-gas computation model.

ALOHA is an emergency response model, intended for rapid deployment by responders and for emergency planning. It incorporates source strength as well as Gaussian and heavy-gas dispersion models and an extensive chemical property library. Model output is in both text and graphic form and includes a "footprint" plot of the area downwind of a release where concentrations may exceed a user-set threshold level. ALOHA can accept weather data transmitted from portable monitoring stations and can plot footprints on electronic maps.

The emergency responder is the primary target audience of ALOHA; hence, the model does not address air quality issues. ALOHA is not designed to model chronic, low-level (fugitive) emissions. The maximum duration of a release in ALOHA is 1 hour. All algorithms are presented and fully referenced in the ALOHA documentation. ALOHA does not account for:

- Building wake effects
- Jet effects
- Chemical reactivity within a dispersing cloud
- Cloud lift-off
- Concentration fluctuations
- Terrain effects

ALOHA's distance limits for footprint plotting are:

- Minimum distance: 10 meters
- Maximum distance: 10 kilometers

## E.3 Ammonia Release Accidents

Four release accidents were evaluated. Each one used the same average meteorology for the site. The time of the accident was assumed to be noon on June 30th on a day when the cloud cover was 80 percent and the relative humidity was 50 percent. The wind speed was assumed to be 3 meters/second measured at 2 meters, and the temperature at the time of the accident was assumed to be 25 °C (77 °F). The atmospheric stability at the time of the accidents was assumed to be Pasquill D, and the height of the inversion layer was assumed to be 500 meters. The height of the release was assumed to be ground level. These parameters specify the Gaussian dispersion parameters used in the ALOHA plume calculation.

Within ALOHA, the user can also specify the source term. When liquid ammonia is released, a large fraction of the ammonia will flash into a gas. The remaining liquid will fall to the ground and form a

pool. Heat transfer from the ground will evaporate the pool, releasing the remaining ammonia into the air. If a pool forms, then the release duration will be the sum of the time it takes to discharge all the ammonia from the tank or pipe, plus the time it takes for the pool to evaporate; the longer this time, the lower the peak downwind concentration. This accident analysis assumes that no pool will form, thereby maximizing the downwind concentration from the release.

ALOHA calculates the distance to three Emergency Response Planning Guidelines (ERPG) concentration end points: ERPG-1, ERPG-2 and ERPG-3. The definitions for these three endpoints are given in Table E-2. The distance to ERPG-2 will be considered the point beyond which no long-term health effects from any ammonia release would be anticipated.

**Table E-2. ERPG Concentrations for Ammonia**

| Term | Ammonia Limit | Definition |
|---|---|---|
| ERPG-1 | 25 ppm | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor. |
| ERPG-2 | 150 ppm | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action. |
| ERPG-3 | 750 ppm | The maximum airborne concentration below which it is believed that nearly all individuals could be exposed to for up to 1 hour without experiencing or developing life-threatening health effects. |

ppm = parts per million

While these concentrations are measured outdoors, ALOHA also calculates the buildup of concentration inside a specified structure for a specified distance from the release point. In the case of these accidents, the shelter is assumed to be a single-story structure similar to a wooden home. The distance to the location where the ERPG-2 concentration would be exceeded indoors is also estimated.

The concentration within the structure shows one mitigation strategy that might be used if a release occurred, namely *sheltering in place.* An EPA-mandated risk management plan (40 CFR Part 68) would actually specify the response plan to any accident. *Notification* and *sheltering in place* is one mitigation strategy that might be specified in such a plan.

*Release Scenario 1*

This accident considers a catastrophic failure of the ammonia storage tank when it is at 87.5 percent of its capacity. For a well-maintained system (both the EPA risk management plan [40 CFR Part 68] and the Occupational Safety and Health Administration [OSHA] Process Safety Management Program [29 CFR Part 1910] require such maintenance programs), the likelihood of a catastrophic failure of a moderate pressurized tank (above atmospheric but less than 150 pounds per square inch gauge [psig]) is less than $10^{-4}$ per year. It could be as low as $10^{-6}$ per year. Should the tank catastrophically fail, it is assumed that the accident occurs when the tank is filled to 87.5 percent of its capacity and would therefore release 15,300 gallons, or 81,000 pounds, of ammonia. The release is assumed to occur over a 10-minute period.

The distance to the point where the outside concentration is below the EPRG-2 value is 6.1 kilometers (3.8 miles). At any outdoor location, because the plume release duration is 10 minutes, the time it would take for the plume to pass a location would never be much longer than 10 minutes. Thus, the second criterion in the definition (namely, that the duration exceed 1 hour) would never be met at any outdoor

location. The model also calculates a concentration that might be anticipated inside a standard single-story dwelling. The indoor concentration would exceed ERPG-2 for distances of less than 1.4 kilometers (0.87 miles). Thus, if *notification* and *sheltering in place* were selected as the proposed emergency response in the risk management plan, the ERPG-2 concentration would not be exceeded for any person exposed to the release plume at distances beyond 1.4 kilometers and less than 6.1 kilometers. At distances less than 1.4 kilometers, the occupant of a dwelling or business would not receive concentrations above the ERPG-2 value if they either left the structure after the plume had passed or ventilated it after the plume passed. It can be seen that there are reasonable mitigation strategies for any individual who might be exposed to the plume, even for a short period of time.

*Release Scenario 2*

This accident also considers the catastrophic failure of the ammonia storage tank when filled to 87.5 percent of its capacity. The expected frequency of this release is the same as for Scenario 1, somewhere between $10^{-4}$ to $10^{-6}$ per year for a well-maintained system. In this scenario, the release is assumed to occur over a 3-minute period. For this release, the distance to the point where the concentration is below the ERPG-2 value is 6.5 kilometers (4 miles) from the release point. The distance where the EPGR-2 is exceeded indoors is slightly greater than Scenario 1, 1.43 kilometers (0.89 miles).

In comparing Scenarios 1 and 2, the distance to the ERPG-2 end point is slightly greater because of the higher initial concentration (81,000 pounds released over 3 minutes instead of 10 minutes); however; the consequences are not expected to be significantly different from Scenario 1.

*Release Scenario 3*

This accident scenario considers a catastrophic rupture of the piping associated with the storage tank. Because the failure could occur in any of several components, this release is considered more likely than either Scenario 1 or Scenario 2, probably in the range of $10^{-3}$ to $10^{-5}$ per year. This release is assumed to be smaller than either Scenario 1 or 2 because, while the source of the release is the ammonia in the storage tank, the failure of the piping would depressurize the tank. This would initially flash the anhydrous ammonia into a vapor, but the flashing would cool the liquid in the tank down to its boiling point atmospheric pressure -35 °C (-28 °F). Once the liquid cooled, the vaporization of the remaining liquid would be controlled by the heat transfer from the atmosphere through the walls of the tank; because this rate is quite low, the rate of vaporization would be low as well. It is assumed that the rapid release would occur over a 10-minute period and that after this initial release, emergency crews would be able to stop the release so the slow long-term release controlled by heat transfer through the walls of the tank could be neglected.

It is estimated that the amount of ammonia that would be released during tank depressurization, which cools the remaining liquid in the tank, would be 16,400 pounds.

The distance to the ERPG-2 outdoor endpoint was found to be 2.4 kilometers (1.5 miles). The distance to the point where the ERPG-2 is not exceeded indoors is 0.54 kilometers (0.34 miles). Thus, in terms of consequences, the footprint would just be smaller than it was for Scenarios 1 and 2. This is important because if the wind direction were from the east, no populated areas of Rensselaer would be impacted by this scenario.

*Release Scenario 4*

This accident scenario is assumed to occur during the motor vehicle cargo tank unloading operation. It is limited by the content of the flexible hoses connecting the cargo tank to the plant piping, estimated to be 100 pounds. This release is also assumed to occur over a 10-minute period. Because there would be an

estimated two shipments per month, and releases of this nature are normally the result of human error, one 100-pound release might be anticipated during the life of the plant.

For the 100-pound release, the distance to the ERPG-2 end point is estimated to be 127 meters, less than one-tenth of a mile. Thus, there would be no potential for health-significant exposures to anyone not located on the plant site.

## E.4 Summary

Table E-3 shows the results of the release modeling for the four release scenarios.

**Table E-3. Distance To ERPG Concentration Endpoints**

| Scenario | ERPG-3 km (miles) | ERPG-2 km (miles) | ERPG-1 km (miles) | ERPG-2 exceeded indoors km (miles) |
|---|---|---|---|---|
| 1 | 2.1 (1.3) | 6.1 (3.8) | > 10 (6) | 1.40 (0.87) |
| 2 | 3.4 (2.1) | 6.5 (4.0) | > 10 (6) | 1.43 (0.89) |
| 3 | 0.87 (0.54) | 2.4 (1.5) | 6.7 (4.1) | 0.54 (0.34) |
| 4 | Too close to estimate | 0.13 (0.08) | 0.33 (0.2) | Too close to estimate |

The calculation shows that Scenarios 1 and 2 are quite similar and that Scenarios 3 and 4 have significantly smaller impact zones. As a result, only Scenarios 1 and 2 would potentially impact the city of Rensselaer. Furthermore, the calculation shows that if reasonable mitigation strategies, such as *notification* followed by either *evacuation* or *sheltering in place*, were adopted, the ERPG-2 definition would not be exceeded for any individual exposed to the plume. Thus, given the unlikely frequency of the most severe releases and their maximum consequences, significant health impacts from any accidental release of anhydrous ammonia could be avoided.

## E.5 References

EPA (U.S. Environmental Protection Agency), 2004. *Areal Locations of Hazardous Atmospheres (ALOHA) User's Manual*, Version 5.3.1, U.S. Environmental Protection Agency and National Oceanic and Atmospheric Administration, March 2004.

# APPENDIX F

# COMMENTS ON DRAFT ENVIRONMENTAL ASSESSMENT AND COMMENT RESPONSES

On February 14, 2005, the U.S. Department of Energy (DOE) sent letters to the following individuals and organizations announcing the availability of the draft environmental assessment (EA) on the DOE Golden Field Office website and inviting comments on it.

Howard Jones
Jasper County Coop
2530 N. McKinley Ave.
Rensselaer, IN 46204

The Honorable Herbert H. Arihood, Mayor
122 S. Van Rensselaer
Rensselaer, IN 46204

Ronald P. McIlwain
President
Jasper County Council
1130 W. Wood Rd.
Rensselaer, IN 46204

David Wuethrich
Wuethrich Pork & Grain Inc.
5547 E. 200 St.
Rensselaer, IN 46204

Roger E. Ward
15558 W. 500 St.
Francesville, IN 47946

Ms. Elizabeth McCloskey
U. S. Fish and Wildlife Service
P. O. Box 2616
1000 W. Oak Hill Rd.
Chesterton, IN 46304

Indiana State NEPA Point of Contact
Mr. David Parry
Permit Coordinator
Indiana Department of
Environmental Management
Indiana Government Center North,
Room 1315
100 North Senate Avenue
P. O. Box 6015
Indianapolis, IN 46204

Steve Rothblatt, Director
Air and Radiation Division
U.S. Environmental Protection Agency
77 West Jackson Blvd. (A-18J)
Chicago, IL 60604

Trunkline Gas Company
Attn. Gary Stewart
10483 W600S
Ambia, IN 47917

Jane Hardesty
State Conservationist
Indiana State Office
6013 Lakeside Boulevard
Indianapolis, IN 46278-2933

David P. Kennedy
CSX Transportation
Agricultural Products Marketing
500 Water St.
Jacksonville, FL 32202

Mr. Robert G. Lewis
Treasurer
Historic Preservation Association
of Jasper County
4916 Locksley Drive East
Rensselaer, IN 47978

Ms. Beulah Arnott
Jasper County Historian
128 S. Augusta St.
Rensselaer, IN 47978

Mr. LaVern Meyer
President
Jasper County Historical Society
479 N. Van Rensselaer
Rensselaer, IN 47978

DOE received three substantive comments on the draft EA: one from the Indiana Department of Environmental Management (IDEM) and two from the U.S. Environmental Protection Agency (EPA).

**IDEM Comment**

> On page 19 of your report, you indicate that Rensselaer loam is present on the site. This soil is a listed hydric soil for Indiana, an indication that wetlands regulated under federal and state law may be present on the site. We strongly recommend that you have the U.S. Army Corps of Engineers inspect the site to verify that no wetlands are present. A visual inspection of the site may not be sufficient to determine the location, size, and boundaries of wetlands. In addition, the National Wetland Inventory maps are also not sufficient to determine the presence of wetlands on this site. The USACE office with jurisdiction in Jasper County Indiana, is the USACE Detroit District Office, Wetlands Program, at 313-226-6812". (The IDEM comments also repeated the general issues and guidance previously submitted in IDEM's response to DOE's scoping letter.)

**IDEM Comment Response:**

In response to this comment, IBEC commissioned American Consulting, Inc., of Indianapolis, Indiana, to conduct a formal wetlands determination at the site. The wetlands determination was done on March 12, 2005. The determination concluded that the site is an active farm with no wetlands or waters. The full text of the wetland's determination, which was sent to the U.S. Army Corp of Engineers for concurrence on March 17, 2005, follows:

Mr. James F. Gries, Project Manager
US Army Corps of Engineers
South Bend Field Office
2422 Viridian Drive Suite #101
South Bend, Indiana 46628

Re: Wetland Determination
IBEC Site
Rensselaer, Jasper County, Indiana
ACE Project No. IN20050323

Dear Mr. Gries:

American Consulting, Inc. (ACE) investigated the IBEC parcel, located south of State Road 114 and east of the North West Indiana Grain Company elevator on March 12, 2004, to determine the presence of potential wetlands and Waters of the United States. The site is located in the southeast quadrant of Section 25, Range 6 West, Township 29 North, Rensselaer, Jasper County, Indiana. No wetlands were indicated on the site according to the National Wetland Inventory or aerial photography.

On behalf of the Iroquois Bioenergy Company, ACE requests your concurrence with our determination on the basis of our site visit and the following analysis of site conditions that no wetlands are present on the subject parcel. Enclosed for your review are various maps of the subject parcel.

Vegetation

Vegetation at the site was dominated by corn stubble. The entire site was actively farmed during the 2004 growing season and aerial photography indicates the site has been farmed for multiple years. No dominate plant species were identified as wetland indicator plants within the investigated area. Therefore, this site does not meet the hydrophytic vegetation criteria for wetlands.

Hydrology

The subject parcel is gently rolling. Drainage on the site is toward the roadside drainage swale along State Road 114 and ultimately to a culvert under State Road 114. No defined drainage areas or areas which exhibited wetland hydrology were noted on the site.

Soils

The soil types in the area are Rensselaer loam, Iroquois fine sandy loam, Darroch loam, and Rockton fine sandy loam, 1-3 percent slopes. Rensselaer loam and Iroquois fine sandy loam are listed on the state hydric soils list and are capable of supporting wetlands. No field investigation was completed to determine the presences of field indicators of hydric soils.

Conclusion

Based upon the observed site conditions, no wetlands, Waters of the US or Waters of the State were identified within the investigated area. Although some areas of the site have mapped hydric soils, no areas which contained hydrophytic vegetation or indicators of wetland hydrology were noted. Therefore, the site does not satisfy the three criteria required for a determination of a jurisdictional wetland. The site is an active farm with no wetlands or waters.

If you have any questions or comments regarding this site, please contact Christine Meador at the number above or at cmeador@amercons.com.

Very truly yours,
American Consulting, Inc.

Christine Meador

CM:djm

Enclosures

cc: Keith Gibson, IBEC
Bill Fallon, Battelle

**EPA Comment 1**

> We are concerned about wastewater discharged from the proposed plant. According to the DEA, the proposed plant would discharge about 100 gallons per minute of non-process wastewater and water treatment additives to an existing drainage ditch. The DEA states that the effluent would merge with water in downstream ditches and eventually reach the Iroquois River (about 3 miles away). The DEA states that the outfall concentration of sodium hypochlorite and sodium hydroxide is 0.0046 milligrams per liter, which is about 0.0023 milligrams per liter below the permitted limit. The DEA concedes that, "The projected concentrations of sodium hypochlorite/sodium hydroxide at the outfall, while not exceeding the Indiana water quality standards, would not provide a…robust margin of safety." Given the small margin of safety, there seems to be a risk for the outfall concentrations of sodium hypochlorite and sodium hydroxide to occasionally exceed the permitted limit. The DEA does not evaluate this risk, nor does it determine the associated water quality impacts associated with these exceedances. Therefore, the final environmental assessment (FEA) should evaluate water quality impacts from excessive sodium hypochlorite and sodium hydroxide effluent concentrations. If a Finding of No Significant Impact (FONSI) is issued for the proposed project, it should include commitments to mitigate such water quality impacts (e.g., connecting to a wastewater treatment plant).

**EPA Comment 1 Response:**

The comment states in part that:

> The Draft EA concedes that, "The projected concentrations of sodium hypochlorite/sodium hydroxide at the outfall, while not exceeding the Indiana water quality standards, would not provide a…robust margin of safety."

DOE believes that the full text at the end of Section 3.2.4.1 provides a better characterization:

> The projected concentrations of sodium hypochlorite/sodium hydroxide at the outfall, while not exceeding the Indiana water quality standards, would not provide a <u>similarly</u> robust margin of safety. The concentrations of hazardous or toxic constituents and the discharge temperature appear to be at levels below those that would be hazardous to aquatic receptors.

Most plant processes, including monitoring and adjustment of wastewater composition, would be computer-controlled by a new, state-of-the-art Siemens Moore Advanced Process Automation Control System. Wastewater composition would be analyzed continuously and adjusted as necessary. Hypochlorite in the discharge would be neutralized with bisulfite to destroy essentially all the residual hypochlorite. Typically, this would result in a "none detected" reading. The sodium hydroxide in the wastewater ensures that the pH of the wastewater stream is in an appropriate range (8-9) for discharge to receiving waters. While acknowledging that the margin of safety for chronic exposure to hypochlorite/sodium hydroxide is less than for other discharged pollutants, DOE maintains that the concentrations of discharged constituents in untreated wastewater are at levels below those that would be hazardous to or represent an unacceptable acute or chronic risk to aquatic receptors, even if permitted discharge levels were temporarily exceeded due to occasional upset conditions. DOE bases this position on the following considerations for acute and chronic exposure.

*Acute Exposure*

DOE agrees that if the permitted level of discharge of sodium hypochlorite/sodium hydroxide were temporarily exceeded, it would temporarily increase the acute exposure risk to aquatic organisms. However, IBEC's National Pollutant Discharge Elimination System (NPDES) permit application calculates that the Final Acute Value (FAV), which is the Lowest Listed $LC_{50}$/5, for sodium hypochlorite/sodium hydroxide is 0.32 milligrams per liter (mg/l). The calculated outfall concentration for hypochlorite/sodium hydroxide is 0.0046 mg/l. Thus, the FAV for sodium hypochlorite/sodium hydroxide is approximately 70 times greater than the steady-state discharge concentration. To meet Indiana water quality standards at the point of discharge, the steady-state discharge concentration for permitted wasterwater constituents shall not exceed the calculated FAV. DOE believes that the potential acute risk to aquatic species attributable to an occasional exceedance would be limited in both duration and severity—lasting only until upset conditions were detected and corrected. DOE believes that the approximately 70-fold margin of error that exists between normal discharge concentrations of sodium hypochlorite/sodium hydroxide (0.0046 mg/l) and unacceptable discharge concentrations (> 0.32 mg/l) provides an adequate margin of safety for acute exposure risk.

*Chronic Exposure*

With the exception of sodium hypochlorite/sodium hydroxide, the Chronic Aquatic Criteria (CAC) for all permitted discharges exceed the calculated outfall concentrations by at least two orders of magnitude. For sodium hypochlorite/sodium hydroxide, the CAC (0.0071 mg/l) exceeds the calculated outfall concentration (0.0046 mg/l) by a factor of approximately 1.5. To meet Indiana water quality standards, receiving water concentrations shall not exceed the calculated CAC. While acknowledging that this margin of error for chronic exposure is not robust, the discharge concentration conforms to state-permitted chronic exposure levels. DOE does not believe that chronic exposure safeguards would be compromised by occasional, temporary increases in outfall concentrations because an occasional exceedance would be limited in both duration and severity—lasting only until upset conditions were detected and corrected.

*Mitigation*

The comment recommends that if a FONSI is issued, it should include "commitments to mitigate such water quality impacts (e.g., connecting to a wastewater treatment plant)." The nearest wastewater treatment plant is in Rensselaer, a distance of approximately 5 miles. In a March 23, 2005, telephone conversation, the Rensselaer wastewater treatment plant supervisor stated that connecting the proposed fuel ethanol plant to this facility would not be feasible. Constructing a dedicated wastewater treatment plant would be financially prohibitive. Rather than stipulating a specific mitigation commitment that could not be physically or financially met, DOE proposes that if a FONSI is issued, it include as a stipulation for federal funding that all wastewater discharge monitoring and reporting, and all other conditions of operation specified in IBEC's NPDES permit, be met.

**EPA Comment 2**

> We are concerned about project impacts from increased groundwater consumption. The DEA states that the proposed project would withdraw about 400 gallons per minute of groundwater. According to the DEA, the Indiana Department of Natural Resources (IDNR) stated that the groundwater resource at the proposed site should be able to support the demand. However, the DEA also states that, "…it is possible that the addition of two new high-capacity wells at the proposed site, combined with the drawdown from existing high-capacity wells near the proposed site, could result in a local cone of depression that would

adversely impact the operation of nearby, shallower wells." 13 wells have been identified within one mile of the proposed site. The FEA should include a more detailed description of the proposed project on groundwater supply effects on these 13 wells. If a FONSI is issued for the proposed project, it should include commitments to mitigate any possible groundwater supply impacts.

**EPA Comment 2 Response:**

The comment recommends that if a FONSI is issued, it should include commitments to mitigate any possible groundwater supply impacts.

Problems with competing usages of groundwater in Indiana resulted in state legislation aimed at alleviating "groundwater emergencies." In 1991, the Indiana General Assembly enacted House Bill 1260 requiring the Advisory Council for the Bureau of Water and Resource Regulation, Department of Natural Resources, to develop a plan to meet the needs of citizens and the environment if a water shortage in Indiana threatens the health, safety, welfare, or economic well-being of the citizens or the environment. A water shortage was defined as a "limitation of the water supply resulting from natural phenomenon such as drought and problems of water distribution and use."

As regards groundwater usage, the law does not establish a well permitting process, but it does allow an aggrieved person to file a complaint and seek mitigation. The owner of a groundwater withdrawal facility with a capability of withdrawing less than 100,000 gallons of water a day whose water supply is damaged by the owner of a groundwater withdrawal facility with a capability of withdrawing more than 100,000 gallons per day may seek relief. High-capacity wells must be registered. (The proposed plant would withdraw more than 100,000 gallons per day.) In most instances, the law does not preclude a high-capacity user from impacting groundwater levels; *however, if levels are lowered to a point where a domestic well fails, the owner of the high-capacity facility must provide an alternate supply of water to the homeowner.* In addition, the Department of Natural Resources may restrict, and has restricted, high-capacity groundwater pumping if water withdrawals exceed the recharge capability of an aquifer.

DOE believes that current provisions of Indiana law, as outlined above, stipulate and define the appropriate mitigation measures and procedures if the proposed plant were to result in an adverse impact to groundwater supply for neighboring wells. In light of these provisions of state law, DOE does not believe that an additional commitment to mitigation measures is required.