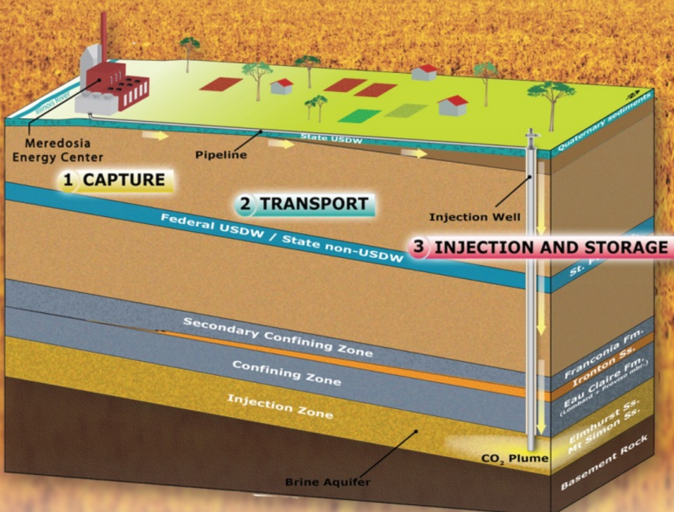
U.S. Department of Energy

FutureGen 2.0 Project

Draft Environmental Impact Statement

DOE/EIS-0460D | April 2013



Volume II | Appendices

Office of Fossil Energy

National Energy Technology Laboratory

LIST OF APPENDICES

INTENTIONALLY LEFT BLANK

APPENDIX A

Public Scoping

for the

Draft Environmental Impact Statement
FutureGen 2.0 Project
Meredosia, Illinois (Morgan County)

DOE/EIS-0460D
April 2013

INTENTIONALLY LEFT BLANK

1 INTRODUCTION

This Public Scoping Report summarizes the U.S. Department of Energy's (DOE) public scoping activities and the scoping comments for the FutureGen 2.0 Project Environmental Impact Statement (EIS). The public scoping period began on May 23, 2011, when DOE issued a Notice of Intent (NOI) to prepare an EIS in the *Federal Register*, under Docket ID No. FR Doc. 2010–12632 (76 FR 29728). As part of the NOI, comments and suggestions were requested to be received within the 30-day scoping period and no later than June 22, 2011. Public scoping meetings were held June 7, 8, and 9, 2011 in Taylorville, Tuscola, and Jacksonville, Illinois, respectively.

Under the FutureGen 2.0 Project (the "project"), DOE proposes to provide financial assistance (approximately $1 billion) through separate Cooperative Agreements with Ameren Energy Resources (Ameren) and the FutureGen Alliance (the Alliance) to support the implementation of project components, which if successful would advance the goals of the project. The potential issues identified from comments received during the public scoping period are summarized in Section 4. DOE took these issues into consideration when defining the scope and areas of emphasis (or focus) of this EIS for the FutureGen 2.0 Project.

2 PUBLIC SCOPING ACTIVITIES

The NOI (Attachment A) initiated the public scoping period where members of the public (including federal, state, and local agencies; affected federally-recognized Indian tribes; and other interested stakeholders) were invited to comment on the proposed scope and content of the EIS. DOE mailed invitation letters to potentially interested parties the week of May 23, 2011, to announce the dates and locations of the public scoping meetings. The NOI stated that the public scoping meetings would be held at the following locations:

- June 7, 2011 at Taylorville High School, Taylorville, Illinois
- June 8, 2011 at Ironhorse Golf Club, Tuscola, Illinois
- June 9, 2011 at the Elks Lodge, Jacksonville, Illinois

The meeting locations were selected to provide appropriate geographic coverage and reasonable accessibility for stakeholders potentially affected by actions associated with the proposed oxy-combustion facility at the Meredosia Power Station site and the proposed CO_2 pipelines, injection sites, geologic storage areas, and associated facilities.

DOE also published announcements in the following local newspapers on the dates indicated:

- *Journal-Courier*, Jacksonville; May 22, 29; June 1, 5
- *State Journal-Register*; Springfield; May 22; June 5
- *Breeze-Courier*; Taylorville; May 23; June 3, 5
- *Herald & Review*; Decatur; June 1, 5
- *Daily Union*; Shelbyville; May 31; June 4
- *News-Progress*; Sullivan; May 25; June 1
- *Tri-County Journal*; Tuscola; May 26; June 2
- *Tuscola Journal*; Tuscola; May 25; June 1
- *Record-Herald*; Arcola; May 26; June 2
- *Journal-Gazette / Times-Courier*; Mattoon / Charleston; June 1, 4

Additionally, announcement letters and project information were provided to local libraries. Letters accompanying the project information requested that the libraries post the announcement letters in a public viewing area until June 30, 2011. The announcement letters publicized the scoping meeting dates and locations and the availability of project information at the library. Project information included the NOI and two 8 ½" x 11" printouts of the DOE posters that were available during the scoping meetings (NEPA timeline and Project Overview Map). The project information packages were sent to the following libraries:

- M-C River Valley Public Library District (Meredosia, IL)
- Jacksonville Public Library
- Taylorville Public Library
- Tuscola Public Library
- Arcola Public Library

Each scoping meeting began with an informal session from 5:00 p.m. to 7:00 p.m. During this time, attendees were able to view project-related posters, handouts, and a video on NETL's Carbon Sequestration Program (March 2007); and to ask questions of DOE, Ameren, and Alliance representatives. Sign-in sheets, comment forms and a box to submit comments were also provided at the sign-in table. A total of 160 attendees signed the meeting attendance lists cumulatively among all three meetings (93 in Jacksonville, 36 in Taylorville, and 31 in Tuscola). Lists of signed-in attendees for each of the meetings are provided in Appendix E.

The formal scoping meeting at each location began at 7:00 p.m. and included presentations by DOE, Ameren, and the Alliance, followed by an opportunity for verbal comments by the public. The presentations and comments were transcribed by a court reporter for each meeting. Transcripts of the meetings and slides for the DOE, Ameren, and the Alliance presentations are available at: http://www.netl.doe.gov/publications/others/nepa/index.html.

3 PUBLIC SCOPING COMMENTERS

A total of 21 individuals provided verbal comments cumulatively among all three meetings (15 in Jacksonville, 5 in Taylorville, and 1 in Tuscola) (Table 1). During the comment period, DOE accepted comments by telephone, facsimile, U.S. mail, and electronic mail. A total of 26 respondents submitted comment letters to DOE during the scoping period (Table 2).

Table 1. Commenters During the Scoping Meetings

Name	Affiliation
June 7, 2011 – Taylorville, IL	
Greg Brotherton	Mayor, City of Taylorville
John Curtain	Christian County Board, Chair
Steve Sipes	Mayor, City of Pana
Alan Rider	Resident
Jack Norman	Tenaska (Taylorville Energy Center) representative
June 8, 2011 – Tuscola, IL	
Barbara Brehm	Landowner

Table 1. Commenters During the Scoping Meetings

Name	Affiliation
June 9, 2011 – Jacksonville, IL	
Brad Zeller	Morgan County Board, Chair
Kelly Hall	Jacksonville Community Development Director (representing Mayor of Jacksonville, Andy Ezard)
Andy Davenport	Landowner
David Davenport	Landowner
Jeffrey Niemann	Landowner
Elizabeth Niemann	Landowner
Richard Johnson	Resident
William Hawks	Resident
Catherine Edmiston	Citizens Against Longwall Mining
Patty Rykhus	Resident
Alan Rider	Resident
Reginald Jordan	Resident
Joyce Blumenshine	Sierra Club, Heart of Illinois Group
Terry Denison	President, Jacksonville Regional Economic Development Corporation
Ginny Fanning	Jacksonville Area Chamber of Commerce

Table 2. Submitted Comments During the Scoping Period

Name	Affiliation	Location
Marilyn Schutt	Resident	Morgan County
Jim Duncan	Vet-2-Vet	Morgan County
Dave Davenport*	Landowner	Morgan County
Andy Davenport*	Landowner	Morgan County
Nadine Szczepanski	MacMurray College	Morgan County
Betty Niemann*	Landowner	Morgan County
Virginia Niemann	Resident	Morgan County
Susan Mattes	Resident	Morgan County
Johnney F. Rentz	Resident	Morgan County
Marvin Martin	Landowner	Morgan County
Dick Rawlings	Resident	Morgan County
Kerry Mackey	Resident	Morgan County
James Goldsborough	Resident, Goldsborough Electric, LLC	Morgan County
Richard Ommen	Resident	Morgan County
Ernie Marsh	Resident	Christian County
Jadon Evans	Resident	Christian County
Carolyn Randall	Landowner	Christian County
Alan Rider*	Resident	Christian County
Patty Rykhus*	Resident	Christian County

Table 2. Submitted Comments During the Scoping Period

Name	Affiliation	Location
Allen Worrell	Resident	Christian County
Beverly Pryor	Landowner	Douglas County
Robert Guennewig	Landowner	Douglas County
Willis E. Chupp	Resident	Douglas County
Emerson and Norma Jean Moore	Landowner	Douglas County
Marsha Strader	Landowner	Douglas County
Diane Bingaman	Landowner	Not Available

*Also commented during scoping meetings.

4 PUBLIC SCOPING COMMENT SUMMARY

In general, the majority of respondents commented unfavorably, with a primary emphasis on potential impacts to farmers and farmland. Other negative views not directly related to a specific environmental resource included: issues with the experimental nature of the project; a lack of belief that economic benefits would occur; the use of public funds for a private endeavor; belief that project funding should go toward renewable and alternative energy technologies aside from coal; and potential increased electricity costs for consumers. In terms of environmental resource-specific concerns, the majority of comments were related to Socioeconomics and carbon capture and storage (CCS), with a general belief that CCS ultimately contaminates the land instead of the air. The majority of natural resource topics were addressed in terms of impacts to farmlands; issues strictly related to natural resources tended to be general in nature (e.g., potential impacts to surface waters should be addressed). Additionally, two petitions in opposition of the project, signed by a total of about 340 residents and landowners in Morgan County, and one petition signed by 55 residents and landowners in Douglas County, were submitted to DOE.

Of the commenters that responded favorably, many commented positively on the project primarily due to economic and job creation benefits for the community, as well as benefits in terms of self-sufficient National energy production.

Table 3 provides a summary of the scoping comments that were received, organized by comment category or applicable resource area.

Table 3. Public Scoping Comment Summary

Comment Category or Resource Area	Comment Summary
Opposition to the Project	General opposition to the project due to generally unfavorable views, the experimental nature of the project; general concerns that the Alliance cannot be trusted when they say CCS would stop global warming because it is an alliance of energy companies; potential adverse consequences to farmers and high quality farmland; general adverse environmental impacts including environmental contamination and seismic issues; a lack of belief that economic benefits would occur; the use of public funds; a lack of CCS regulations and questions of liability if a CO_2 leak occurred; belief that project funding should go toward renewable and alternative energy technologies aside from coal; belief that CCS contaminates the land instead of the air; project costs; and a belief that local individuals that support the project do not live near an injection site and would not be personally affected.
Support for the Project	General support for the project due to economic benefits including job creation; a belief that the area could become a pioneer in energy technology; an increased need for National energy self-sufficiency; local educational opportunities; and that it represents a cleaner use of Illinois coal.
Purpose and Need	States that the project is federally funded, but if the industry thought it was profitable they would invest in it by themselves. General opposition to the project as it would be wasteful federal spending.
Purpose and Need	States that climate change impacts are occurring now, so why invest tax dollars in an established industry instead of other leading-edge energy technologies. Prefers that DOE fund alternative energy projects other than coal. States that investing in leading or cutting-edge technology would also create jobs.
Purpose and Need	Asks if additional electricity production is needed and if oxy-combustion is a cost-competitive electricity generation technology.
Alternatives	States that project officials have stated that additional injection sites may be required. Generally asks if additional storage sites are possible or expansion of the existing site.
Alternatives	Feels that the storage area should be at the plant site and not in Douglas County and that the risks are too high with a small amount of benefit.
Alternatives	Asks how the decision between the three alternative injection sites will be made. Asks if the sequestration site could be somewhere else, e.g., closer to the plant.
Alternatives	States that project alternatives should include funding energy efficiency and renewable energy projects.

Table 3. Public Scoping Comment Summary

Comment Category or Resource Area	Comment Summary
Alternatives	States that saline formations exist across the country and asks why not develop the project in a less inhabited area with less risk to farmland.
Economics; Energy Use	Asks that the complete costs of the project in terms of energy use (e.g., coal hauling) be included; asks that a complete life cycle cost analysis of the project be performed.
Regulation	States that new state legislation must be enacted for the project but nobody has explained what that legislation would be; asks if there is not new legislation if the project would go forward.
Liability Insurance	States that a study was done to determine if the FutureGen 2.0 Project could obtain a major industrial liability insurance policy and it was determined that the project could not.
Coal Mining	Generally asks that impacts of coal mining be addressed with respect to water resources, biological resources, and farmland.
Coal Mining	States that coal mining causes adverse impacts to farming due to land subsidence and states that increased mining for the project would be detrimental to agricultural production.
Coal Mining	General environmental and safety concerns about coal mining.
Coal Mining	States that coal mining causes adverse impacts to agricultural land.
Coal Mining	States coal mining activities cause contamination of streams and groundwater.
Coal Mining	States waste streams at coal mine sites should be included.
Air Quality	Asks that the DEIS analyze emissions, especially in terms of how the project compares to a conventional coal burning plant.
Air Quality	Asks that "uncertain air emissions" be explained and unexpected shutdowns/outages and restarts be explained.
Air Quality	States that all waste streams should be detailed in the DEIS including disposal sites.

Table 3. Public Scoping Comment Summary

Comment Category or Resource Area	Comment Summary
Biological	Quotes original FutureGen EIS text on subsurface microbes (Section 3.2.2.5) and asks if these are the building blocks of the planet.
Biological	Asked if transporting warm CO_2 could cause insects and molds in the ground to proliferate, which would normally freeze during winter.
Biological	States concern that using the Morgan County injection site could cause pollution by brine groundwater, CO_2, carbolic acid, etc. to a nearby stream that drains to the Illinois River (Indian Creek) and adverse impacts to fish, animals, plants, groundwater, and farm fields along the creek would result.
Climate and Greenhouse Gases	Asks that the DEIS analyze emissions, especially in terms of how the project compares to a conventional coal burning plant.
Community Services	States that local services in the Alexander area do not have the infrastructure or money to be able to respond to potential accidents at the Morgan County site or pipeline.
Geology	Stated concern that the Alliance would perform a study of how much subsurface pore space would be required to support the project and asks that an independent 3rd party perform the study.
Geology	Quotes the original FutureGen EIS (Section 3.2.1) stating that there is uncertainty with respect to fate and movement of injected CO_2. States that people living in the area of injection do not want to be affected by a learning experience.
Geology	Generally asks that environmental impacts of a CO_2 release be analyzed in the DEIS. Address methods for testing for leaks and procedures to stop CO_2 release if a leak occurred, including remediation.
Geology	States that unless multiple characterization wells are drilled and tested it cannot be known if the subsurface can contain the injected CO_2.
Geology	States that the earth changes (tectonic plates shift and move) and only looking at storage for 30, 50, or even hundreds of years may not be permanent storage.
Geology	States that a number of requirements for the depth to the Mt. Simon formation have been made public (for injection site requirements) and questions whether the depth is adequate at the preferred site.
Geology	Asks that the DEIS analyze seismic impacts of sequestration; consider proximity to New Madrid Fault. States that any seismic activity caused by the project could cause structural damage to buildings in the area.

Table 3. Public Scoping Comment Summary

Comment Category or Resource Area	Comment Summary
Geology	Asks for an explanation on why the CO_2 will not come out of the ground. Asks that the risks and environmental impacts of any other gases coming to the surface (e.g., methane) be defined.
Geology	States that the Morgan County site is not a good injection location because the Mt. Simon formation is more porous and not as deep there as in other locations and shale layers are discontinuous, which means a higher risk for the CO_2 to migrate. States that injecting the CO_2 will ultimately force CO_2, brine groundwater, or a combination of the two to either travel a large distance laterally or migrate to the surface.
Geology	Stated that the Morgan County injection Site is made up of sandstone and sits at a slight angle, which makes carbon injection problematic.
Geology	Generally questions CCS as being experimental; i.e., would the CO_2 stay stored as expected.
Geology	States that a study concluded that more pore space is required than originally thought to store CO_2. Questions the size of FutureGen 2.0's storage site and states that the Alliance's CEO has stated that the sequestration site may need to be expanded to 2,500 or as much as 10,000 acres.
Geology	States that the monitoring wells should be over a larger area than 2,500 acres.
Geology	States that remediating contamination in the ground is a long and costly proposition.
Geology	Questions whether CCS and associated CO_2 injection pressures, would cause adverse consequences to groundwater, surface water, and the land surface, and how large of a pore space would really be required to store the volume of CO_2 anticipated.
Geology	Generally asks that environmental impacts of a CO_2 release be analyzed in the DEIS. Address methods for testing for leaks and procedures to stop CO_2 release if a leak occurred, including remediation.
Geology	Asks if an odorant (e.g., methanethiol) could be added to CO_2 to help detect CO_2 leaks.
Geology	States that the Alliance has stated that if a CO_2 leak occurred the project would be shut down, but when the Alliance was asked what would happen to the already stored CO_2 that was leaking, the Alliance had no answer. Asks if the stored CO_2 would just keep migrating to the surface.

Table 3. Public Scoping Comment Summary

Comment Category or Resource Area	Comment Summary
Groundwater	States concern that using the Morgan County injection site could cause pollution by brine groundwater, CO_2, carbolic acid, etc. to a nearby stream that drains to the Illinois River (Indian Creek) and adverse impacts to fish, animals, plants, groundwater, and farm fields along the creek would result.
Land Use	Asks if the project secured mineral rights for the injection area what would happen to neighboring land values and permitted land uses.
Materials and Waste Management	States that when burning coal some waste can be captured, but other wastes are not (e.g., mercury).
Materials and Waste Management	States that coal ash disposal impacts should be considered.
Materials and Waste Management	States that all waste streams should be detailed in the DEIS including disposal sites.
Materials and Waste Management	States that plant-generated valuable byproduct disposition and revenues should be addressed in the DEIS, including sulfur and nitrogen.
Materials and Waste Management	Asks what will happen to nitrogen byproducts in the process; questions whether an ammonia processing plant would be built. Questions how sulfur byproducts will be dealt with and whether a sulfuric acid processing plant will be built.
Physiography and Soils	States concern that using the Morgan County injection site could cause pollution by brine groundwater, CO_2, carbolic acid, etc. to a nearby stream that drains to the Illinois River (Indian Creek) and adverse impacts to fish, animals, plants, groundwater, and farm fields along the creek would result.
Physiography and Soils	States that Morgan County farmland is one of the most productive in the world, so it should not be risked for a dangerous experiment.
Public Health and Safety	Asks if hydrogen sulfide will be transported with the CO_2, which is toxic.
Public Health and Safety	States that CO_2 is hazardous to public health and asks what would happen if CO_2 is released at injection site or along pipeline. Generally questions how hazardous the CO_2 product is.
Public Health and Safety	States that the project is supposed to last 30 years; questions who will look after the safety of people in 50, 100, or 1000 years.

Table 3. Public Scoping Comment Summary

Comment Category or Resource Area	Comment Summary
Public Health and Safety	States concern about impacts of a CO_2 release to public safety and asks what precautions would be taken to evacuate areas if a leak occurred.
Public Health and Safety	States that local services in the Alexander area do not have the infrastructure or money to be able to respond to potential accidents at the Morgan County site or along the pipeline.
Public Health and Safety	States that chemicals are used in CO_2 sequestration process, so there are dangers at plant site as well as injection site.
Socioeconomics	Questions the estimated number of employees for construction and operation, i.e., believes they are higher than would actually be used or needed.
Socioeconomics	Asked if parts or percentages of the project could be sold to foreign investors and questioned whether taxpayers would want to fund a project that could be sold to foreign investors.
Socioeconomics	Asks that impacts be addressed to farmers living along the CO_2 pipeline in terms of being disrupting or displaced.
Socioeconomics	Asks how local farmers would be compensated if negative impacts arose from the project.
Socioeconomics	States that there is a difference between the required construction workforce in the original FutureGen EIS vs. what has been reported for FutureGen 2.0 and asks that the difference be explained. Also asks that the value of Prime Farmland be discussed in terms of impacts to farmers if detrimental environmental impacts result.
Socioeconomics	Submitted a document describing impacts to land values due to environmental contamination and associated public stigma.
Socioeconomics	States concern about impacts to property values and the inability to build within a certain distance of the pipeline.
Socioeconomics	Questions whether the project would actually end up investing in Morgan County, e.g., there are not any companies in Morgan County that produce the parts needed to retrofit the power plant.
Socioeconomics	Asks if the project secured mineral rights for the injection area what would happen to neighboring land values and permitted land uses.
Socioeconomics	Asks if any state or county tax abatements or incentives or other incentives have been offered with respect to the Morgan County site.

Table 3. Public Scoping Comment Summary

Comment Category or Resource Area	Comment Summary
Socioeconomics	Generally asks if energy costs for consumers would be raised as a result of the project.
Socioeconomics	Questions whether the project would create jobs for local residents.
Surface Water	States concern that using the Morgan County injection site could cause pollution by brine groundwater, CO_2, carbolic acid, etc. to a nearby stream that drains to the Illinois River (Indian Creek) and adverse impacts to fish, animals, plants, groundwater, and farm fields along the creek would result.
Surface Water	Asks that water resources be studied in depth. States that the Morgan County injection site and pipeline are close to creeks and stream crossings.
Transportation and Traffic	States that the road to the Morgan County site could not withstand the traffic that would result from the project and a road upgrade would be required.
Utilities	Asks if "irretrievably committed" water used by the project would be reconciled with user needs including growth in Meredosia.
Utilities	Generally asks if energy costs for consumers would be raised as a result of the project.

INTENTIONALLY BLANK

ATTACHMENT A
NOTICE OF INTENT

INTENTIONALLY BLANK

will meet to receive updates on EAC's program activities and budget. The Board will receive updates on the Voting System Testing and Certification program. The Board will hear updates from a special committee on Defining Issues of Voting System Sustainability. The Board will hear presentations by the National Institute of Standards and Technology (NIST) and the Federal Voting Assistance Program (FVAP) on UOCAVA Internet voting and common data format. The Board will receive updates on EAC grants programs including: The Accessible Voting Technology Initiative; and the Pre-Election Logic and Accuracy Testing and Post-Election Audit Initiative. The Board will receive updates on EAC research and studies. The Board will hear a presentation on a Rutgers report on Voter Participation of People with Disabilities in 2010. The Board will hear other committee reports, elect officers and consider motions. The Board will consider other administrative matters.

Members of the public may observe but not participate in EAC meetings unless this notice provides otherwise. Members of the public may use small electronic audio recording devices to record the proceedings. The use of other recording equipment and cameras requires advance notice to and coordination with the EAC's Communications Office.

This meeting will be open for public observation.

PERSON TO CONTACT FOR INFORMATION: Bryan Whitener, *Telephone:* (202) 566–3100.

Thomas R. Wilkey,

Executive Director, U.S. Election Assistance Commission.

[FR Doc. 2011–12667 Filed 5–19–11; 11:15 am]

BILLING CODE 6820–KF–P

DEPARTMENT OF ENERGY

Notice of Intent To Prepare an Environmental Impact Statement and Notice of Potential Floodplain and Wetlands Involvement for the FutureGen 2.0 Program

AGENCY: Department of Energy.

ACTION: Notice of Intent and Notice of Potential Floodplain and Wetlands Involvement.

SUMMARY: The U.S. Department of Energy (DOE or the Department) announces its intent to prepare an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*), the Council on Environmental Quality's (CEQ) NEPA regulations (40 CFR Parts 1500–1508), and DOE's NEPA implementing procedures (10 CFR Part 1021) to assess the potential environmental impacts of DOE's proposed action: providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act, or "ARRA") for the FutureGen 2.0 program. DOE has prepared this Notice of Intent (NOI) to inform interested parties of the pending EIS and to invite public comments on the proposed action, including: (1) The range of environmental issues, (2) the alternatives to be analyzed, and (3) the impacts to be considered in the EIS. The NOI also provides notice in accordance with 10 CFR Part 1022 (DOE's regulations for compliance with floodplain and wetland review requirements) that the proposed project may involve potential impacts to floodplains and wetlands.

The FutureGen 2.0 program would provide financial assistance for the repowering of an existing electricity generator with clean coal technologies integrated with a pipeline that would transport carbon dioxide (CO_2) to a sequestration site where it would be injected and stored in a deep geologic formation. DOE entered into separate cooperative agreements with Ameren Energy Resources (Ameren) and with the FutureGen Alliance (the Alliance) that define DOE's proposed action. This program consists of an Oxy-Combustion Large Scale Test undertaken by Ameren at its Meredosia Power Station in west central Illinois and a Pipeline and CO_2 Storage Reservoir undertaken by the Alliance. In addition, the Alliance would construct and operate facilities for research, training, and visitors in the vicinity of the sequestration site. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. The program would provide performance and emissions data as well as establish operating and maintenance experience that would facilitate future large-scale commercial deployment of these technologies. DOE would provide technical and programmatic guidance to Ameren and the Alliance and oversee activities for compliance with the terms of the cooperative agreements. DOE is responsible for NEPA compliance activities.

DOE encourages government agencies, private-sector organizations, and the general public to participate in the FutureGen 2.0 program through the NEPA process. DOE will consult with interested Native American Tribes and Federal, state, regional and local agencies during preparation of the EIS. Further, DOE invites agencies with jurisdiction by law or special expertise to participate as cooperating agencies in the preparation of this EIS.

DATES: DOE invites comments on the proposed scope and content of the EIS from all interested parties. To ensure consideration in the preparation of the EIS, comments must be received by June 22, 2011. DOE will consider late comments to the extent practicable. In addition to receiving comments in writing and by e-mail [See **ADDRESSES** below], DOE will conduct public scoping meetings during which government agencies, private-sector organizations, and the general public are invited to present oral and written comments with regard to DOE's proposed action, alternatives, and potential impacts of the proposed FutureGen 2.0 program. DOE will consider these comments in developing the EIS. Public scoping meetings will be held on June 7, 8, and 9, 2011 [See "Public Scoping Process" under **SUPPLEMENTARY INFORMATION** below].

ADDRESSES: Written comments on the scope of the EIS and requests to participate in the public scoping meetings should be addressed to: Mr. Cliff Whyte, U.S. Department of Energy, National Energy Technology Laboratory, P.O. Box 880, Morgantown, West Virginia 26507–0880. Individuals and organizations who would like to provide oral or written comments should contact Mr. Whyte by mail at the above address; telephone (toll-free) 1–877–338–5689; fax 304–285–4403; or electronic mail (*FG2.EIS@netl.doe.gov*).

Oral comments will be heard during the formal portion of the scoping meetings [See "Public Scoping Process" under **SUPPLEMENTARY INFORMATION** below]. Various displays and other information about DOE's NEPA process and the FutureGen 2.0 program will be available, and representatives from DOE and the project partners will be present at an informal session to discuss the FutureGen 2.0 program and the EIS process.

FOR FURTHER INFORMATION CONTACT: For further information about this project, contact Mr. Whyte as described above. For general information about the DOE NEPA process, please contact Ms. Carol M. Borgstrom, Director, Office of NEPA Policy and Compliance (GC–54), U.S. Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585; telephone (202–586–4600); fax (202–586–7031); or leave a toll-free message (1–800–472–2756).

SUPPLEMENTARY INFORMATION:

Background

On February 27, 2003, President George W. Bush proposed that the United States undertake a $1 billion, 10-year project to build the world's first coal-fueled plant to produce electricity and hydrogen with near-zero emissions. In response to that announcement, DOE developed plans for the original FutureGen project, which would establish the technical and economic feasibility of producing electricity and hydrogen from coal—a low-cost and abundant energy resource—while capturing and geologically storing the CO_2 generated in the process. DOE issued a Final EIS for the original FutureGen project (DOE/EIS–0394) in November 2007 and an associated Record of Decision in July 2009 (74 FR 35174). The proposed action would have resulted in the construction and operation of a 330–MWe (gross) integrated gasification combined cycle (IGCC) plant near Mattoon, Illinois, with capture and storage of more than 1 million tons of CO_2 per year in the Mount Simon geologic formation. The total cost of the original FutureGen Project proved to be higher than acceptable, however, causing a funding gap that could not be filled by Federal or state governments or private industry. As a result DOE refocused its approach. The FutureGen 2.0 program consists of the two separate Cooperative Agreements with Ameren and the Alliance. Ameren's partners include Babcock & Wilcox Power Generation Group (B&W) and Air Liquide Process & Construction, Inc. (AL). The Alliance is a non-profit corporation that represents a global coalition of coal producers, coal users and coal equipment suppliers, including full members: Alpha Natural Resources, Inc.; Anglo American, LLC; CONSOL Energy, Inc.; Louisville Gas and Electric Company and Kentucky Utilities Company (LG&E and KU); Peabody Energy Corporation; Rio Tinto Energy America; and Xstrata, PLC.

Purpose and Need for DOE Action

In pursuing the United States' goal of providing safe, affordable and clean energy for its citizens, coal plays an important role in the nation's energy supply. However, without carbon capture and sequestration, the combustion of coal and other fossil fuels leads to increased releases of CO_2 into the atmosphere. Because power plants are large stationary sources, it is generally considered to be more feasible to capture CO_2 from them and store it rather than attempting to capture it from mobile sources such as automobiles.

To this end, DOE has sought to support near-zero emissions technologies that would produce electric power from coal while permanently storing CO_2 in deep geologic formations. The technical, economic, and environmental feasibility of producing electric power from coal coupled with geologic storage technology must be proven. DOE believes that oxy-combustion technology has the potential to help open a market for repowering in many of the world's existing pulverized coal power plants. In the absence of the proven operation of a repowered, near-zero emissions plant, the contribution of coal to the nation's energy supply could be reduced. This could potentially increase the use of higher cost and/or nondomestic energy resources and impact the domestic economy as well as energy security.

Proposed Action

DOE proposes to provide financial assistance (approximately $1 billion) to Ameren and the Alliance to support implementation of their projects, which if successful would provide critical performance and emissions data as well as establish operating, permitting, maintenance, and other experience needed for future commercial deployment of these technologies.

The FutureGen 2.0 program seeks to continue the work of the original FutureGen project by advancing technology that can make the United States a world leader in carbon capture and storage (CCS). In formulating its proposal for FutureGen 2.0, DOE sought to reduce the project's overall cost by changing the technology from coal gasification to oxy-combustion. The inherent scalability of oxy-combustion technology allows a reduction in power plant size with substantial cost benefits. Studies by DOE's National Energy Technology Laboratory have identified oxy-combustion technology as a potentially cost-effective approach to implement carbon capture at existing coal-fueled facilities. It also has the potential for use in new power plants as well as in repowering a large cross-section of the world's existing pulverized coal plants.

The FutureGen 2.0 program would proceed through 2020 with design, construction, operation, and monitoring. Performance and economic test results would be shared among all participants, industry, the environmental community, and the public. The Alliance has an open membership policy to encourage the addition of other coal producers, coal users and coal equipment suppliers, both domestic and international. Consistent with the original FutureGen project, DOE encourages participation from international organizations to maximize the global applicability and acceptance of FutureGen 2.0's results, helping to support an international consensus on the role of coal and geologic storage in addressing global greenhouse gas emissions and energy security.

Oxy-Combustion Large Scale Test

For the Oxy-Combustion Large Scale Test, Ameren and its team would repower Unit 4 at Ameren's Meredosia Power Station in west central Illinois using advanced oxy-combustion technology. The oxy-combustion facility may be capable of running on a range of coals and operating conditions. The data generated would be used to expand the market for oxy-combustion technology. The project is also expected to provide performance and emissions data as well as establish operating and maintenance experience that will facilitate future large-scale commercial projects.

The scope of this test includes project definition, design, procurement, manufacture, installation, startup, commercial operation and testing of an integrated oxy-combustion coal boiler with CO_2 capture, purification, and compression. The plant would generate approximately 200 MWe gross with a net output estimated at approximately 140 MWe. The CO_2 would be cleaned, compressed for transport, and delivered to a terminal point for transfer to the Alliance's project.

Meredosia Power Station: The Meredosia Power Station is located adjacent to the east side of the Illinois River, south of Meredosia, Illinois, approximately 18 miles west of Jacksonville, Illinois. The plant includes four generating units, three of which are coal-fired and one of which is oil-fired. Unit 4, built in 1975, is an oil-fired unit that is currently idle. The steam turbine and generator have low operating hours and could be placed into service as part of the repowered oxy-combustion design. The station contains existing infrastructure that could support the operation of the oxy-combustion system including interconnection to the electrical grid, water supply and intake structures, wastewater outfalls, coal storage and handling areas, and barge and truck delivery systems for coal. The 5,300-foot western boundary of the 260-acre Meredosia Power Station fronts the Illinois River, where the station's oil and coal barge unloading facilities are located. The land immediately adjacent to the station on the north, northeast and southeast is railroad property; other immediately adjacent property is roadway. Beyond and in addition to the railroad property and roadways, land use is primarily residential to the north and northeast, scattered residential and agricultural to the east, and industrial to the south.

Oxy-Combustion Technology: This technology involves designing the power plant's boiler to combust coal with a mixture of nearly pure oxygen and recycled flue gas (which is primarily CO_2) rather than air. An air separation unit produces the oxygen. The concentrated stream of CO_2 that leaves the boiler would be ready for processing by environmental cleanup equipment (to remove other captured emissions) and the compression and purification unit. The concentrated and compressed CO_2 would then be transferred to a pipeline for transmission to the Alliance's storage location. The oxy-combustion technology during normal operations would produce near-zero emissions of oxides of nitrogen (NO_X), oxides of sulfur (SOx), mercury, particulate matter and other pollutants typical of a conventional coal-fired boiler. The plant would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent.

Pipeline and CO_2 Storage Reservoir

For the Pipeline and CO_2 Storage Reservoir project, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The Alliance's work involves selection of a suitable storage site, development of the subsurface storage field, development of CO_2 transport infrastructure (pipeline), and construction of the associated research and training facilities, including a visitor center. The Alliance has identified its preferred site in Morgan County, Illinois, for the injection facility, and two other sites (one in Christian County and one in Douglas County, Illinois) as potential alternate locations should the preferred site prove infeasible. The Alliance's preferred site for geologic storage in Morgan County, Illinois is approximately 30 miles from the Meredosia Power Station, and the Alliance's alternate sites in Christian County and Douglas County, Illinois are approximately 75 and 125 miles from the plant site, respectively. All three sites would be evaluated in the EIS unless DOE determines that they are not reasonable alternatives.

The Alliance would construct a pipeline to transport CO_2 from the Meredosia Power Station to the selected storage site where it would be injected through deep wells into the target geologic formation. The pipeline and storage reservoir would be designed to inject and store approximately 39 million metric tons over a 30-year operating period. Depending on stakeholder and landowner acceptance, the Alliance may also consider other sources of CO_2 in addition to that from Ameren's plant for injection. Research would include site characterization, injection and storage, and CO_2 monitoring and measurement.

The target formation for CO_2 injection and storage is the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline formations. The formation's positive characteristics for CO_2 storage include its isolation from other strata, as well as its depth, lateral continuity, and relative permeability. The Mount Simon is bounded below by a Pre-Cambrian igneous rock and above by the Eau Claire formation, which is a mixture of tightly layered shales with low permeability, as well as by secondary caprock formations above the Eau Claire. The Alliance would implement a monitoring, verification, and accounting (MVA) program to monitor the injection and storage of CO_2 within the geologic formations to verify that it stays within the target formation. The MVA program would meet injection control permitting and requirements that DOE may impose. In accordance with the Safe Drinking Water Act, the Alliance would be required to obtain a Class VI underground injection control permit from the U.S. Environmental Protection Agency. The MVA program consists of the following components: (1) Injection system monitoring; (2) containment monitoring (via monitoring wells, mechanical integrity testing, and other means); (3) CO_2 plume tracking via multiple techniques; (4) CO_2 injection simulation modeling; and (5) perhaps new experimental techniques not yet in practice.

Proposed Project Schedules

The Oxy-Combustion Large Scale Test would initiate operations (including CO_2 capture, purification and compression) in 2016 and complete federally-funded project activities (operational testing) in 2018. The Pipeline and CO_2 Storage Reservoir would become operational at the same time (2016) and complete federally-funded project activities (operational testing and two-years of additional federally-funded MVA activities) in 2020. CO_2 capture, pipeline transport, injection, and MVA activities are expected to operate (without federal funding) for approximately 30 years. MVA activities would take place during injection and continue beyond its cessation as prescribed by regulatory requirements. The schedule is contingent upon Ameren and the Alliance receiving the necessary permits and regulatory approvals, as well as financial closing on all the necessary funding sources, including DOE's financial assistance. DOE's proposal to provide full financial assistance for detailed design, procurement of equipment, construction, and operations is contingent upon DOE's completion of the NEPA process, and achievement of the permitting and financial requirements listed above by Ameren and the Alliance.

Connected and Cumulative Actions

The components of the FutureGen 2.0 program will be evaluated individually and collectively within the EIS. Although injection of other sources of CO_2 is not currently proposed, such injection is reasonably foreseeable and will be evaluated in the EIS. DOE will also consider the cumulative impacts of the program, which will include the analysis of emissions (including greenhouse gas emissions) and other incremental impacts. Cumulative impacts are impacts on the environment which result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions.

Alternatives

NEPA requires that an EIS evaluate the range of reasonable alternatives to an agency's proposed action. DOE's range of reasonable alternatives includes the No Action Alternative, which is to withhold financial assistance for the FutureGen 2.0 program, and the Action Alternative, which is to provide financial assistance to the FutureGen 2.0 program.

DOE has developed the range of reasonable alternatives for FutureGen 2.0 program based on evaluation of various clean coal technologies through the Clean Coal Power Initiative program; analysis of the original FutureGen Project in terms of technology, costs, and suitability for geologic storage; data obtained and reviewed through various funding opportunity announcements; data obtained for the original FutureGen Project and a related project called Restructured FutureGen; and the interest of industry to participate in projects to support FutureGen 2.0 based on these evaluations. In particular, DOE's current proposal to advance the programmatic goal of CO_2 storage in the

Mount Simon Formation in Illinois through the FutureGen Program was addressed in its *Final Environmental Impact Statement for the FutureGen Project* (DOE/EIS–0394 [November 2007]) and associated Record of Decision (74 FR 35174 (2009)).

Through review and consideration of these data and analysis, the repowering of an existing power plant with oxy-combustion technology was identified as the approach that would meet cost and technology advancement objectives of FutureGen Program. Furthermore, DOE determined that due to cost and technical advantages obtained through efforts conducted by the FutureGen Alliance under the original FutureGen Project, that the Alliance's choice of geologic storage formations would be limited to the Mount Simon Formation. Given these factors, reasonable alternatives were limited to potential oxy-combustion repowering projects at a location from which it would remain economically viable to transport captured CO_2 for injection into the Mount Simon Formation.

The range of reasonable alternatives for a financial assistance project that is proposed by industrial participants is limited to the alternatives or project options under consideration by the participants or that are reasonable within the confines of the project as proposed (*e.g.*, the particular location of the processing units, pipelines, injection sites on land proposed for the project, and potential measures to mitigate potential environmental impacts) and a "no-action" alternative. Regarding the no action alternative, DOE assumes for purposes of the EIS that, if DOE decides to withhold financial assistance, the project would not proceed.

DOE will evaluate the two projects that constitute the FutureGen 2.0 program with and without any mitigating conditions that DOE may identify as reasonable and appropriate. Alternatives considered in developing respective components of the proposed FutureGen 2.0 program and eliminated from further consideration will also be discussed in the EIS.

The sequestration site would be designed to accept and store at a minimum the CO_2 captured at Ameren's Meredosia Power Station over its 30-year design life. The Alliance undertook a site selection process in October 2010 with the issuance of a Request for Proposals seeking a site upon which the Alliance would construct and operate the CO_2 storage project. The Alliance hosted two public meetings, one for prospective site offerors and a subsequent meeting for the general public, on October 28, 2010, in Springfield, Illinois. Representatives for 16 proposed sites attended the meeting, and the Alliance received proposals from six sites in November 2010. In December 2010, the Alliance selected four of the six sites for further evaluation and subsequently identified three candidate sites, one preferred and two alternates, which will be evaluated in the EIS.

DOE will also consider a no-action alternative whereby the Department would not fund the FutureGen 2.0 program and the project would not proceed. In the absence of DOE funding, it would be unlikely that the project proponents, or industry in general, would soon undertake the utility-scale integration of CO_2 capture and geologic storage with a coal-fired power plant repowered with oxy-combustion. Absent DOE's investment in a utility-scale facility, the development of oxy-combustion repowered plants integrated with CO_2 capture and geologic storage would occur more slowly or not at all.

Decision Making Process

DOE will consider public scoping comments in preparing a Draft EIS, which will be issued for public comment. DOE will consider public comments on the Draft EIS and respond as appropriate in the Final EIS. No sooner than 30 days following completion of the Final EIS, DOE would announce its decision regarding whether to provide financial assistance to these projects in a Record of Decision (ROD). If DOE decides to provide financial assistance, the Alliance would develop its pipeline and storage site. Similarly, Ameren would proceed with detailed design and construction activities at the Meredosia site.

Floodplains and Wetlands

Activities required to implement the FutureGen 2.0 program, such as those required to repower Unit 4 at the Meredosia Power Station, would be undertaken to avoid or minimize potential impacts to wetlands or floodplains. The Meredosia Power Station site includes low lying areas to the west, north, and south, which are located in the floodplain. However, the existing generating units as well as proposed locations for the new oxy-combustion unit are located above the floodplain elevation. Any wetland and floodplain impacts that might result from installation of monitoring and injection wells, or the construction of CO_2 pipelines or other linear features required for this program, will be described in the EIS. In the event that DOE were to identify wetlands and floodplains that would be affected by the FutureGen 2.0 program as a result of pipelines, injection facilities, or connected actions, DOE would prepare a floodplain and wetland assessment in accordance with its regulations at 10 CFR Part 1022, and include the assessment in the Draft EIS.

Preliminary Identification of Environmental Issues

DOE intends to address the issues listed below when considering the potential impacts resulting from the construction and operation of the proposed FutureGen 2.0 program and any connected actions. This list is neither intended to be all-inclusive, nor a predetermined set of potential impacts. DOE invites comments on whether this is an appropriate list of issues that should be considered in the EIS. The preliminary list of potentially affected resources or activities and their related environmental issues includes:

Air quality resources: Potential air quality impacts from emissions during construction and operation of the repowered Unit 4 at the Meredosia plant or CCS facilities and other related facilities on local or regional air quality;

Climate change: Potential impacts from emissions of CO_2 and other greenhouse gas emissions;

Water resources: Potential impacts from water utilization and consumption, plus potential impacts from stream crossings and wastewater discharges;

Infrastructure and land use: Potential environmental and socioeconomic impacts associated with the project, including delivery of feed materials and distribution of products (*e.g.*, access roads, pipelines);

Visual resources: Potential impacts to the view shed, scenic views (*e.g.*, impacts from the injection wells, pipelines, and support facilities for the injection wells and pipelines), and perception of the community or locality;

Solid wastes: Pollution prevention and waste management issues (generation, treatment, transport, storage, disposal or use), including potential impacts from the generation, treatment, storage, and management of hazardous materials and other solid wastes;

Biological resources: Potential impacts to vegetation, wildlife, threatened or endangered species, and ecologically sensitive habitats;

Floodplains and wetlands: Potential wetland and floodplain impacts from construction of project facilities;

Traffic: Potential impacts from the construction and operation of the facilities, including changes in local traffic patterns, deterioration of roads, traffic hazards, and traffic controls;

Historic and cultural resources: Potential impacts related to site development and the associated linear facilities (*e.g.*, pipelines);

Geology: Potential impacts from the injection and storage of CO_2 on underground resources such as ground water supplies, mineral resources, and fossil fuel resources, and the fate and stability of CO_2 being stored;

Health and safety issues: Potential impacts associated with use, transport, and storage of hazardous chemicals, as well as CO_2 capture and transport to the sequestration site;

Socioeconomics: Potential impacts to schools, housing, public services, and local revenues, including the creation of jobs;

Environmental justice: Potential for disproportionately high and adverse impacts on minority and low-income populations;

Noise and light: Potential disturbance impacts from construction, transportation of materials, and facility operations;

Connected actions: Potential impacts from the integrated operations of the oxy-combustion project and sequestration project, as well as potential development of support facilities or supporting infrastructure;

Cumulative effects that could result from the incremental impacts of the proposed project when added to other past, present, and reasonably foreseeable future actions;

DOE will also address compliance with regulatory and environmental permitting requirements and environmental monitoring plans associated with the carbon capture facility and CO_2 geologic storage activities.

Public Scoping Process

This Notice of Intent initiates the scoping process under NEPA, which will guide the development of the Draft EIS. To ensure identification of issues related to DOE's proposed action with respect to the proposed FutureGen 2.0 program, DOE seeks public input to define the scope of the EIS. The public scoping period will end June 22, 2011. Interested government agencies, Native American Tribes, private-sector organizations, and the general public are encouraged to submit comments or suggestions concerning the content of the EIS, issues and impacts that should be addressed, and alternatives that should be considered. Scoping comments should clearly describe specific issues or topics that the EIS should address. Written, e-mailed, or faxed comments should be received by June 22, 2011 (see ADDRESSES). DOE will consider late comments to the extent practicable.

DOE will conduct public scoping meetings according to the following schedule:

June 7, 2011—Taylorville High School, 815 W. Springfield Road, Taylorville, IL 62568.

June 8, 2011—Ironhorse Golf Club, 2000 Ironhorse Drive, Tuscola, IL 61953.

June 9, 2011—The Jacksonville Elks Lodge, 231 West Morgan Street, Jacksonville, IL 62650.

Each public scoping meeting will include an informal session from 5 to 7 p.m, followed by a formal presentation at 7 p.m.

Oral comments will be heard during the formal portion of the scoping meetings. The public is also invited to learn more about the project at an informal session at each location. DOE requests that anyone who wishes to speak at the public scoping meetings should contact Mr. Whyte, either by phone, e-mail, fax, or postal mail (see ADDRESSES).

Those who do not arrange in advance to speak may register at the meeting (preferably at the beginning of the meeting) and would be given an opportunity to speak after previously scheduled speakers. Speakers will be given approximately five minutes to present their comments. Those speakers who want more than five minutes should indicate the length of time desired in their request. Depending on the number of speakers, DOE may need to limit all speakers to five minutes initially and provide additional opportunity as time permits. Individuals may also provide written materials in lieu of, or supplemental to, their presentations. DOE will give equal consideration to oral and written comments.

DOE will begin the formal meeting with an overview of the proposed FutureGen 2.0 program. The meeting will not be conducted as an evidentiary hearing, and speakers will not be cross-examined. However, speakers may be asked questions to help ensure that DOE fully understands the comments or suggestions. A presiding officer will establish the order of speakers and provide any additional procedures necessary to conduct the meeting. A stenographer will record the proceedings, including all oral comments received.

Issued in Washington, DC, this 18th day of May 2011.

Charles D. McConnell,

Chief Operating Officer, Office of Fossil Energy.

[FR Doc. 2011–12632 Filed 5–20–11; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Environmental Management Site-Specific Advisory Board, Oak Ridge Reservation

AGENCY: Department of Energy.

ACTION: Notice of open meeting.

SUMMARY: This notice announces a meeting of the Environmental Management Site-Specific Advisory Board (EM SSAB), Oak Ridge Reservation. The Federal Advisory Committee Act (Pub. L. 92–463, 86 Stat. 770) requires that public notice of this meeting be announced in the **Federal Register**.

DATES: Wednesday, June 8, 2011, 6 p.m.

ADDRESSES: DOE Information Center, 475 Oak Ridge Turnpike, Oak Ridge, Tennessee 37830.

FOR FURTHER INFORMATION CONTACT: Patricia J. Halsey, Federal Coordinator, Department of Energy Oak Ridge Operations Office, P.O. Box 2001, EM–90, Oak Ridge, TN 37831. Phone (865) 576–4025; Fax (865) 576–2347 or e-mail: *halseypj@oro.doe.gov* or check the Web site at *http://www.oakridge.doe.gov/em/ssab.*

SUPPLEMENTARY INFORMATION:

Purpose of the Board: The purpose of the Board is to make recommendations to DOE–EM and site management in the areas of environmental restoration, waste management, and related activities.

Tentative Agenda: The main meeting presentation will be on the 2011 Oak Ridge Reservation Remediation Effectiveness Report and the upcoming CERCLA Five-Year Review.

Public Participation: The EM SSAB, Oak Ridge, welcomes the attendance of the public at its advisory committee meetings and will make every effort to accommodate persons with physical disabilities or special needs. If you require special accommodations due to a disability, please contact Patricia J. Halsey at least seven days in advance of the meeting at the phone number listed above. Written statements may be filed with the Board either before or after the meeting. Individuals who wish to make oral statements pertaining to the agenda item should contact Patricia J. Halsey at the address or telephone number listed

INTENTIONALLY LEFT BLANK

APPENDIX B

Consultation Letters

B1 – Native American Tribal Consultation

B2 – Protected Species Consultation

B3 – Cultural Resources Consultation

for the

Draft Environmental Impact Statement
FutureGen 2.0 Project
Meredosia, Illinois (Morgan County)

DOE/EIS-0460D
April 2013

INTENTIONALLY LEFT BLANK

Appendix B

Consultation Letters

In the course of preparing this EIS, interaction efforts among state and federal agencies were necessary to discuss issues of concern or other interests that could be affected by the proposed project, obtain information pertinent to the environmental impact analysis of the proposed project, and initiate consultations or permit processes. Following are the consultation letters sent to the various agencies accompanied by the agency responses, when responses were received. The appendix is organized as follows:

B1 – Native American Tribal Consultation (Peoria Tribe of Indians of Oklahoma, Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas, Kickapoo Tribe of Oklahoma, Kickapoo Traditional Tribe of Texas, Prairie Band of the Potawatomi Nation, Ho-Chunk Nation of Wisconsin, Iowa Tribe of Kansas & Nebraska, Osage Nation, Kaw Nation, Citizen Potawatomi Nation, Forest County Potawatomi Community, Hannahville Indian Community, Pokagon Band of Potawatomi Indians, Sac and Fox Tribe of the Mississippi in Iowa, Sac and Fox Nation of Missouri in Kansas and Nebraska, Sac and Fox Nation of Oklahoma, Delaware Nation, Oklahoma, Miami Tribe of Oklahoma)

B2 – Protected Species Consultation (U.S. Fish and Wildlife Service, Marion Illinois Sub-office)

B3 – Cultural Resources Consultation (Illinois Historic Preservation Agency, State Historic Preservation Office)

INTENTIONALLY LEFT BLANK

APPENDIX B1

NATIVE AMERICAN TRIBAL CONSULTATION

INTENTIONALLY LEFT BLANK

July 18, 2011

Mr. Thomas E. Gamble
Chief
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Gamble:

The U.S. Department of Energy (DOE) issued a Notice of Intent on May 23, 2011 to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in the notice, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Ms. Janice Rowe-Kurak
Chairperson
Iowa Tribe of Oklahoma
Rt. 1, Box 721
Perkins, OK 74059

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Ms. Rowe-Kurak:

The U.S. Department of Energy (DOE) issued a Notice of Intent on May 23, 2011 to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in the notice, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. David K. Sprague
Chairperson
Match-e-be-nash-she-wish Band of Pottawatomi Indians of Michigan
P.O. Box 218
Dorr, MI 49323

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Sprague:

The U.S. Department of Energy (DOE) issued a Notice of Intent on May 23, 2011 to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in the notice, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Homer A. Mandoka
Chairperson
Nottawaseppi Huron Band of the Potawatomi, Michigan
2221 - 1 1/2 Mile Rd
Fulton, MI 49052

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Mandoka:

The U.S. Department of Energy (DOE) issued a Notice of Intent on May 23, 2011 to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in the notice, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. George Blanchard
Governor
Absentee-Shawnee Tribe of Indians of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee, OK 74801

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Blanchard:

The U.S. Department of Energy (DOE) issued a Notice of Intent on May 23, 2011 to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in the notice, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Ms. Glenna J. Wallace
Chief
Eastern Shawnee Tribe of Oklahoma
P.O. Box 350
Seneca, MO 64865

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Ms. Wallace:

The U.S. Department of Energy (DOE) issued a Notice of Intent on May 23, 2011 to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in the notice, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Ron Sparkman
Chief
The Shawnee Tribe
P.O. Box 189
Miami, OK 74354

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Sparkman:

The U.S. Department of Energy (DOE) issued a Notice of Intent on May 23, 2011 to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in the notice, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Frank Hecksher
Special Projects Manager
Peoria Tribe of Indians of Oklahoma
P.O. Box 1527
118 S. Eight Tribes Trail
Miami, OK 74355

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Hecksher:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline

geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Russell Bradley
Chairman
Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas
P.O. Box 271
1107 Goldfinch Road
Horton, KS 66439

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Bradley:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline

geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Gilbert Salazar
Chairman
Kickapoo Tribe of Oklahoma
P.O. Box 70
407 North Hwy. 102
McCloud, OK 74851

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Salazar:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline

geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Juan Garza , Jr.
Chairman
Kickapoo Traditional Tribe of Texas
HC 1, Box 9700
Eagle Pass, TX 78852

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Garza , Jr.:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Steve Ortiz
Chairman
Prairie Band of the Potawatomi Nation
16281 Q Road
Mayetta, KS 66509-8970

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Ortiz:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Wilfrid Cleveland
President
Ho-Chunk Nation of Wisconsin
P.O. Box 667
W9814 Airport Road
Black River Falls, WI 54615

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Cleveland:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline

geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Timothy Rhodd
Chairman
Iowa Tribe of Kansas & Nebraska
3345 B Thrasher Road
White Cloud, KS 66094

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Rhodd:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. John D. Red Eagle
Principal Chief
Osage Nation
P.O. Box 779
627 Grandview
Pawhuska, OK 74056

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Red Eagle:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline

geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Guy Gene Munroe
Chairman
Kaw Nation
698 Grandview Drive
Kaw City, OK 74641

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Munroe:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. John A. Barrett
Chairman
Citizen Potawatomi Nation
1601 S. Gordon Cooper Drive
Shawnee, OK 74801

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Barrett:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Frank Harold
Chairman
Forest County Potawatomi Community
P.O. Box 340
5416 Everybody's Road
Crandon, WI 54520

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Harold:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline

geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Kenneth Meshigaud
Chairman
Hannahville Indian Community
N14911 Hannahville B1 Rd.
Wilson, MI 49896-9728

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Meshigaud:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Matthew Wesaw
Chairman
Pokagon Band of Potawatomi Indians
P.O. Box 180
58620 Sink Road
Dowagiac, MI 49047

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Wesaw:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline

geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. Adrian Pushetonequa
Chairman
Sac and Fox Tribe of the Mississippi in Iowa
349 Meskwaki Road
Tama, IA 52339-9629

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Pushetonequa:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Ms. Twen Barton
Chairwoman
Sac and Fox Nation of Missouri in Kansas and Nebraska
305 N. Main Street
Reserve, KS 66434

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Ms. Barton:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Mr. George Thurman
Principal Chief
Sac and Fox Nation of Oklahoma
920883 S. Highway 99, Bldg. A
Stroud, OK 74079

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Thurman:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

July 18, 2011

Ms. Tamara Francis
Delaware Nation, Oklahoma
P.O. Box 825
Anadarko, OK 73005

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Ms. Francis:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified your tribal government of the department's intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide you with the best available project information and to determine whether your tribe has an interest in the lands potentially affected and wishes to engage in government-to-government consultations in accordance with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, and DOE's American Indian and Alaskan Native Policy.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler, which may result in a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County, Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas

County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

We are very interested in receiving your comments on the proposed action and accommodating your wishes for further consultation and coordination. Your active participation in this ongoing consultation process will be facilitated if we receive a written response on behalf of your tribal government. If you require any additional information, please do not hesitate to contact me via (cliff.whyte@netl.doe.gov) or phone (304-285-2098). Thank you for your assistance.

Sincerely,

Cliff D. Whyte

Cliff Whyte
NEPA Compliance Officer

Attachments

TRADITIONAL COUNCIL

CHAIRMAN
Juan Garza, Jr., Kisisika

SECRETARY
Jesus Anico, Chakodata

TREASURER
Rogelio Elizondo, Apichicuea

MEMBERS
David J. Gonzalez, Kikekideah
Nanate Hernandez, Nanatea

KICKAPOO
TRADITIONAL TRIBE OF TEXAS

HCR 1 Box 9700
Eagle Pass, Texas 78852

Traditional Council

August 3, 2011.

Cliff Whyte
NEPA Compliance Officer.
3610 Collins Ferry Road
PO Box 880
Morgantown, WV 26507

Re: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Sir:

Thank you for your letter dated July 18, 2011, regarding FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460).

Thank you for advising us about the proposed action. The Kickapoo Nation values its traditions and customs so we appreciate your taking the time to ask for our input in this matter. By keeping the lines of communication open we can peacefully co-exist yet attend to our respective businesses.

We do not have any questions or concerns regarding the information within your letter as we are unaware of any tribal sites in this area, therefore it does not affect our interests in any way. Furthermore, the Kickapoo Traditional Tribe of Texas wishes you success in your endeavor.

Should you have any further questions please do not hesitate to contact us.

Juan Garza, Jr., Chairman

From:	Cliff Whyte
To:	Cynthia Ong; Fred Carey
Cc:	Lucy Swartz
Subject:	Fwd: FutureGen 2.0 Program Environmental Impact Statement; Morgan,Christian, and Douglas Counties, Illinois(DOE/EIS-0460)
Date:	Tuesday, November 22, 2011 12:56:00 PM

Please add this to the administrative record.

Thanks
Cliff

****
Cliff Whyte, General Engineer
U.S. Department of Energy
National Energy Technology Laboratory

304-285-2098 Office
cliff.whyte@netl.doe.gov

>>> "George Strack" <gstrack@miamination.com> 11/22/2011 12:46 PM >>>

November 22, 2011

Cliff Wyhte

NEPA Compliance Officer

National Energy Technology Laboratory

3610 Collins Ferry Road

PO Box 880

Morgantown, WV 26507

Re: FutureGen 2.0 Program Environmental Impact Statement; Morgan,Christian, and Douglas Counties, Illinois(DOE/EIS-0460)

Aya, kikwehsitoole. My name is George Strack and I am the Tribal Historic Preservation Officer for the Federally Recognized Miami Tribe of Oklahoma. In this capacity, I am the Miami Nation's point of contact for all Section 106 issues.

In reference to the above mentioned construction project, the Miami Nation is not currently aware of existing documentation directly linking a specific Miami cultural or historic site to the above referenced construction site. However, as this site is within the homelands of the Miami Nation, should any human remains or Native American cultural objects falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or anthropological evidence be discovered during any phase of this specific project, the Miami Nation requests immediate consultation with the entity of jurisdiction specific to the location of discovery.

The Miami Nation offers no objection to the proposed construction at this time. However, again, should human remains and/or objects be uncovered, regardless of initial determination as to site dating or cultural affiliation, please contact me at 317-625-1288 or by mail at the address listed below to initiate consultation.

Sincerely,

George J. Strack

Tribal Historic Preservation Officer

Miami Tribe of Oklahoma

PO Box 1326

Miami, OK 74355

gstrack@miamination.com

INTENTIONALLY LEFT BLANK

APPENDIX B2

PROTECTED SPECIES CONSULTATION

INTENTIONALLY LEFT BLANK

NATIONAL ENERGY TECHNOLOGY LABORATORY
Albany, OR • Morgantown, WV • Pittsburgh, PA

U.S. DEPARTMENT OF ENERGY

July 18, 2011

Mr. Matt Mangan
Biologist
Marion Illinois Suboffice
Fish and Wildlife Service, U.S. Department of the Interior
8588 Route 148
Marion, IL 62959

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Mr. Mangan:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified the Fish and Wildlife Service of its intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 Program. As described in that letter, the FutureGen 2.0 Program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide the best available project information and to initiate consultation with your office for conformance with the National Environmental Policy Act (NEPA), the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler and the main boiler igniters, which, if realized, would require a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

DOE's contractor for the EIS, Potomac-Hudson Engineering, Inc. (PHE), will support the consultations for the respective laws, and a representative from PHE will contact your office soon. PHE will be obtaining data for inclusion in the EIS. Please note that representatives from Ameren and the Alliance may also periodically contact your office as they continue to develop the project. We are very interested in receiving your comments on the proposed action and your assistance with the EIS. We would appreciate your response within thirty days of the date of this letter. If you require any additional information, please do not hesitate to contact me via email (cliff.whyte@netl.doe.gov) or phone (304-285-2098). We look forward to your support.

Sincerely,

Cliff Whyte
NEPA Compliance Officer

Attachments

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Marion Illinois Sub-Office (ES)
8588 Rout 148
Marion, IL 62959
(618) 997-3344

August 16, 2011

Mr. Cliff Whyte
U.S. Department of Energy
National Energy Technology Laboratory
3610 Collins Ferry Road, P.O. Box 880
Morgantown, WV 26507

Dear Mr. Whyte:

This is in response to your letter requesting preliminary comments on the proposed FutureGen 2.0 Program. The proposed program consists of an oxy-combustion large scale test and a pipeline and CO_2 storage reservoir component. The oxy-combustion large scale test and the preferred CO_2 storage reservoir site are located in Morgan County, Illinois. The two alternative CO_2 storage reservoir sites are located Christian, and Douglas Counties Illinois. These comments are provided under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); the Endangered Species Act of 1973, as amended; and, the National Environmental Policy Act.

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain from the Fish and Wildlife Service (Service) information concerning any species, listed or proposed to be listed, which may be present in the area of a proposed action. Therefore, we are furnishing you the following list of species which have ranges that include the oxy-combustion large scale test, preferred CO_2 storage reservoir, and two alternative CO_2 storage reservoir areas (Morgan, Christian, and Douglas Counties) and have included background information for each species in an attachment:

Classification	Common Name (Scientific Name)	Habitat
Endangered	Indiana bat (*Myotis sodalis*)	Caves, mines; small stream corridors with well developed riparian woods; upland and bottomland forests
Proposed as Endangered	Snuffbox (*Epioblasma triquetra*)	Small to medium-sized creeks and some larger rivers, in areas with a swift current

Classification	Common Name (Scientific Name)	Habitat
Threatened	Decurrent false aster (*Boltonia decurrens*)	Disturbed alluvial soils
Threatened	Eastern prairie fringed orchid (*Platanthera leucophaea*)	Mesic to wet prairies

There is no designated critical habitat in the project area at this time.

For additional information you can go to our technical assistance website at the first link below which provides Section 7 consultation guidance for Federal agencies and their applicants (i.e. project proponents). From there you can go through the step-by-step instructions for the section 7(a)(2) consultation process. You will find information on threatened and endangered species and list of species by county (second link below) along with other information on the consultation process. By following the instructions, you can determine what your action area is, whether listed species may be found within the action area, and if the project may affect listed species. I have also included the third link below which includes a map showing the area of responsibility for our office and that of our Rock Island Field office which covers a portion of the proposed project.

http://www.fws.gov/midwest/endangered/section7/s7process/index.html

http://www.fws.gov/midwest/endangered/lists/illinois-cty.html

http://www.fws.gov/midwest/endangered/lists/illinoisfos.html

In developing the proposed project we would recommend that impacts to wetlands be avoided or impacts minimized to the greatest extent possible. We would also recommend that any tree clearing be minimized or avoided if possible to reduce impacts to potential habitat for the Indiana bat and migratory birds.

Thank you for the opportunity to provide preliminary comments on the proposed project. If you have any questions, please contact Matt Mangan of my staff at (618) 997-3344, ext. 345.

Sincerely,

/s/ Matthew T. Mangan

For Joyce A. Collins
Assistant Field Supervisor

FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES INFORMATION FOR MORGAN, CHRISTIAN, AND DOUGLAS COUNTIES, ILLINOIS

The endangered **Indiana bat** (*Myotis sodalis*) has been noted as occurring in several Illinois counties. Potential habitat for this species occurs statewide, therefore, Indiana bats are considered to potentially occur in any area with forested habitat. Indiana bats migrate seasonally between winter hibernacula and summer roosting habitats. Winter hibernacula include caves and abandoned mines. Females emerge from hibernation in late March or early April to migrate to summer roosts. Females form nursery colonies under the loose bark of trees (dead or alive) and/or in cavities, where each female gives birth to a single young in June or early July. A maternity colony may include from one to 100 individuals. A single colony may utilize a number of roost trees during the summer, typically a primary roost tree and several alternates. Some males remain in the area near the winter hibernacula during the summer months, but others disperse throughout the range of the species and roost individually or in small numbers in the same types of trees as females. The species or size of tree does not appear to influence whether Indiana bats utilize a tree for roosting provided the appropriate bark structure is present. However, the use of a particular tree does appear to be influenced by weather conditions, such as temperature and precipitation.

During the summer, Indiana bats frequent the corridors of small streams with well-developed riparian woods, as well as mature bottomland and upland forests. It forages for insects along stream corridors, within the canopy of floodplain and upland forests, over clearings with early successional vegetation (old fields), along the borders of crop lands, along wooded fence rows, and over farm ponds and in pastures. It has been shown that the foraging range for the bats varies by season, age and sex and ranges up to 81 acres (33 ha). To avoid impacting the species, tree clearing activities should not occur during the period of April 1 to September 30. If a proposed action occurs within a 5-mile radius of a winter hibernacula, tree clearing should be prohibited from April 1 to November 15. If it is necessary to clear trees during this time frame, mist net surveys may be necessary to determine if Indiana bats are present. A search for this species should be made prior to cave impacting activities.

The **snuffbox** (*Epioblasma triquetra*) is proposed as endangered and is listed as occurring in the Kankakee and Embarrass Rivers, which includes Coles, Cumberland, Douglas, Kankakee, and Will Counties, Illinois. The species prefers small to medium-sized creeks and some larger rivers, in areas with a swift current.

The **decurrent false aster** (*Boltonia decurrens*) is listed as threatened and is known to occur in several Illinois counties in the floodplain of the Illinois and Mississippi River. It is considered to potentially occur in any county bordering the Illinois River and Jersey, Madison and St. Clair Counties bordering the Mississippi River. It occupies disturbed alluvial soils in the floodplains of these rivers. Federal regulations prohibit any commercial activity involving this species or the destruction, malicious damage or removal of this species from Federal land or any other lands in knowing violation of State law or regulation, including State criminal trespass law.

The **eastern prairie fringed orchid** (*Platanthera leucophaea*) is listed as threatened and occurs in several Illinois counties. It occupies wet grassland habitats. Federal regulations prohibit any commercial activity involving this species or the destruction, malicious damage or removal of this species from Federal land or any other lands in knowing violation of State law or regulation, including State criminal trespass law. This species should be searched for whenever wet prairie remnants are encountered.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Marion Illinois Sub-Office (ES)
8588 Rout 148
Marion, IL 62959
(618) 997-3344

January 6, 2012

Mr. Ken Humphreys, CEO
FutureGen Alliance, Inc.
1101 Pennsylvania Avenue NW
Sixth Floor
Washington, D.C. 20004

Dear Mr. Humphreys:

We have reviewed the Protected Species Survey Report prepared by Specialized Ecological Services for the FutureGen Industrial Alliance, Incorporated Soil-Gas Monitoring and Meteorological Tower Project located in Morgan County, Illinois. The proposed project involves the installation of a meteorological tower and soil-gas collection network in support of the FutureGen 2.0 Morgan County carbon sequestration site. These comments are provided under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.); the Endangered Species Act of 1973, as amended; and the National Environmental Policy Act.

Information in the letter indicates that a field survey revealed that no suitable habitat for the decurrent false aster (*Boltonia decurrens*) and Indiana bat (*Myotis sodalis*) exists within the proposed project area, thus you have determined the proposed project will have no effect on either species. The field survey also revealed the eastern prairie fringed orchid is not present within the project area, thus you have determined the proposed project will have no effect on the eastern prairie fringed orchid. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should the project be modified, or new information indicates listed or proposed species may be affected, consultation or additional coordination with this office as appropriate, should be initiated.

Thank you for the opportunity to review the proposed project. If you have any questions, please contact Matt Mangan of my staff at (618) 997-3344, ext. 345.

Sincerely,

/s/ Matthew T. Mangan

For Joyce A. Collins
Assistant Field Supervisor

cc: Mr. Robert O. Rinella, Specialized Ecological Services
Ms. Amanda Stegen, Battelle
Mr. Cliff Whyte, USDOE
Mr. Tyson Zobrist, USACE

APPENDIX B3

CULTURAL RESOURCES CONSULTATION

INTENTIONALLY LEFT BLANK

Illinois Historic
Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

Morgan County PLEASE REFER TO: IHPA LOG #004042811
Prentice
IL Route 123 at Beilschmidt Road going West on Beilschmidt Road, then South along Beilschmidt Road then East to Site
Site Characterization Locale, FutureGen Industrial Alliance, Inc.

June 1, 2011

Joseph P. Craig
Prairie Archaeology and Research
Post Office Box 5603
Springfield, IL 62705

Dear Sir:

Acre(s): 15.3 Site(s): 0
Archaeological Contractor: PAR/Craig

Thank you for submitting the results of the archaeological reconnaissance. Our comments are required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

Our staff has reviewed the archaeological Phase I reconnaissance report performed for the project referenced above. The Phase I survey and assessment of the archaeological resources appear to be adequate. Accordingly, we have determined, based upon this report, that no significant historic, architectural, and archaeological resources are located in the project area.

Please submit a copy of this letter with your application to the state or federal agency from which you obtain any permit, license, grant, or other assistance. Please retain this letter in your files as evidence of compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. This clearance remains in effect for two years from date of issuance. It does not pertain to any discovery during construction, nor is it a clearance for purposes of the Illinois Human Skeletal Remains Protection Act (20 ILCS 3440).

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

A teletypewriter for the speech/hearing impaired is available at 217-524-7128. It is not a voice or fax line.

July 18, 2011

Ms. Anne Haaker
Deputy State Historic Preservation Officer
Preservation Services Division
Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, IL 62701-1507

SUBJECT: FutureGen 2.0 Program Environmental Impact Statement; Morgan, Christian, and Douglas Counties, Illinois (DOE/EIS-0460)

Dear Ms. Haaker:

In a letter dated May 24, 2011, the U.S. Department of Energy (DOE) notified the Illinois State Historic Preservation Officer of its intent to prepare an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in Federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 program. As described in that letter, the FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren Energy Resources (Ameren) and a Pipeline and CO_2 Storage Reservoir component undertaken by the FutureGen Alliance (Alliance). Additional information is now available on the extent of lands that may be affected by the proposed action. The purpose of this correspondence is to provide the best available project information and to initiate consultation with your office for conformance with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA), particularly 36 CFR 800.4.

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren's Meredosia Power Station in west central Illinois. The process would be designed to capture approximately 1.3 million metric tons of CO_2 per year from the oxy-combustion system and is targeted to achieve a CO_2 capture rate exceeding 90 percent. Information about the project component is available at Ameren's website: www.ameren.com/CommunityMembers/Environment/Pages/FutureGenProject.aspx. In addition, there is the potential that natural gas would be required as fuel for the auxiliary boiler and the main boiler igniters, which, if realized, would require a new natural gas pipeline. The pipeline would be constructed within a 70-foot wide right-of-way (ROW) and located within a permanent 20-foot wide easement. Attachment 1 is an illustration of the Meredosia Power Station site showing areas where land would be disturbed both for temporary features and staging areas during construction and for permanent structures to support operations. Attachment 2 is an illustration of potential routes for the natural gas pipeline.

For the Pipeline and CO_2 Storage Reservoir, the Alliance would design, construct, and operate a transmission pipeline and geologic injection and storage facility. The CO_2 captured at Ameren's facility would be transported via the pipeline to the selected storage site where it would be injected through deep wells into the Mount Simon sandstone formation, which is one of the Illinois Basin's major deep saline geologic formations. The Alliance has identified its preferred sequestration site in Morgan County,

Illinois, and has identified two alternative sites, one in Christian County, Illinois and one in Douglas County, Illinois. Information about this project component is available at the Alliance's website: www.futuregenalliance.org. Attachment 3 is an illustration showing the location of the Meredosia Power Station, the preferred and alternative CO_2 storage sites, and the alternative 4-mile wide corridors in which the CO_2 transmission pipeline may be constructed depending upon the storage site selected. Ultimately, the pipeline would be constructed in a single corridor along one of the routes to a single storage site in Morgan County, Christian County, or Douglas County, respectively 30, 75 or 125 miles from the Meredosia Power Station. The construction and permanent ROWs would be 80 feet and 50 feet in width, respectively. A 100-foot ROW may be needed for special requirements, such as pipe transportation in wooded hilly terrain or where side slope construction may be unavoidable. The pipeline would be buried at least four feet underground. Additional depth of cover would be provided for crossings, drain ditches, and irrigation tiles. For agricultural land, the pipeline would be buried at least five feet deep in accordance with Illinois Department of Agriculture Pipeline Construction Standards and Policies.

Two injection wells, 25 monitoring wells, and miscellaneous support facilities would be constructed at the Morgan County CO_2 storage site. Although currently unknown at this time, the final location of injection wells would be based on results from ongoing characterization studies. The Alliance does not plan to identify the location of injection wells at the Christian or Douglas County sites unless concerns arise around the technical, legal, or public acceptability of the preferred Morgan County site. Instead, the Alliance has identified 25-square mile (16,000-acre) study areas in Christian and Douglas counties for injection sites. It is expected that up to approximately 25 acres would be disturbed within the storage site study areas.

DOE's contractor for the EIS, Potomac-Hudson Engineering, Inc. (PHE), will support the consultations for the respective laws, and a representative from PHE will contact your office soon. PHE will be seeking information for inclusion in the EIS. Please note that representatives from Ameren and the Alliance may also periodically contact your office as they continue to develop the project. We are very interested in receiving your comments on the proposed action and your assistance with the EIS. We would appreciate your response within thirty days of the date of this letter. If you require any additional information, please do not hesitate to contact me via email (cliff.whyte@netl.doe.gov) or phone (304-285-2098). We look forward to your support.

Sincerely,

Cliff Whyte
NEPA Compliance Officer

Attachments

Ameren

RECEIVED
AUG - 2 2011
Preservation Services

Ameren Services

July 29, 2011

IHPA REVIEW
H/A
AC
AR
File

CERTIFIED MAIL: 7002 3150 0001 2354 9150

Ms. Anne Haaker
Deputy State Historic Preservation Officer (SHPO)
Illinois Historic Preservation Agency (IHPA)
1 Old State Capitol Plaza
Springfield, IL 62701-1507

RE: Repower Meredosia Unit 4 - FutureGen 2.0 Program

Dear Ms. Haaker:

This letter is to provide initial notification that Ameren Energy Generating a subsidiary of Ameren Energy Resources Company, LLC (AER), the holding company for merchant generation for Ameren Corporation is in the early stages of developing a plan to repower unit 4 of the Meredosia Power Plant. The Meredosia Power Plant is located in Morgan County, Ill., at the southern edge of Meredosia, IL on the Illinois River, (see attached annotated copy of USGS Meredosia Topo map). The repowering is part of the Department of Energy (DOE) FutureGen 2.0 program.

The FutureGen 2.0 program consists of an Oxy-Combustion Large Scale Test component undertaken by Ameren and a Pipeline and CO2 Storage Reservoir component undertaken by the FutureGen Alliance. For the Oxy-Combustion Large Scale Test, Ameren will construct and operate an approximately 200-megawatt electricity (MWe) gross output advanced oxy-combustion system to repower the existing Unit 4 steam turbine generator.

As you know, federal and state regulations require IHPA review for any federal or state-permitted or funded undertaking. Since this projected funded in part by the DOE and may require acquisition of permits/approvals from the US Army Corps of Engineers (USACE) and IL-EPA (land disturbance permitting), we are notifying you in accordance with those regulations.

Current use of the area is industrial / rural. There are some existing structures/buildings located within the project area that will be affected by the new construction and we will provide this information to you as it becomes available. Ground disturbance is expected during the construction/ development phase of the project. The proposed impact areas in and around the Meredosia Power Plant are show on the attached Figure 1.

As we progress with the project and additional information is available related to land impact, we will provide you updated information. Please review the enclosed information and let me know if you

1901 Chouteau Avenue
PO Box 66149, MC 602
St. Louis, MO 63166-6149
Ameren.com

have any comments or concerns with this project. If you require any additional information or would like to have a meeting with Ameren on this project, please feel free to contact me.

We look forward to working with you on this project.

Respectfully,

Brian F. Holderness
Sr. Environmental Health Physicist
Environmental Services
T 314.554.3574
F 314.554.4182
bholderness@ameren.com

Enclosures


USGS
U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY
The National Map
MEREDOSIA QUADRANGLE
ILLINOIS
7.5-MINUTE SERIES
FutureGen 2.0
General impact area
ILLINOIS
Produced by the United States Geological Survey
SCALE 1:24 000
MEREDOSIA, IL
2009

File: P:\ENVIRONMENTAL\FUTUREGEN 2\FIGURES\PLOT PLAN\IMPACT AREAS PHE.DWG Last edited: APR. 26, 11 @ 09:59 a.m. by: david_deguire

NOT TO SCALE

N

AMEREN ENERGY RESOURCES
MEREDOSIA STATION
MEREDOSIA, ILLINOIS
FUTUREGEN 2.0

PROJECT NO. 21562604

URS

DRN. BY:djd April 2011
DSGN. BY:glh
CHKD. BY:glh

Impact Areas

FIG. NO. 1

Illinois Historic Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

Morgan County PLEASE REFER TO: IHPA LOG #022111811
Yatesville
West of Beilschmidt Road
Section:25-Township:16N-Range:9W, Section:26-Township:16N-Range:9W
Soil gas monitoring, FutureGen Industrial Alliance, Inc.

November 29, 2011

Joseph P. Craig
Prairie Archaeology and Research
P. O. Box 5603
Springfield, IL 62705

Dear Mr. Craig:

Acre(s): 6 Site(s): 0
Archaeological Contractor: PAR/Craig

Thank you for submitting the results of the archaeological reconnaissance. Our comments are required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

Our staff has reviewed the archaeological Phase I reconnaissance report performed for the project referenced above. The Phase I survey and assessment of the archaeological resources appear to be adequate. Accordingly, we have determined, based upon this report, that no significant historic, architectural, and archaeological resources are located in the project area.

Please submit a copy of this letter with your application to the state or federal agency from which you obtain any permit, license, grant, or other assistance. Please retain this letter in your files as evidence of compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. This clearance remains in effect for two years from date of issuance. It does not pertain to any discovery during construction, nor is it a clearance for purposes of the Illinois Human Skeletal Remains Protection Act (20 ILCS 3440).

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

c: Ken Humphreys, FutureGen Industrial Alliance, Inc.

January 26, 2012

Ms. Anne E. Haaker
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, IL 62701

RE: FutureGen 2.0 Initiative

Dear Ms. Haaker,

The U.S. Department of Energy (DOE) would like to thank you and your staff for meeting with staff from the FutureGen Alliance in December and back in March. The purpose of this letter is to help clarify roles and responsibilities for complying with Section 106 of the National Historic Preservation Act (NHPA). On August 5, 2010, DOE awarded *American Recovery and Reinvestment Act of 2009* funding to the FutureGen Alliance (Alliance) and Ameren Energy Resources to build FutureGen 2.0, a clean coal repowering program and carbon dioxide storage network.

On November 28, 2011, the Alliance announced that it is negotiating an option to purchase portions of the Meredosia Energy Center from Ameren Energy Resources Company. The purchase option would provide the Alliance with the assets it would need to continue the development of the FutureGen 2.0 clean coal power program in Morgan County, Illinois.

DOE is in the process of drafting an environmental impact statement, which is expected to be published in 2012. DOE sent consultation letters to 24 tribal organizations.

DOE is requesting that your office continue to work with staff from the Alliance regarding the FutureGen 2.0 initiative to identify cultural resource issues and seek comments regarding specific work plans at various stages of this project. Mr. Tom Anderson is the environmental permitting task leader for the Alliance and will continue to be Illinois Historic Preservation Agency's (IHPA's) point of contact. DOE is responsible for complying with Section 106 of NHPA. DOE will likely be contacting your office regarding a Programmatic Agreement in the foreseeable future.

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507
cliff.whyte@netl.doe.gov • Voice (304) 285-2098 • Fax (304) 285-4403 • www.netl.doe.gov

If you have any questions, please contact me at 304-285-2098 or by email at cliff.whyte@netl.doe.gov

Sincerely,

Cliff Whyte
NEPA Compliance Officer

cc:
Joseph Phillippe, Chief Archaeologist of the IHPA
Tom Anderson, Environmental Permitting for the Alliance

APPENDIX C

Map Views of Pipeline

C1 – Pipeline Corridor Overview

C2 – Pipeline Routes with Mile Markers

for the

Draft Environmental Impact Statement
FutureGen 2.0 Project
Meredosia, Illinois (Morgan County)

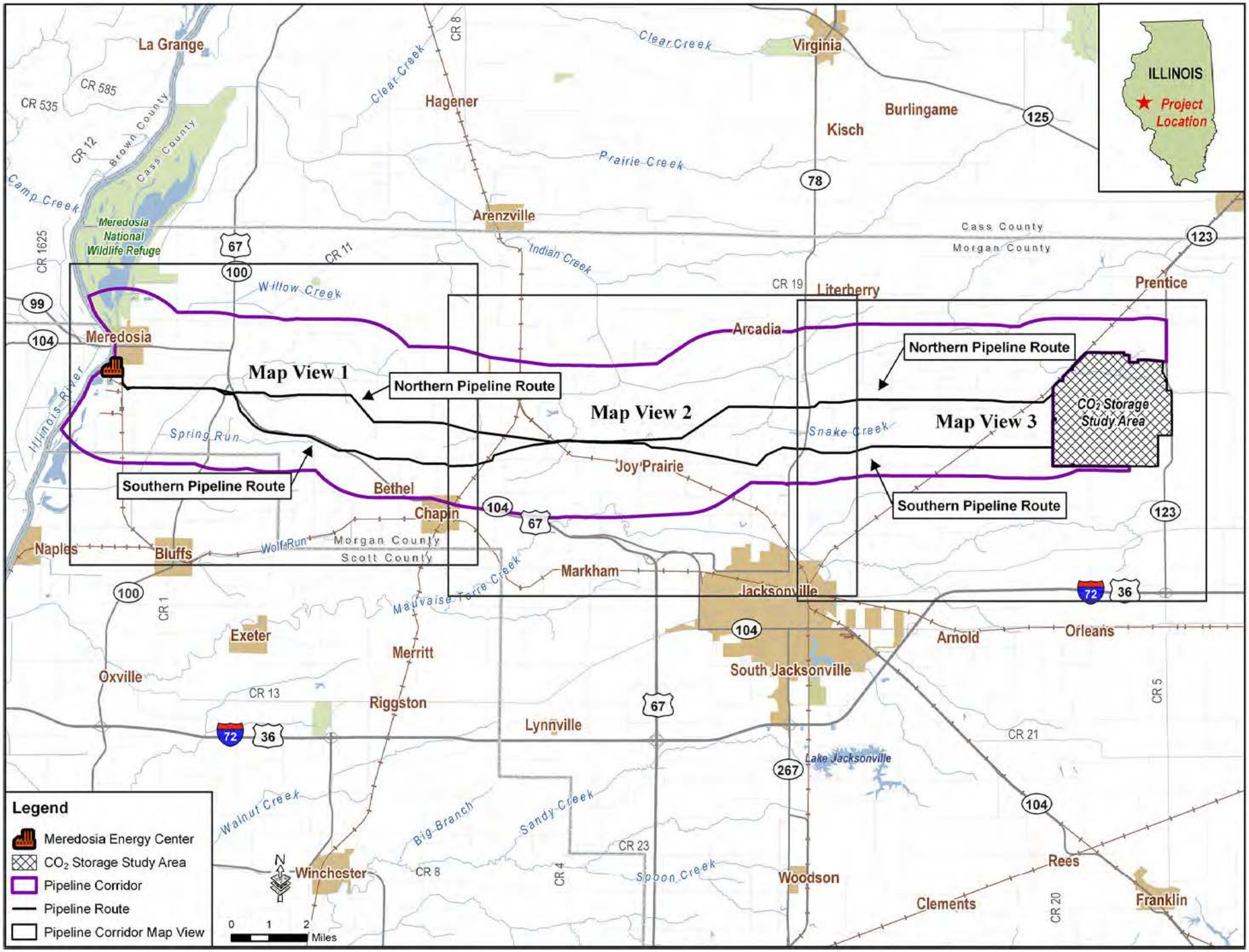
DOE/EIS-0460D
April 2013

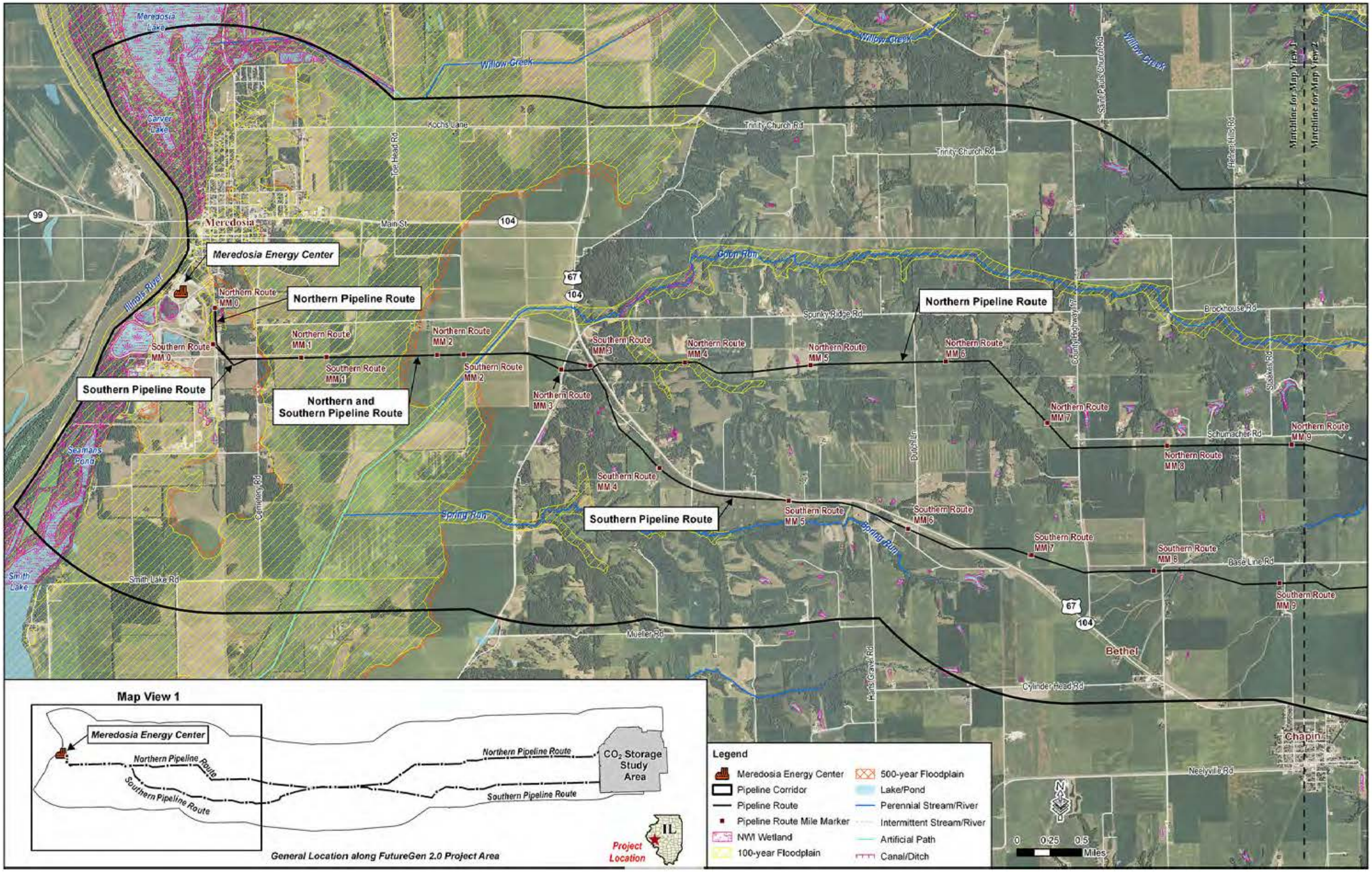
INTENTIONALLY LEFT BLANK

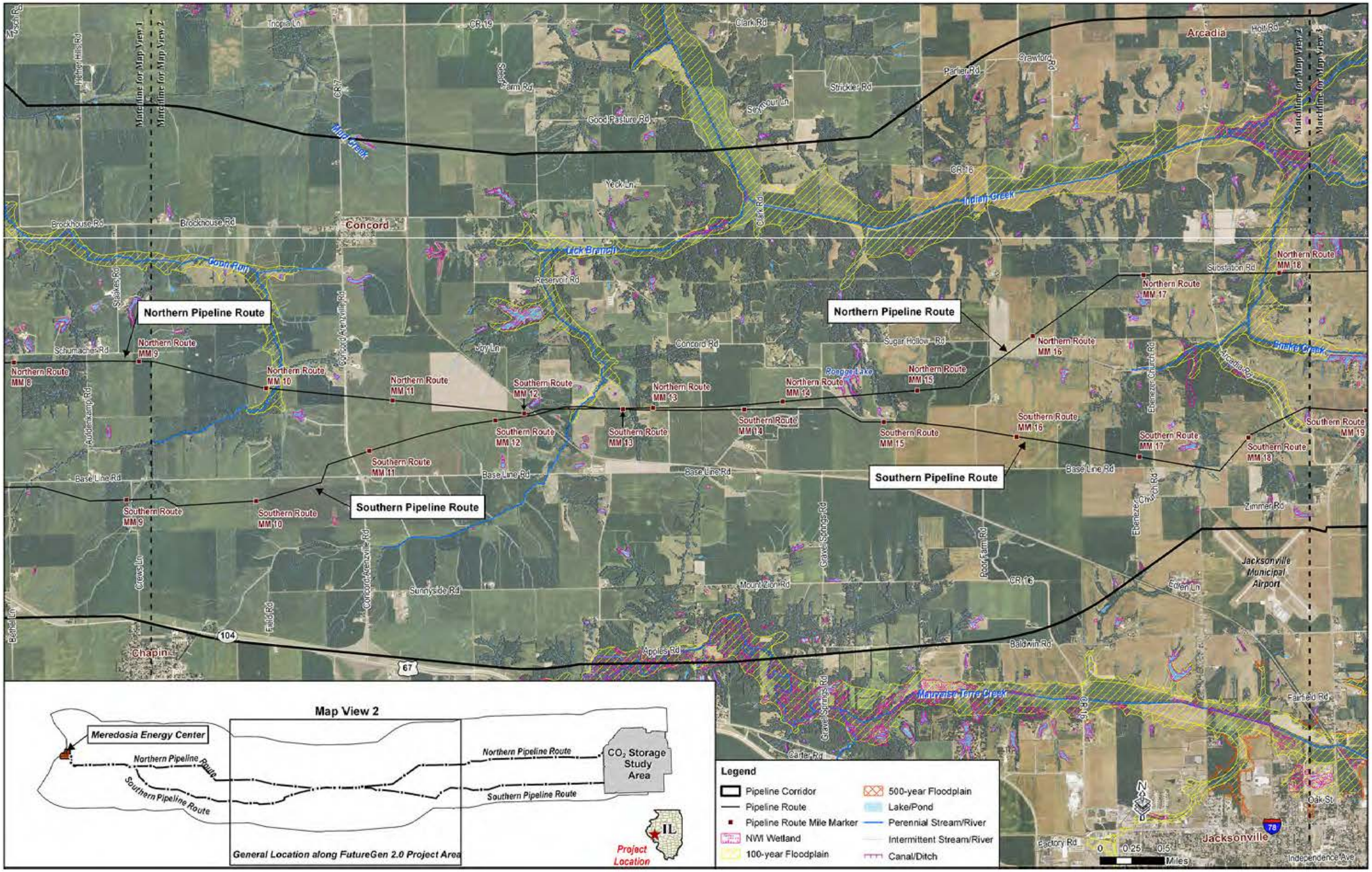
APPENDIX C1

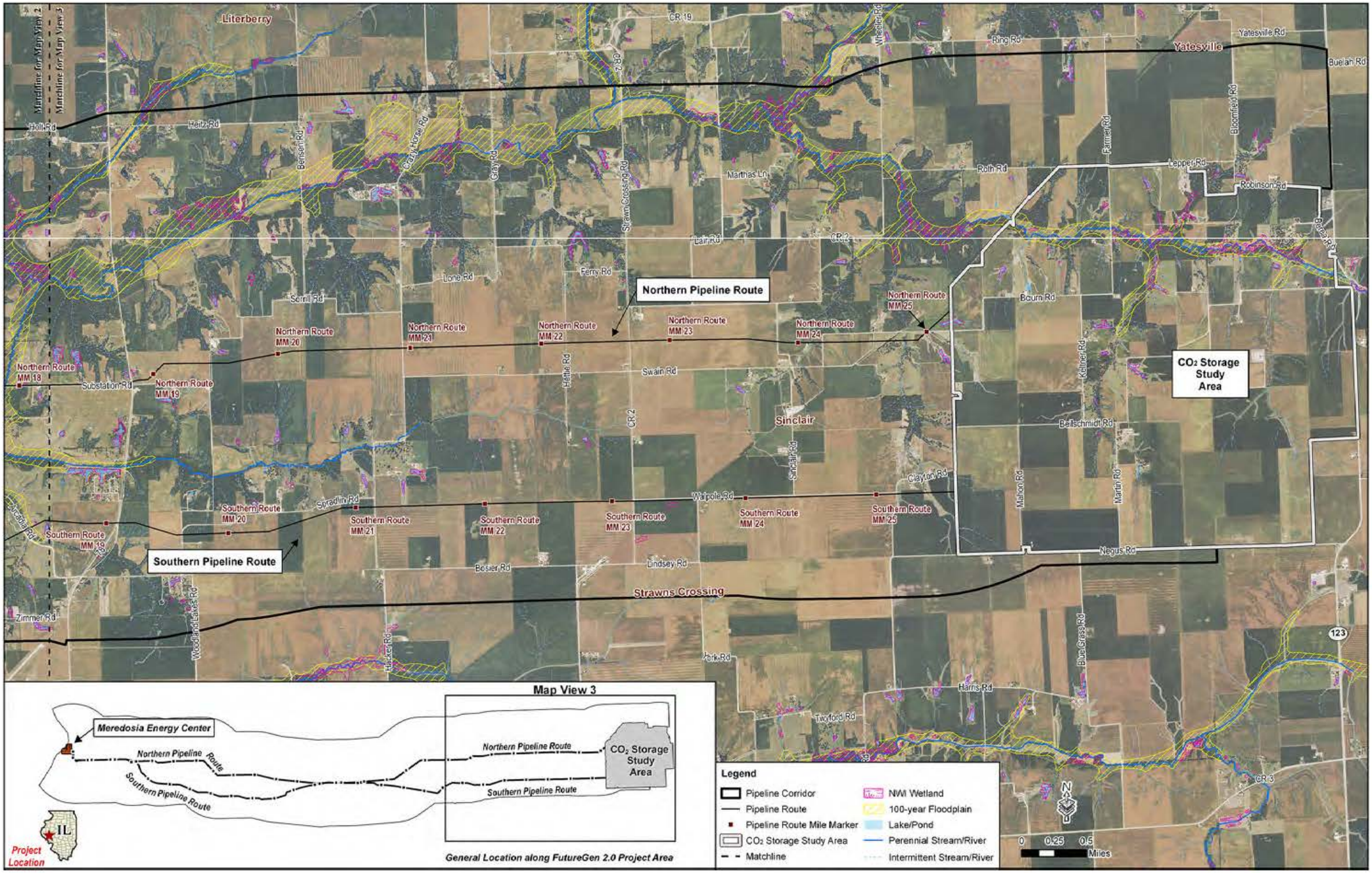
PIPELINE CORRIDOR OVERVIEW

INTENTIONALLY LEFT BLANK


ILLINOIS
Project Location
La Grange
Virginia
Clear Creek
Hagener
Burlingame
Kisch
Prairie Creek
CR 585
CR 535
CR 12
Brown County
Cass County
Camp Creek
Meredosia National Wildlife Refuge
Arenzville
Cass County
Morgan County
CR 1625
CR 11
CR 8
Indian Creek
Willow Creek
CR 19
Literberry
Prentice
Arcadia
Meredosia
Map View 1
Northern Pipeline Route
Map View 2
Map View 3
CO₂ Storage Study Area
Illinois River
Spring Run
Snake Creek
Joy Prairie
Southern Pipeline Route
Bethel
Chapin
Naples
Bluffs
Wolf Run
Morgan County
Scott County
Markham
Mauvaise Terre Creek
Jacksonville
Exeter
Merritt
Arnold
Orleans
South Jacksonville
Oxville
CR 13
Riggston
Lynnville
CR 1
CR 5
CR 21
Lake Jacksonville
Walnut Creek
Big Branch
Sandy Creek
CR 23
Winchester
CR 8
CR 4
Spoon Creek
Woodson
Rees
Clements
CR 20
Franklin
99
104
100
67
78
125
123
72
36
267
Legend
Meredosia Energy Center
CO₂ Storage Study Area
Pipeline Corridor
Pipeline Route
Pipeline Corridor Map View
N
0
1
2
Miles


Meredosia Lake
Carver Lake
Willow Creek
Kochs Lane
Trinity Church Rd
Toe Head Rd
Saint Pauls Church Rd
Hefner Hills Rd
Matchline for Map View 1
Matchline for Map View 2
99
Meredosia
Main St
104
Meredosia Energy Center
Illinois River
Coon Run
67
Northern Route MM 0
Northern Pipeline Route
Spunky Ridge Rd
Brockhouse Rd
County Highway 17
Southern Route MM 0
Northern Route MM 1
Northern Route MM 2
Southern Route MM 3
Northern Route MM 4
Northern Route MM 5
Northern Route MM 6
Southern Route MM 1
Southern Route MM 2
Southern Pipeline Route
Northern and Southern Pipeline Route
Northern Route MM 3
Northern Route MM 7
Schumacher Rd
Northern Route MM 8
Northern Route MM 9
Stookes Rd
Dutch Ln
Seamans Pond
Cemetery Rd
Southern Route MM 4
Spring Run
Southern Route MM 5
Southern Route MM 6
Southern Route MM 7
Southern Route MM 8
Base Line Rd
Southern Route MM 9
Smith Lake
Smith Lake Rd
Mueller Rd
Bethel
Harris Gravel Rd
Cylinder Head Rd
Chapin
Neelyville Rd
Map View 1
Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
CO_2 Storage Study Area
General Location along FutureGen 2.0 Project Area
IL
Project Location
Legend
Meredosia Energy Center
Pipeline Corridor
Pipeline Route
Pipeline Route Mile Marker
NWI Wetland
100-year Floodplain
500-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
Artificial Path
Canal/Ditch
N
0 0.25 0.5 Miles

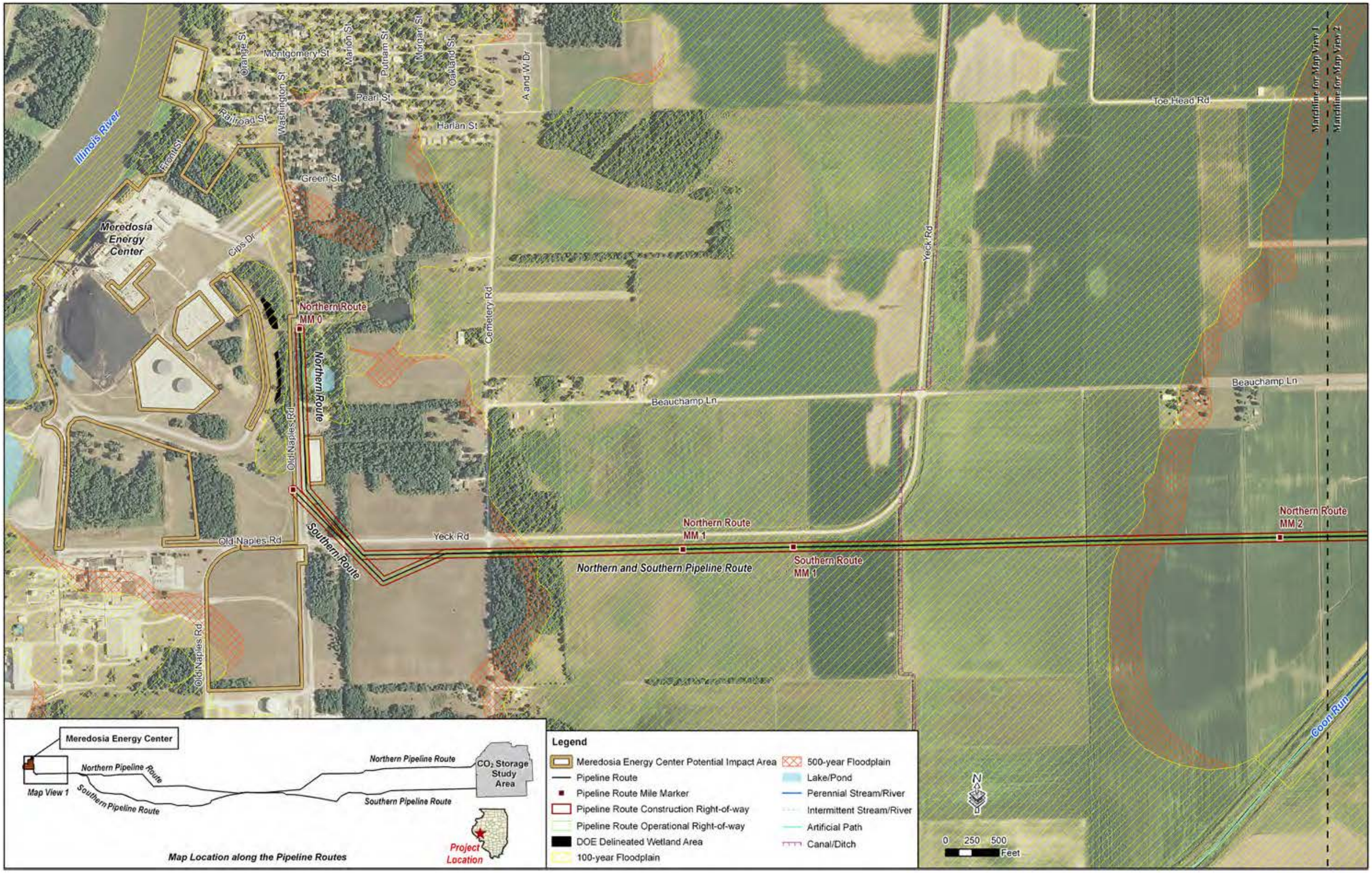

Northern Pipeline Route
Southern Pipeline Route
Northern Route MM 8
Northern Route MM 9
Northern Route MM 10
Northern Route MM 11
Northern Route MM 12
Northern Route MM 13
Northern Route MM 14
Northern Route MM 15
Northern Route MM 16
Northern Route MM 17
Northern Route MM 18
Southern Route MM 9
Southern Route MM 10
Southern Route MM 11
Southern Route MM 12
Southern Route MM 13
Southern Route MM 14
Southern Route MM 15
Southern Route MM 16
Southern Route MM 17
Southern Route MM 18
Southern Route MM 19
Matchline for Map View 1
Matchline for Map View 2
Matchline for Map View 3
Concord
Arcadia
Chapin
Jacksonville
Jacksonville Municipal Airport
Mud Creek
Indian Creek
Lick Branch
Coon Run
Snake Creek
Mauvaise Terre Creek
Roegge Lake
Brockhouse Rd
Base Line Rd
Concord Rd
Sugar Hollow Rd
Substation Rd
Schumacher Rd
Reservoir Rd
Joy Ln
Yeck Ln
Good Pasture Rd
Clark Rd
Seymour Ln
Strickler Rd
Parlier Rd
Crawford Rd
Holt Rd
CR 19
CR 16
Triopia Ln
Sunnyside Rd
Mount Zion Rd
Apples Rd
Baldwin Rd
Carter Rd
Fairfield Rd
Factory Rd
Oak St
Independence Ave
Zimmer Rd
Ebenezer Church Rd
Arcadia Rd
Gravel Springs Rd
Poor Farm Rd
Concord-Arenzville Rd
Crews Ln
Field Rd
Bethel Ln
Aufdenkamp Rd
Stakes Rd
104
67
78
Map View 2
Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
CO2 Storage Study Area
General Location along FutureGen 2.0 Project Area
Project Location
IL
Legend
Pipeline Corridor
Pipeline Route
Pipeline Route Mile Marker
NWI Wetland
100-year Floodplain
500-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
Canal/Ditch
0 0.25 0.5 Miles


Matchline for Map View 2
Matchline for Map View 3
Literberry
CR 19
Ring Rd
Yatesville
Yatesville Rd
Buelah Rd
Holt Rd
Heitz Rd
Bensen Rd
Crazy Horse Rd
Gray Rd
Strawn Crossing Rd
Marthas Ln
Roth Rd
Farmer Rd
Bloomfield Rd
Lepper Rd
Robinson Rd
Lair Rd
CR 2
Lone Rd
Ferry Rd
Scrnll Rd
Northern Pipeline Route
Northern Route MM 18
Northern Route MM 19
Northern Route MM 20
Northern Route MM 21
Northern Route MM 22
Northern Route MM 23
Northern Route MM 24
Northern Route MM 25
Substation Rd
Swain Rd
Hettie Rd
Bourn Rd
Kellner Rd
CO2 Storage Study Area
Sinclair
Sinclair Rd
Bellschmidt Rd
Clayton Rd
Walpole Rd
Spradlin Rd
Martin Rd
Mahon Rd
Southern Route MM 19
Southern Route MM 20
Southern Route MM 21
Southern Route MM 22
Southern Route MM 23
Southern Route MM 24
Southern Route MM 25
Southern Pipeline Route
Bosier Rd
Lindsey Rd
Negus Rd
Strawns Crossing
Zimmer Rd
Woodland Lakes Rd
Hacker Rd
York Rd
Blue Grass Rd
123
Harris Rd
Twyford Rd
CR 3
Map View 3
Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
CO2 Storage Study Area
IL
Project Location
General Location along FutureGen 2.0 Project Area
Legend
Pipeline Corridor
Pipeline Route
Pipeline Route Mile Marker
CO2 Storage Study Area
Matchline
NWI Wetland
100-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
0 0.25 0.5 Miles
N

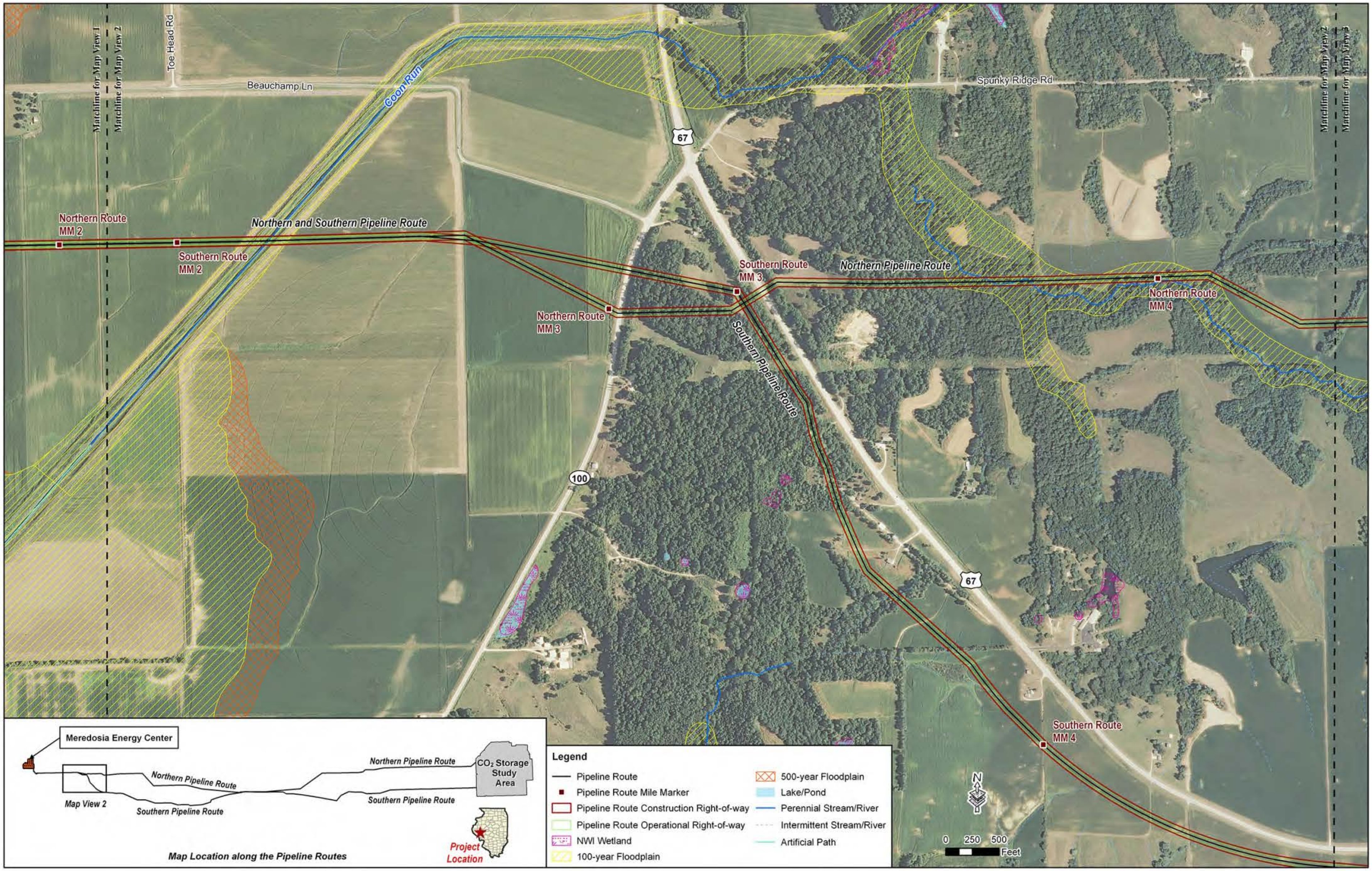
APPENDIX C2

PIPELINE ROUTES WITH MILE MARKERS

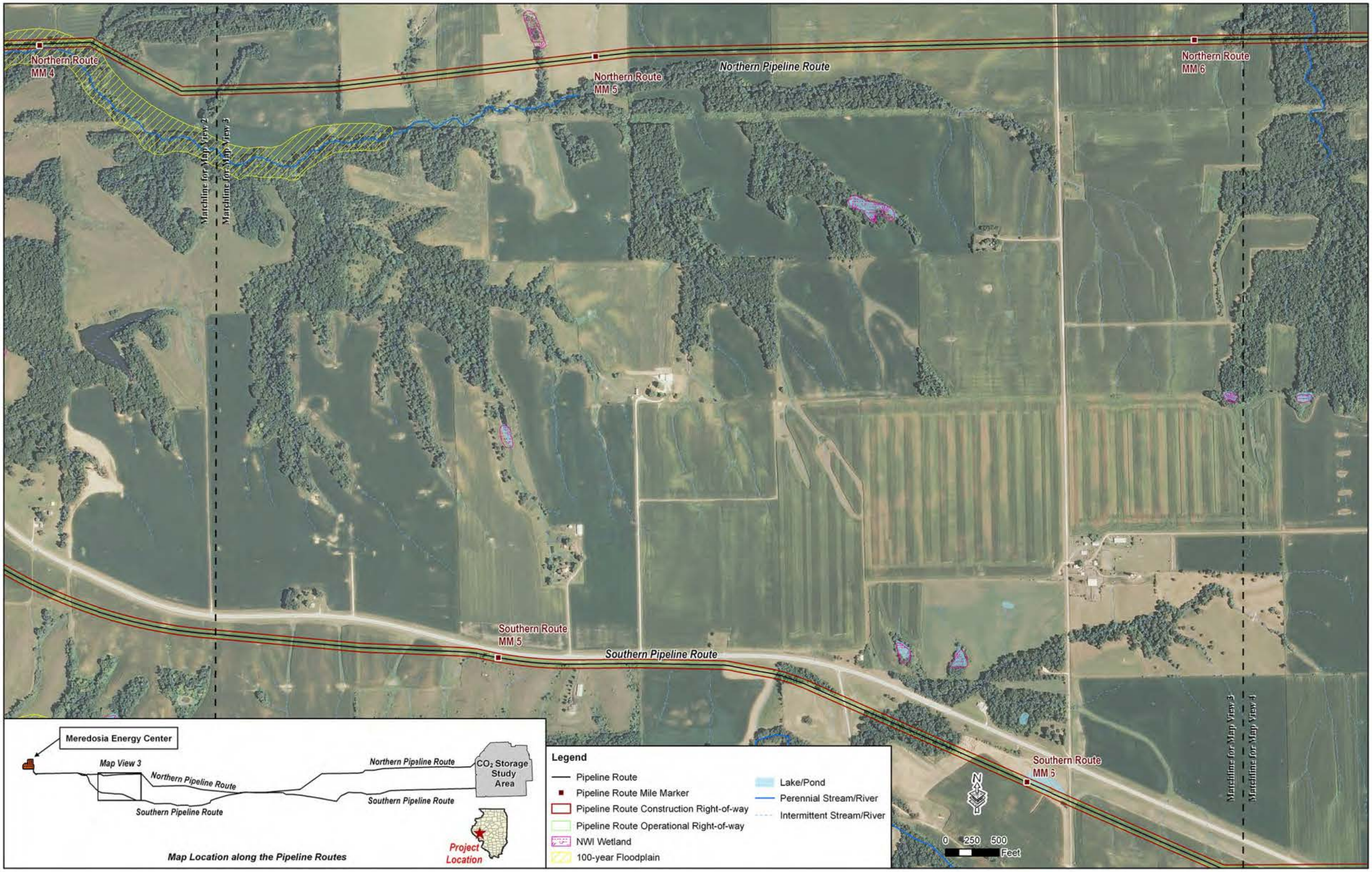
INTENTIONALLY LEFT BLANK

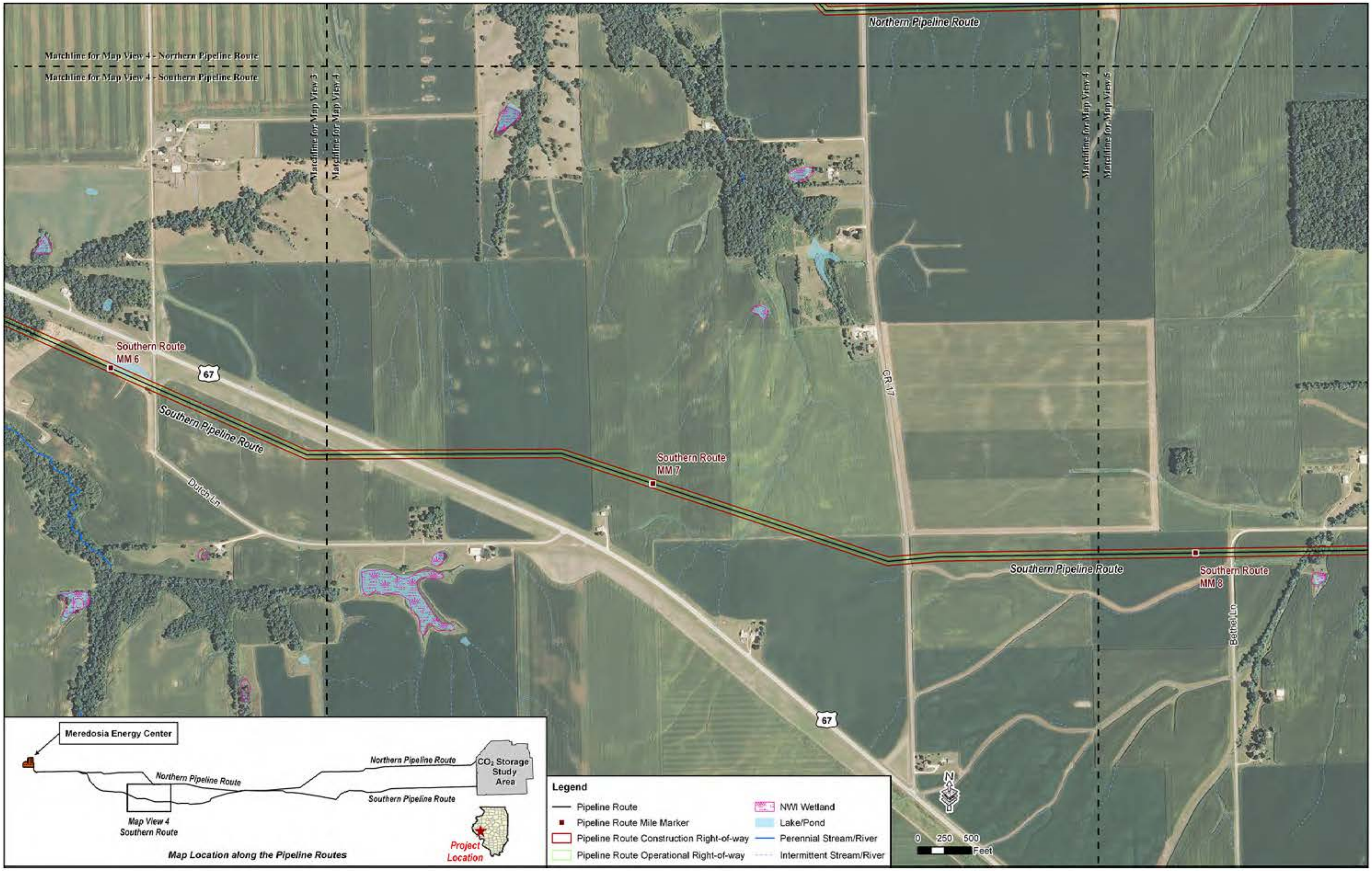


Illinois River
Meredosia Energy Center
Montgomery St
Pearl St
Railroad St
Harlan St
Green St
Front St
Cips Dr
Orange St
Washington St
Marion St
Putnam St
Morgan St
Oakland St
A and W Dr
Cemetery Rd
Yeck Rd
Toe Head Rd
Beauchamp Ln
Old Naples Rd
Old Naples Rd
Northern Route MM 0
Northern Route
Southern Route
Northern Route MM 1
Southern Route MM 1
Northern Route MM 2
Northern and Southern Pipeline Route
Coon Run
Matchline for Map View 1
Matchline for Map View 2
Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
Northern Pipeline Route
Southern Pipeline Route
CO₂ Storage Study Area
Map View 1
Map Location along the Pipeline Routes
Project Location
Legend
Meredosia Energy Center Potential Impact Area
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
DOE Delineated Wetland Area
100-year Floodplain
500-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
Artificial Path
Canal/Ditch
N
0 250 500
Feet

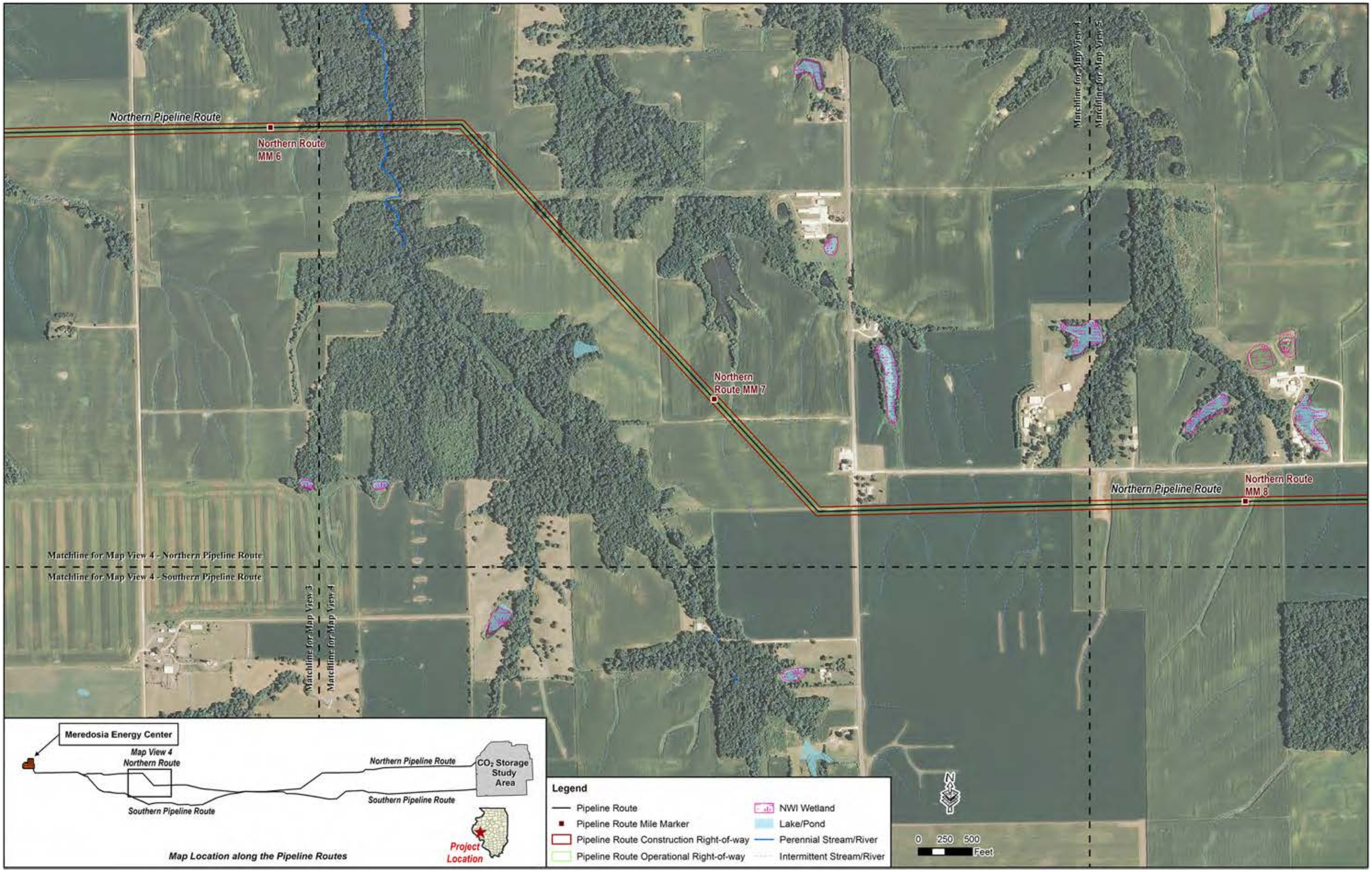


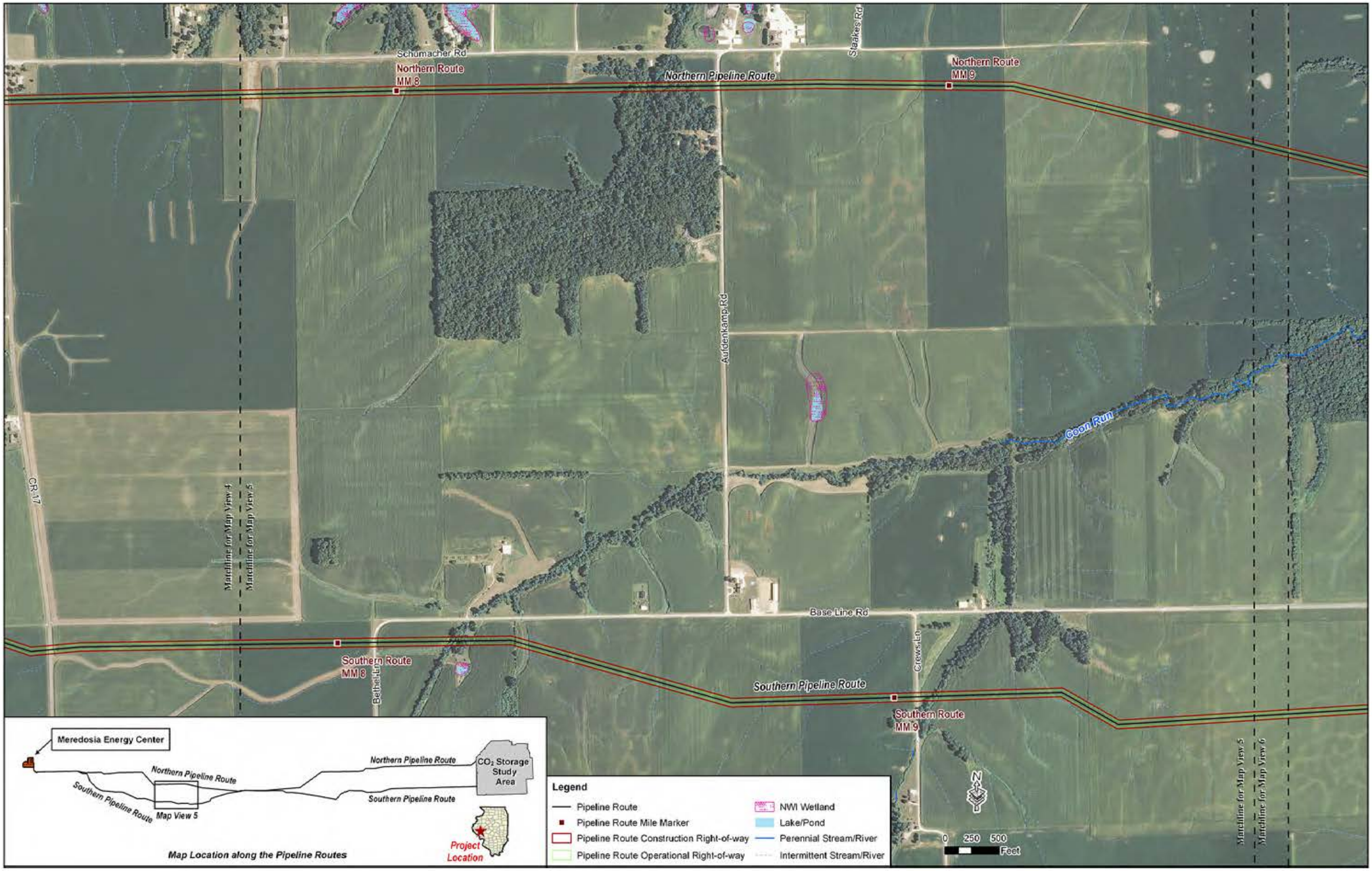
Northern and Southern Pipeline Route
Northern Route MM 2
Southern Route MM 2
Northern Route MM 3
Southern Route MM 3
Northern Pipeline Route
Northern Route MM 4
Southern Pipeline Route
Southern Route MM 4
Beauchamp Ln
Toe Head Rd
Spunky Ridge Rd
Coon Run
67
100
Matchline for Map View 1
Matchline for Map View 2
Matchline for Map View 2
Matchline for Map View 3
Meredosia Energy Center
Northern Pipeline Route
Northern Pipeline Route
CO2 Storage Study Area
Map View 2
Southern Pipeline Route
Southern Pipeline Route
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
100-year Floodplain
500-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
Artificial Path
N
0 250 500
Feet

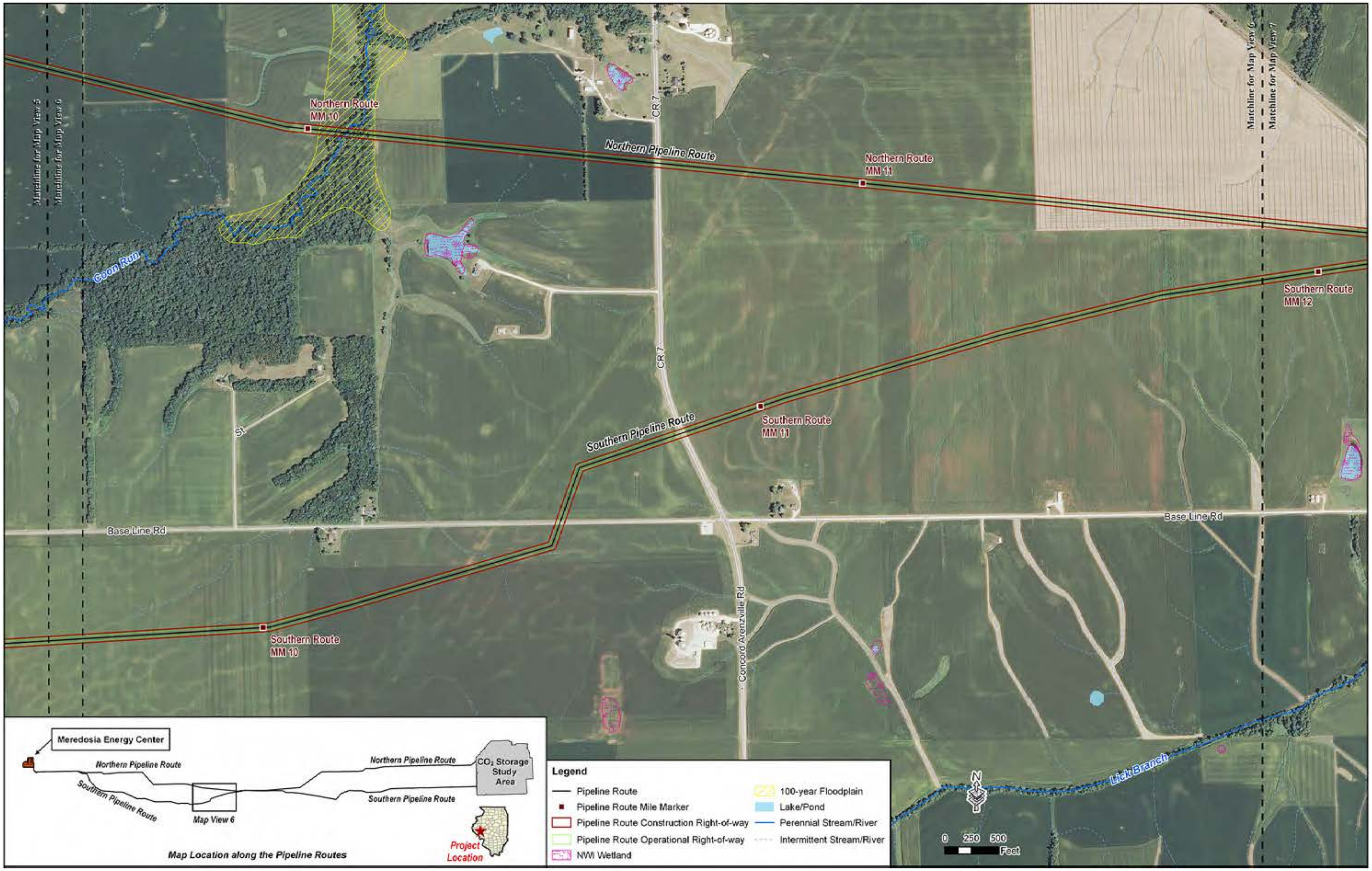

Northern Route
MM 4
Northern Route
MM 5
Northern Pipeline Route
Northern Route
MM 6
Matchline for Map View 2
Matchline for Map View 3
Southern Route
MM 5
Southern Pipeline Route
Southern Route
MM 6
Matchline for Map View 3
Matchline for Map View 4
Meredosia Energy Center
Map View 3
Northern Pipeline Route
Northern Pipeline Route
CO2 Storage
Study
Area
Southern Pipeline Route
Southern Pipeline Route
Project
Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
100-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
N
0
250
500
Feet

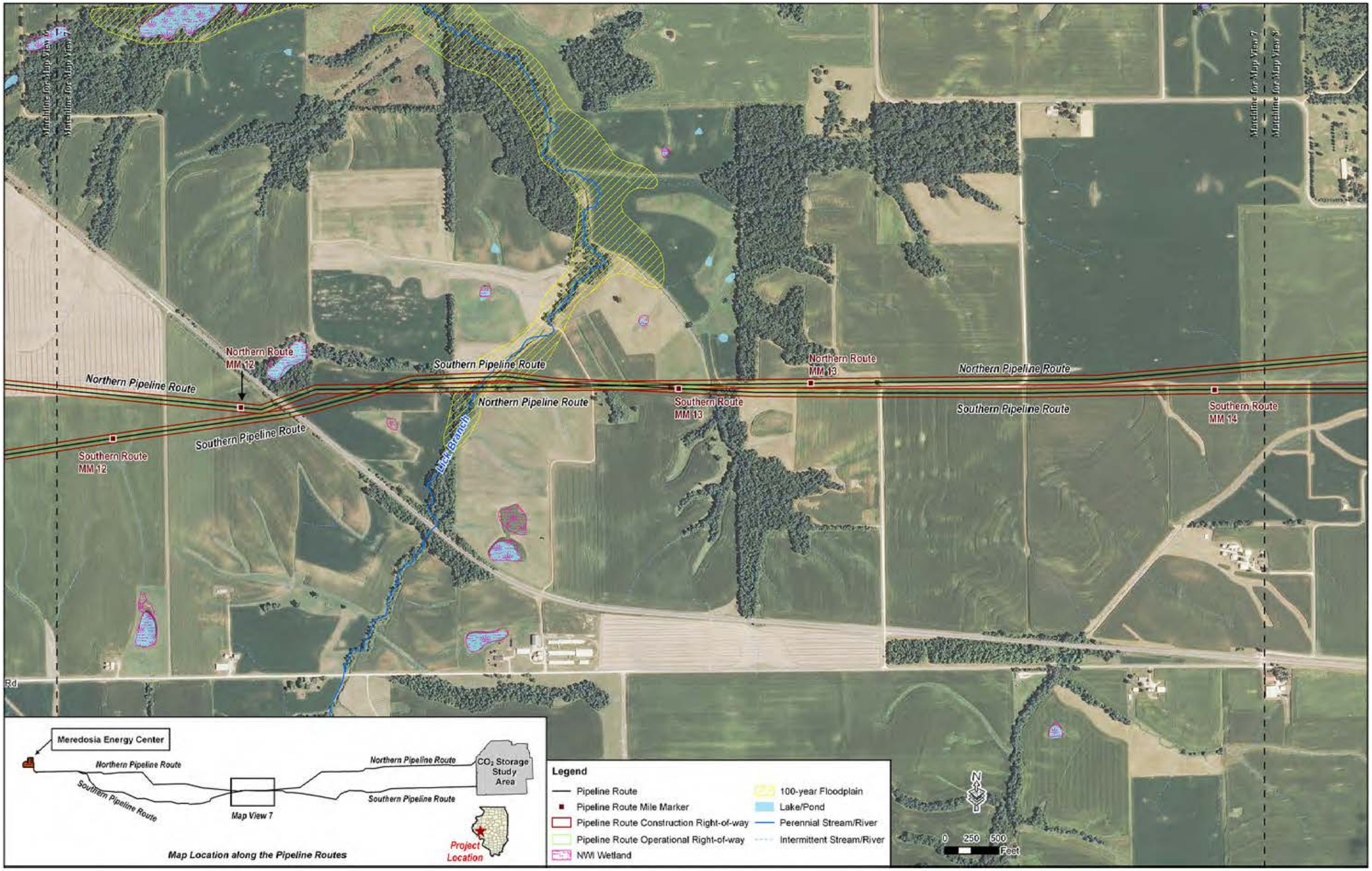


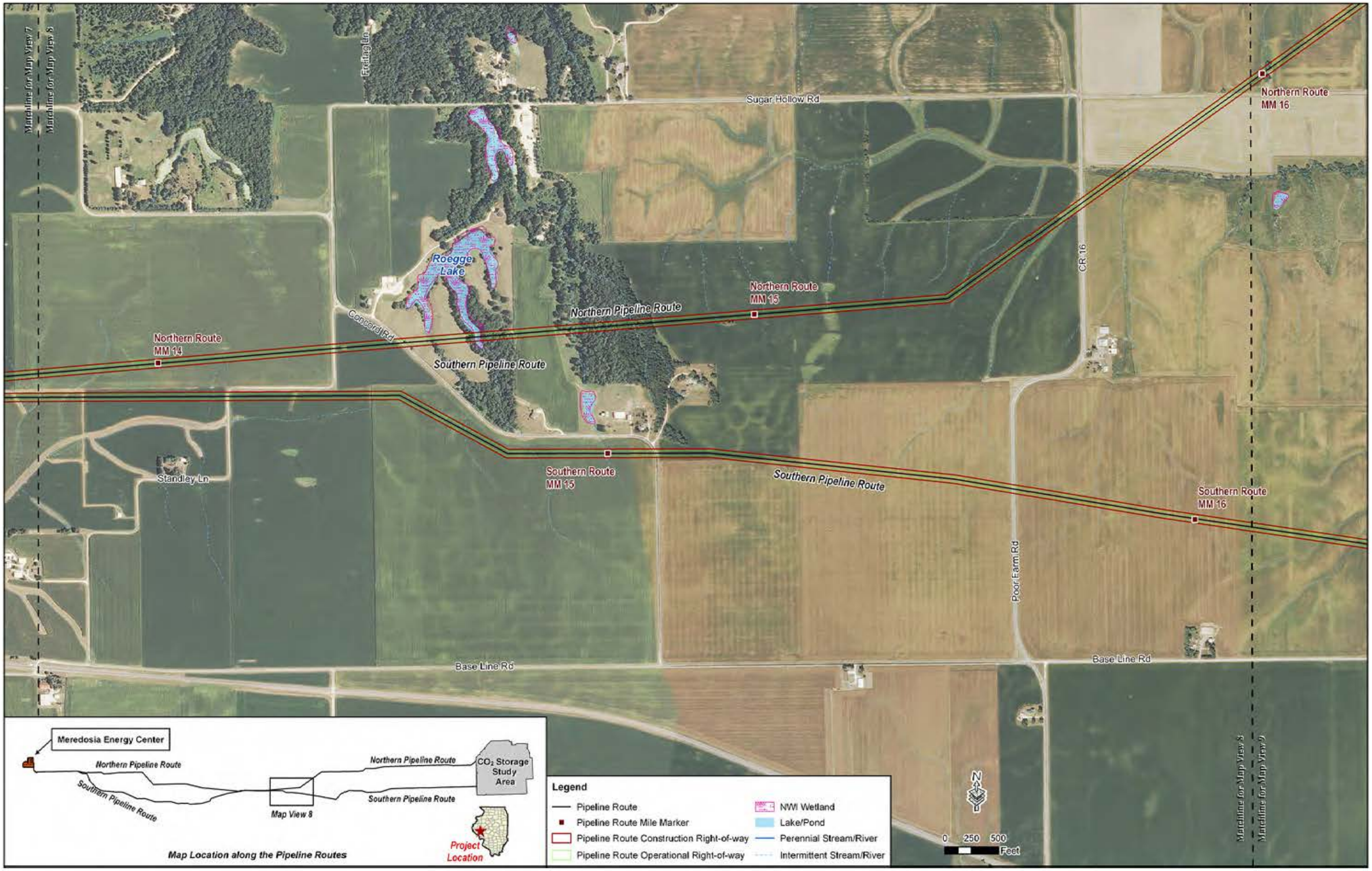
Matchline for Map View 4 - Northern Pipeline Route
Matchline for Map View 4 - Southern Pipeline Route
Matchline for Map View 3
Matchline for Map View 4
Matchline for Map View 4
Matchline for Map View 5
Northern Pipeline Route
Southern Route MM 6
67
Southern Pipeline Route
Dutch Ln
Southern Route MM 7
CR 17
Southern Pipeline Route
Southern Route MM 8
Bethel Ln
67
Meredosia Energy Center
Northern Pipeline Route
Northern Pipeline Route
CO2 Storage Study Area
Southern Pipeline Route
Map View 4 Southern Route
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
N
0 250 500
Feet

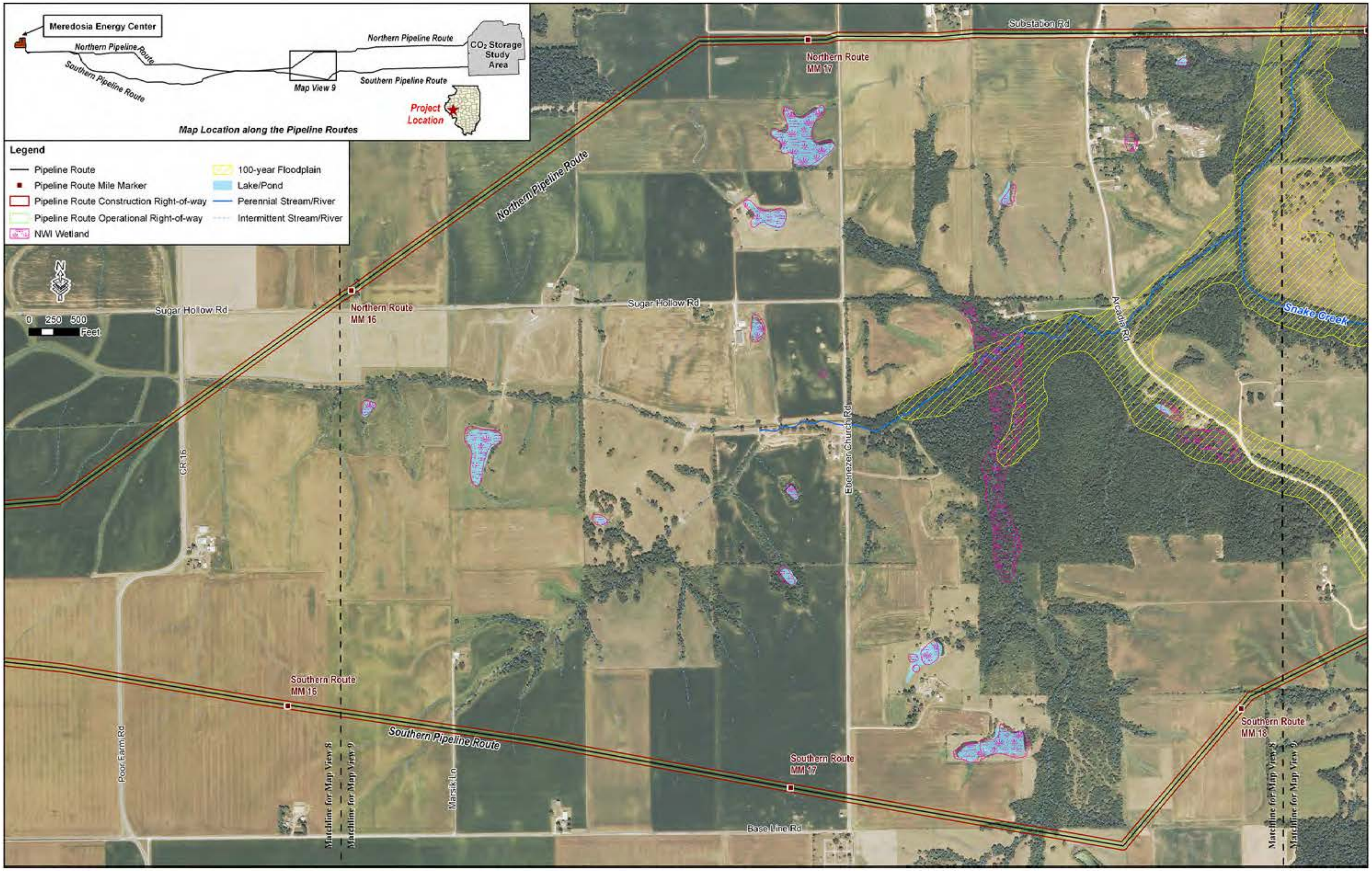

Northern Pipeline Route
Northern Route MM 6
Northern Route MM 7
Northern Pipeline Route
Northern Route MM 8
Matchline for Map View 4 - Northern Pipeline Route
Matchline for Map View 4 - Southern Pipeline Route
Matchline for Map View 3
Matchline for Map View 4
Matchline for Map View 4
Matchline for Map View 5
Meredosia Energy Center
Map View 4 Northern Route
Northern Pipeline Route
CO2 Storage Study Area
Southern Pipeline Route
Southern Pipeline Route
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
N
0 250 500
Feet

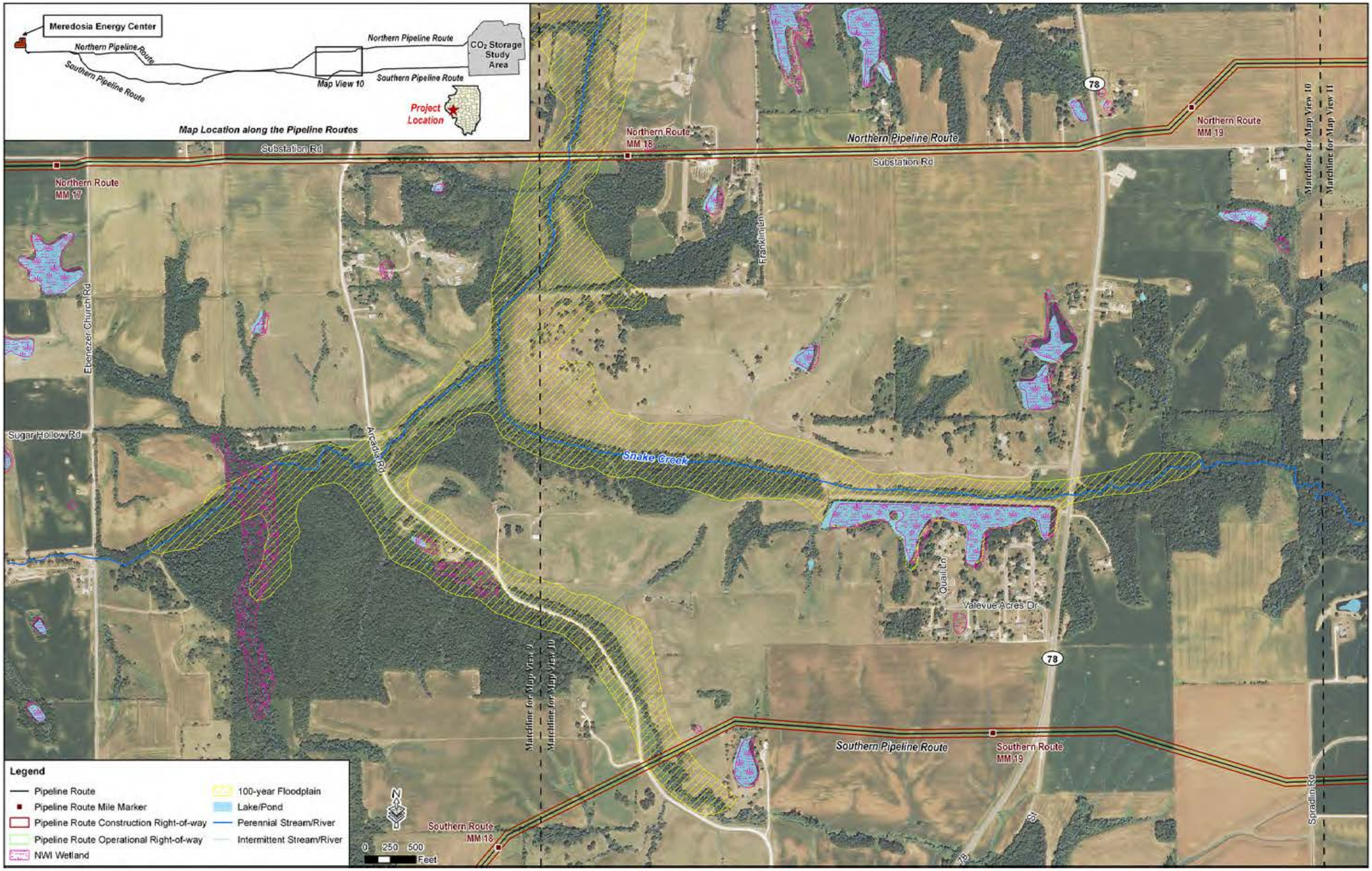

Schumacher Rd
Staakes Rd
Northern Route
MM 8
Northern Pipeline Route
Northern Route
MM 9
Aufdenkamp Rd
Coon Run
CR-17
Matchline for Map View 4
Matchline for Map View 5
Base Line Rd
Southern Route
MM 8
Bethel Ln
Crews Ln
Southern Pipeline Route
Southern Route
MM 9
Matchline for Map View 5
Matchline for Map View 6
Meredosia Energy Center
Northern Pipeline Route
Northern Pipeline Route
CO2 Storage
Study
Area
Southern Pipeline Route
Southern Pipeline Route
Map View 5
Project
Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
0 250 500
Feet

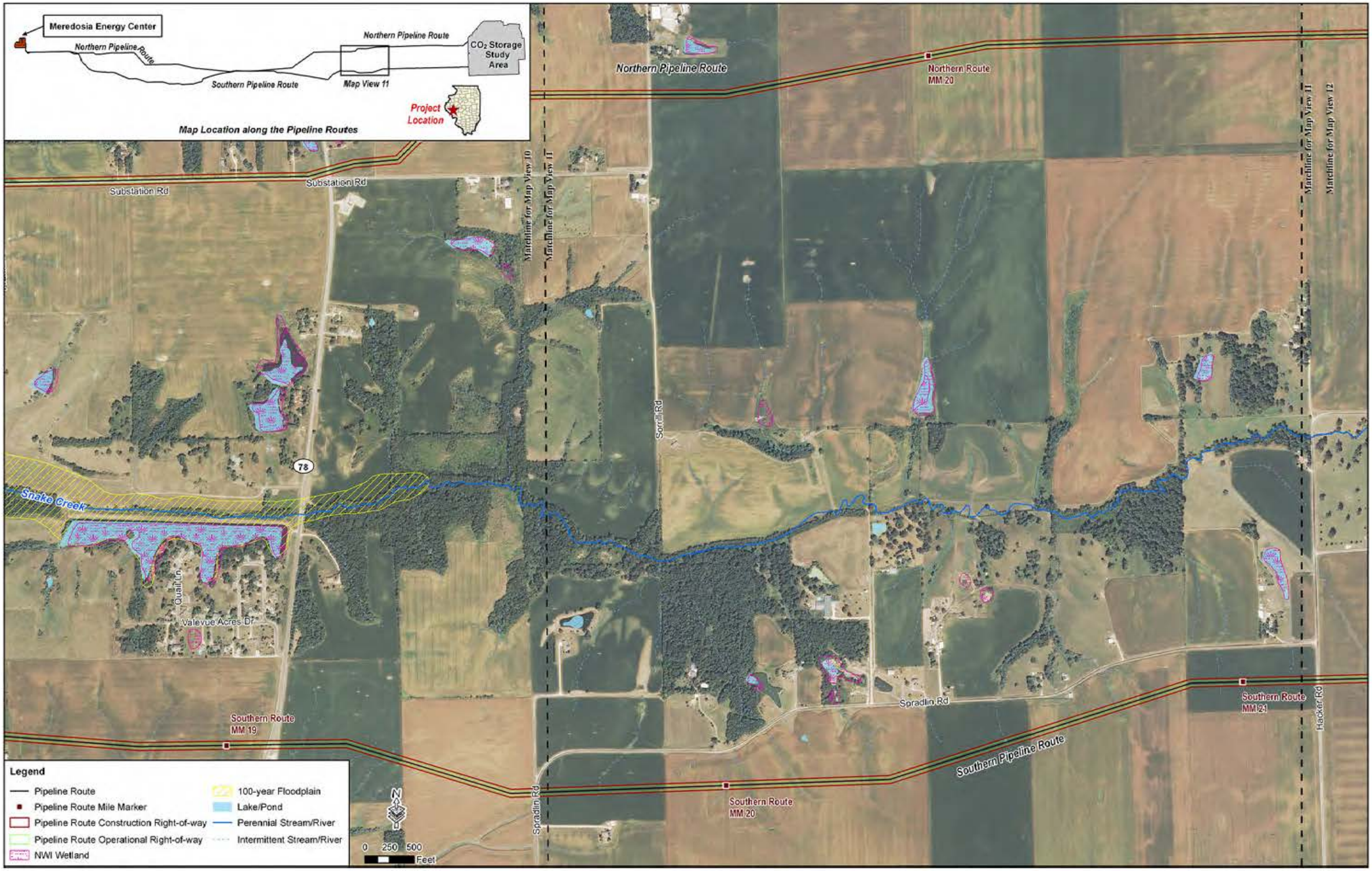

Matchline for Map View 5
Matchline for Map View 6
Matchline for Map View 6
Matchline for Map View 7
Northern Route MM 10
Northern Pipeline Route
Northern Route MM 11
CR 7
Coon Run
Southern Route MM 12
Southern Pipeline Route
Southern Route MM 11
Base Line Rd
Southern Route MM 10
Concord Arenzville Rd
Lick Branch
Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
Map View 6
CO₂ Storage Study Area
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
100-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
0 250 500
Feet
N

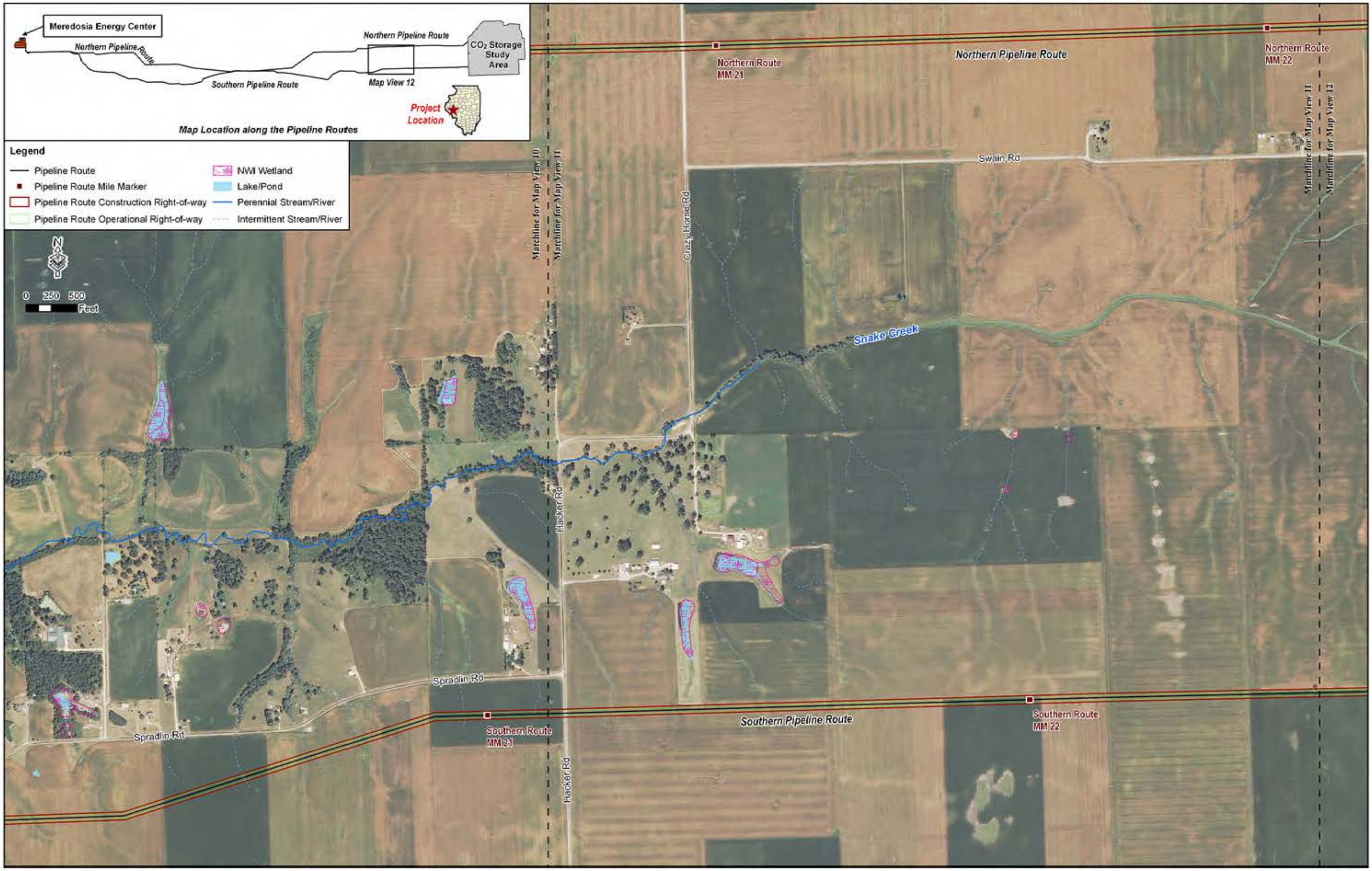

Matchline for Map View 6
Matchline for Map View 7
Matchline for Map View 7
Matchline for Map View 8
Northern Route
MM 12
Northern Pipeline Route
Southern Pipeline Route
Southern Route
MM 12
Southern Pipeline Route
Northern Pipeline Route
Lick Branch
Northern Route
MM 13
Southern Route
MM 13
Northern Pipeline Route
Southern Pipeline Route
Southern Route
MM 14
Rd
Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
Map View 7
Northern Pipeline Route
Southern Pipeline Route
CO₂ Storage Study Area
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
100-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
N
0 250 500
Feet


Matchline for Map View 7
Matchline for Map View 8
Freitag Ln
Sugar Hollow Rd
Roegge Lake
Concord Rd
Northern Pipeline Route
Southern Pipeline Route
Northern Route MM 14
Northern Route MM 15
Northern Route MM 16
Southern Route MM 15
Southern Route MM 16
Standley Ln
CR 16
Poor Farm Rd
Base Line Rd
Matchline for Map View 8
Matchline for Map View 9
Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
CO₂ Storage Study Area
Map View 8
Map Location along the Pipeline Routes
Project Location
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
N
0 250 500
Feet

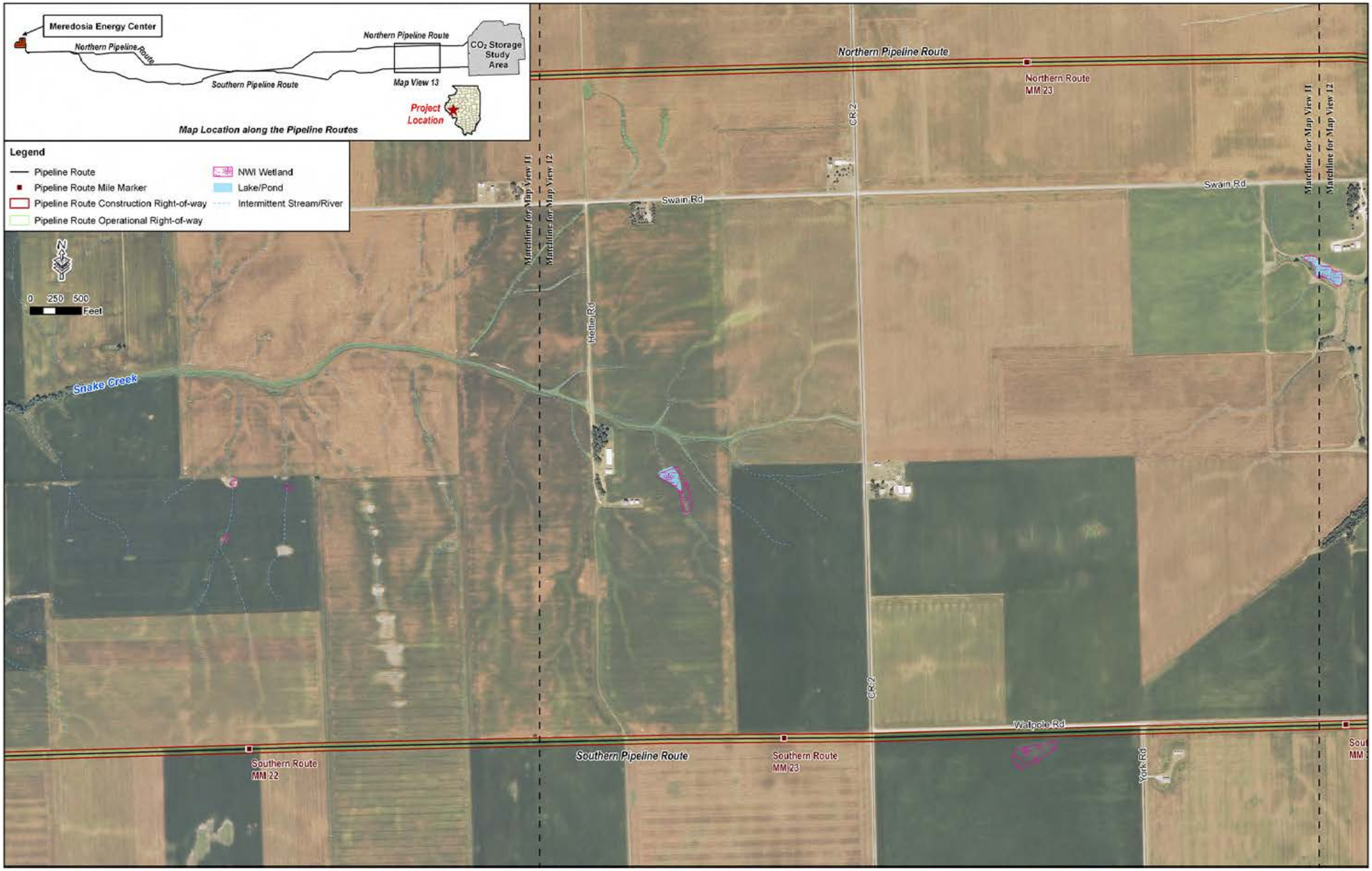

Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
Northern Pipeline Route
CO_2 Storage Study Area
Southern Pipeline Route
Map View 9
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
100-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
0 250 500
Feet
Substation Rd
Northern Route MM 17
Northern Pipeline Route
Northern Route MM 16
Sugar Hollow Rd
Sugar Hollow Rd
Arcadia Rd
Snake Creek
Ebenezer Church Rd
CR 16
Poor Farm Rd
Marsik Ln
Southern Route MM 16
Southern Pipeline Route
Southern Route MM 17
Southern Route MM 18
Base Line Rd
Matchline for Map View 8
Matchline for Map View 9
Matchline for Map View 8
Matchline for Map View 9

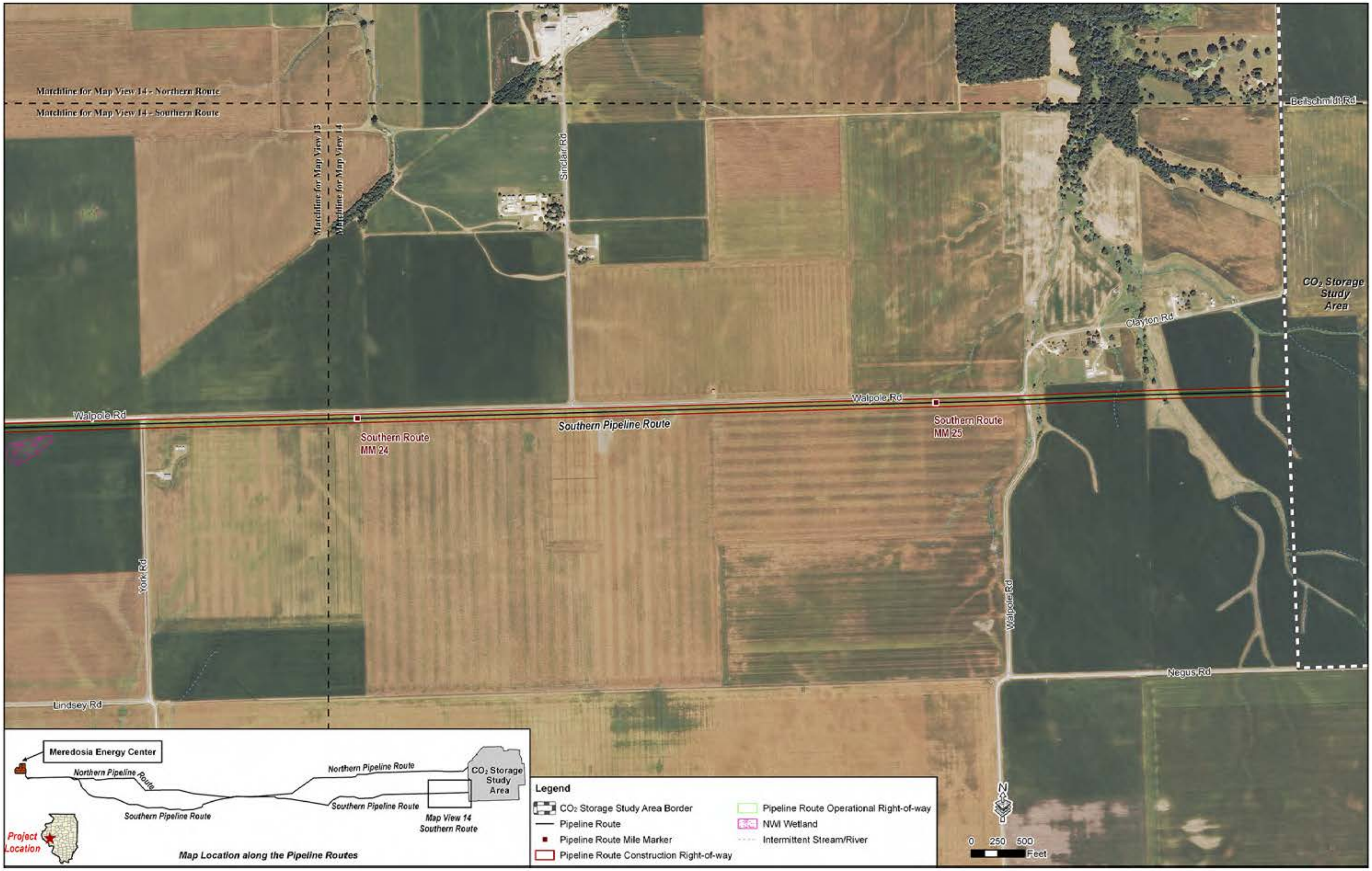

Meredosia Energy Center
Northern Pipeline Route
Northern Pipeline Route
Southern Pipeline Route
Southern Pipeline Route
Map View 10
CO2 Storage Study Area
Project Location
Map Location along the Pipeline Routes
Substation Rd
Northern Route MM 17
Northern Route MM 18
Northern Route MM 19
Northern Pipeline Route
Substation Rd
78
Franklin Ln
Ebenezer Church Rd
Sugar Hollow Rd
Arcadia Rd
Snake Creek
Quail Ln
Valevue Acres Dr
78
Matchline for Map View 9
Matchline for Map View 10
Matchline for Map View 10
Matchline for Map View 11
Southern Pipeline Route
Southern Route MM 19
Southern Route MM 18
Spradlin Rd
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
100-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
0 250 500
Feet

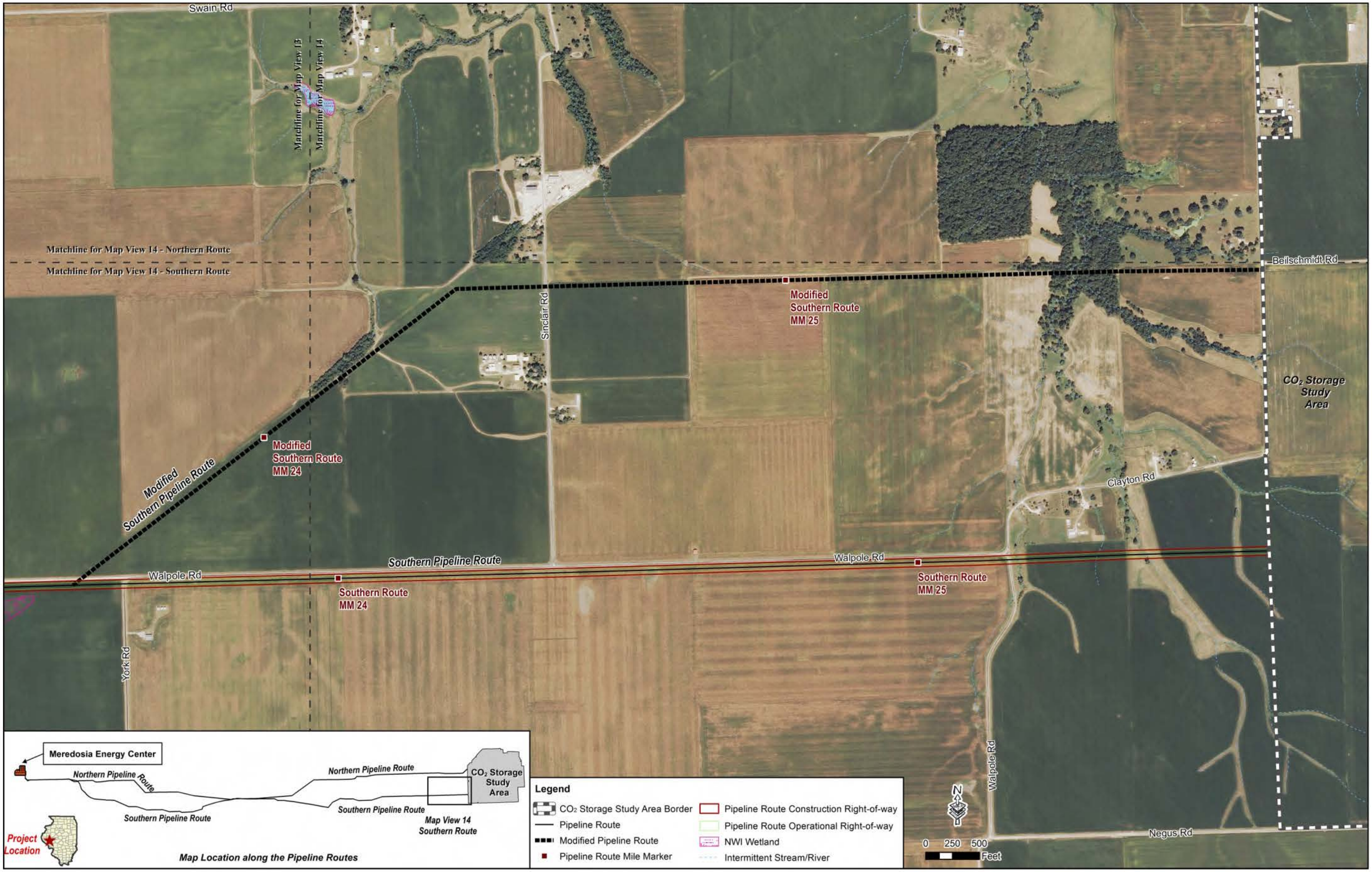

Meredosia Energy Center
Northern Pipeline Route
Southern Pipeline Route
Map View 11
CO2 Storage Study Area
Project Location
Map Location along the Pipeline Routes
Northern Route MM 20
Substation Rd
Matchline for Map View 10
Matchline for Map View 11
Matchline for Map View 12
Sorrill Rd
78
Snake Creek
Quail Ln
Valevue Acres Dr
Spradlin Rd
Southern Route MM 19
Southern Route MM 20
Southern Route MM 21
Hacker Rd
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
100-year Floodplain
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
N
0 250 500
Feet



Meredosia Energy Center
Northern Pipeline Route
Northern Pipeline Route
CO_2 Storage Study Area
Southern Pipeline Route
Map View 12
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
Lake/Pond
Perennial Stream/River
Intermittent Stream/River
0 250 500 Feet
Northern Route MM 21
Northern Pipeline Route
Northern Route MM 22
Swain Rd
Crazy Horse Rd
Matchline for Map View 10
Matchline for Map View 11
Matchline for Map View 11
Matchline for Map View 12
Snake Creek
Hacker Rd
Spradlin Rd
Spradlin Rd
Southern Route MM 21
Southern Pipeline Route
Southern Route MM 22
Hacker Rd


Meredosia Energy Center
Northern Pipeline Route
Northern Pipeline Route
Southern Pipeline Route
Map View 13
CO2 Storage Study Area
Project Location
Map Location along the Pipeline Routes
Legend
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
Lake/Pond
Intermittent Stream/River
0 250 500 Feet
N
Northern Pipeline Route
Northern Route MM 23
Matchline for Map View 11
Matchline for Map View 12
Swain Rd
Swain Rd
CR 2
Hettie Rd
Snake Creek
Walpole Rd
York Rd
Southern Pipeline Route
Southern Route MM 22
Southern Route MM 23


Matchline for Map View 14 - Northern Route
Matchline for Map View 14 - Southern Route
Matchline for Map View 13
Matchline for Map View 14
Sinclair Rd
Beilschmidt Rd
CO2 Storage Study Area
Clayton Rd
Walpole Rd
Walpole Rd
Southern Route MM 24
Southern Pipeline Route
Southern Route MM 25
York Rd
Walpole Rd
Negus Rd
Lindsey Rd
Meredosia Energy Center
Northern Pipeline Route
Northern Pipeline Route
CO2 Storage Study Area
Southern Pipeline Route
Southern Pipeline Route
Map View 14 Southern Route
Project Location
Map Location along the Pipeline Routes
Legend
CO2 Storage Study Area Border
Pipeline Route
Pipeline Route Mile Marker
Pipeline Route Construction Right-of-way
Pipeline Route Operational Right-of-way
NWI Wetland
Intermittent Stream/River
N
0 250 500
Feet



Note: This Map View 14 shows the route that was analyzed in the DEIS along with a short modification to the end of the southern pipeline route. The modification to the southern pipeline route occurs along the last 2 miles of the route before it enters the CO_2 storage study area. The Alliance recently notified landowners along the southern route (modified) of their interest in obtaining pipeline easements. The modified route does not change the impact analysis, as the changes to the route are minor. The final EIS will reflect the updated route.

APPENDIX D

Wetlands Surveys

D1 – Ameren Wetlands Report for Meredosia Energy Center

D2 – Preliminary Jurisdictional Determination and Wetlands Delineation for the Proposed FutureGen Soil-Gas Monitoring and Meteorological Tower

D3 – Preliminary Jurisdictional Determination and Wetlands Delineation for the Proposed FutureGen Development (Stratigraphic Well)

for the

Draft Environmental Impact Statement
FutureGen 2.0 Project
Meredosia, Illinois (Morgan County)

DOE/EIS-0460D
April 2013

INTENTIONALLY LEFT BLANK

APPENDIX D1

AMEREN WETLANDS REPORT FOR MEREDOSIA ENERGY CENTER

INTENTIONALLY LEFT BLANK

Ameren Wetland Report FutureGen 2.0 Project Meredosia, Illinois

February 2012

Prepared for:

Ameren
and
URS Corporation

Prepared by:

Potomac-Hudson Engineering, Inc.
7830 Old Georgetown Road, Suite 220
Bethesda, Maryland 20814

Table of Contents

INTENTIONALLY LEFT BLANK

1 INTRODUCTION

The U.S. Department of Energy (DOE) is preparing an Environmental Impact Statement (EIS) for the proposed action of providing approximately $1 billion in federal funding (most of it appropriated by the American Recovery and Reinvestment Act) for the FutureGen 2.0 Project (the “Project”). The Project consists of the repowering of an existing electricity generator with clean coal technologies integrated with a pipeline that would transport carbon dioxide (CO_2) to a sequestration site where it would be injected and stored in a deep geologic formation. These actions would be completed in two separate project components: (1) an Oxy-Combustion Large Scale Test undertaken by Ameren Energy Resources (Ameren) and (2) a Pipeline and CO_2 Storage Reservoir undertaken by the FutureGen Alliance (Alliance).

For the Oxy-Combustion Large Scale Test, Ameren and its team would construct and operate an advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at Ameren’s Meredosia Power Station in west central Illinois. A concentrated and compressed CO_2 stream produced in the process would be transferred to a pipeline for transmission to the Alliance’s storage location.

Potomac-Hudson Engineering, Inc. (PHE) has prepared this wetlands report to support the EIS and future wetland permitting activities for the Project with the U.S. Army Corps of Engineers (USACE). This report has been prepared for the Ameren portion of the Project, the Oxy-Combustion Large Scale Test component, and does not include analyses of areas that may be affected by the Alliance’s portion of the Project, the Pipeline and CO_2 Storage Reservoir component.

Wetland evaluations were performed at potential impact areas at the Meredosia Power Station site and nearby offsite locations within the project area. The boundaries of the project area have been superimposed on all the figures in this report. In addition, Figures A-2 through A-7 depict temporary and permanent impact areas. Concurrent with the wetland evaluation, an initial assessment of the “ordinary high water mark” (OHWM) of the Illinois River was also conducted in areas at the north end of the Ameren site (Area 3 in Figure A-5) as well as property further to the north of Ameren, which is currently a public boat launch (Area 1 in Figure A-5). These are areas that may be altered by Ameren to support barge unloading during construction. This evaluation was also conducted to support possible USACE permitting efforts. After reviewing an earlier draft of this report, USACE conducted a site visit on August 16, 2011, during which the OHWM was identified. The OHWM (set at 440 feet) is shown in the aerial images provided in Appendix A.

The remaining report is organized as follows:

- Section 2 – ***Definitions*** discusses the wetland and ordinary high water mark definitions as contained in the Clean Water Act (CWA).
- Section 3 – ***Methodology*** discusses the three-parameter wetland delineation methodology, the ordinary high water mark determination methodology, and field procedures employed.
- Section 4 – ***Existing Conditions*** describes the study area and summarizes the wetlands that were delineated.

In addition, the following attachments are provided in this report:

- Attachment A – Figures
    - Figure A-1 – USGS Map - Meredosia Quadrangle
    - Figure A-2 – National Wetland Inventory Map
    - Figure A-3 - Soils Map
    - Figure A-4 – FEMA Flood Insurance Rate Map
    - Figure A-5 - Vegetation Map
    - Figure A-6 – Delineated Wetlands Map
    - Figure A-7 – Delineated Wetlands Map (enlarged)
    - Figure A-8 – Photograph Locations Map
    - Figure A-9 – Survey Map with Spot Elevations for Ordinary High Water Mark (Benton & Associates, Inc.)
    - Figure A-10 – Impacted Areas Map with Ordinary High Water Mark Contour (URS, 2011c)
- Attachment B – Site Photographs
- Attachment C – Wetland Data Sheets
- Attachment D – Qualifications of Preparers

2 DEFINITIONS

2.1 WETLANDS

Wetlands are defined under the CWA (40 Code of Federal Regulations [CFR] Part 230) as follows:

> ***Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.***

Certain features, called "Waters of the U.S.," (WOUS) are regulated by the USACE under the CWA, because they are important for the preservation of navigable waterways and interstate commerce. WOUS are subject to federal jurisdiction and permitting under Section 404 of the CWA. The regulatory definition of WOUS in the CWA (40 CFR Part 230) is as follows:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

- ***(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or***
- ***(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or***
- ***(iii) Which are used or could be used for industrial purposes by industries in interstate commerce;***

(4) All impoundments of waters otherwise defined as waters of the United States under this definition;

(5) Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;

(6) The territorial sea;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with EPA.

Wetland boundary determinations are typically conducted by applying the Routine Methodology listed in the ***Corps of Engineers Wetlands Delineation Manual*** (the "Manual"). This methodology requires that three criteria be present in order for an area to qualify as a federally jurisdictional wetland. The three wetland criteria are identified as (USACE, 1987):

(1) hydrophytic vegetation;

(2) hydric soils; and

(3) wetland hydrology.

Hydrophytic vegetation is defined as macrophytic plant life growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. The USFWS has developed a list of wetland plants and their affinity for wetland conditions. The "***National List of Plant Species that Occur in Wetlands: North Central (Region 3)***" (USFWS, 1988) lists wetland plants common to the north central United States.

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions within the major portion of the root zone. The National Technical Committee for Hydric Soils has developed criteria for hydric soil determination in addition to a list of hydric soil types.

Wetland hydrology is the permanent or periodic inundation or soil saturation for a significant period during the vegetative growing season. Many factors influence the hydrology of an area, including precipitation, topography, soil permeability and plant cover. The frequency and duration of inundation or soil saturation are the important factors in the determination of the existence of wetland hydrology (USACE, 1987).

2.2 ORDINARY HIGH WATER MARK

USACE regulations define the term "ordinary high water mark" (OHWM) for purposes of the CWA, as found in 33 CFR 328.3(e):

> ***The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.***

3 METHODOLOGY

3.1 WETLANDS DELINEATION METHODOLOGY

3.1.1 Vegetation

As vegetation serves as an indicator of existing environmental conditions, the methodology of the Manual directs the researcher to analyze the existing vegetation. This involves estimation of existing plant species composition by direct observation. Wetlands are usually characterized by the predominance of hydrophytic plant species. Conversely, upland areas would be dominated by plant species better adapted to drier soil conditions. A mesic zone, or the transition zone between wetland and upland habitat, is often comprised of a mixture of facultative wetland species, facultative, and facultative upland species.

With respect to vegetation, the Manual places great emphasis on the presence of hydrophytic species (dominance) as indicators of wetland areas. The determination of whether or not a species is dominant is based upon its percentage of cover. Dominance, as defined herein, refers to the spatial extent of a species. Commonly, the most abundant species in each vegetation stratum (trees, shrubs, vines, and herbs) exceeds 50 percent of the total dominance measure (i.e., aerial cover or basal area) (USACE, 1987). Table 3-1 presents the criteria for determining wetland indicator classifications.

Table 3-1. USFWS Wetland Plant Indicator Status

Wetland Indicator Classification	Percent Occurrence in Wetlands
Obligate Wetland (OBL)	Greater than 99%
Facultative Wetland (FACW)	67 to 99%
Facultative (FAC)	33 to 66%
Facultative Upland (FACU)	1 to 33%
Obligate Upland (UPL)	Less than 1%

Source: USFWS, 1988a

A positive (+) or negative (-) symbol used in conjunction with one of the facultative indicator classes relates to a species preference to either the drier or the wetter end of its indicator class. The positive sign indicates preference to the wetter end of the category and a negative sign is a preference to the drier end (USFWS, 1988a). These wetlands indicator classifications were determined for species found in the project area and used in conjunction with their percentage of cover to determine whether a prevalence of wetland species are dominant in any of the vegetation communities occurring in the project area.

3.1.2 Soils

A hydric soil is formed when it lies within a saturated, flooded, or ponded area for a sufficient duration during the growing season, which aids in the development of anaerobic conditions in the upper part of the soil profile. Typical hydric soil indicators include a low-chroma matrix, redoximorphic features (low-chroma mottles or high-chroma mottles), gleying, oxidized rhizospheres, iron concretions, and manganese nodules. A soil is generally considered to be hydric if it has a chroma of 1 or a chroma of 2 with mottling (USACE, 1987).

An auger was used to extract soil profiles for inspection from multiple points along wetland boundaries and adjacent uplands. Soil samples were taken to a depth of approximately 12 inches below ground surface and examined for hydric soil traits (i.e. color, texture, and moisture content). The color of the soil matrix was then compared to the colors presented in the Munsell Soil Color Chart to confirm whether the colors were consistent with the hydric soil criteria.

3.1.3 Hydrology

Wetland hydrology is often the least exact and most difficult parameter to establish in the field, largely due to seasonal fluctuations of ground water elevation and seasonal precipitation. Additional factors that influence wetland hydrology include topography, plant cover, soil texture, and depth to bedrock. Documenting the existence of wetland hydrology involves the observations of wetland field indicators, which provide direct or indirect evidence of inundation or soil saturation for extended periods during the growing season. Although these indicators are quickly assessed in the field, professional judgment must be used to decide whether these indicators demonstrate that the wetland hydrology criterion has been satisfied. Drift lines, water marks, sediment deposits, root staining, scour areas, buttressed trees and drainage patterns are some of the indicators which commonly identify wetland hydrology (USACE, 1987).

3.1.4 Non-jurisdictional Wetlands

WOUS include all navigable waterways, their tributaries, as well as wetlands contiguous to and adjacent to those navigable waterways and tributaries. Isolated wetlands (those that have no surface hydrologic connection to WOUS) are not regulated under federal jurisdiction unless they are adjacent to or within the 100-year floodplain of WOUS. Determinations of whether features should be considered WOUS were based on field observations and desktop reviews of available mapping (e.g., U.S. Geological Survey topographic maps) based on the CWA definition provided in Section 2.

3.2 WETLANDS FIELD DELINEATION PROCEDURES

The field investigation of potentially affected areas of the Meredosia Power Station site and offsite locations occurred on May 25, 26 and 27, 2011. The wetland delineation activities were conducted using the ***Corps of Engineers Wetlands Delineation Manual*** (1987) (the "Manual") guidelines based upon the three-parameter approach defined earlier (hydrophytic vegetation, hydric soils, and wetland hydrology).

The locations of all wetland features identified were marked in the field using flagging tape and subsequently recorded using a Trimble ProXRT Global Positing System (GPS) unit capable of sub-meter accuracy using real-time differential GPS and/or data post-processing procedures. All features were recorded for horizontal position using Illinois State Plane West, North American Datum, 1983 (NAD 83) coordinates in feet.

3.3 ORDINARY HIGH WATER MARK DETERMINATION METHOD

A site visit was conducted on May 25, 2011 of the two areas of the banks of the Illinois River that could be potentially disturbed during construction of the project, namely in Area 1 and Area 3 (see Figure A-5 and Photos 1 through 7). Site observations were then reviewed in light of the USACE's definition of the OHWM, as discussed in Section 2.2. On August 16, 2011, a USACE representative conducted a site visit and identified the OHWM at the 440-foot elevation. Based on this determination, spot elevations for the OHWM were taken during a survey conducted August 25, 2011 (Figure A-9). The OHWM contour line was then interpolated and is shown in the aerial images of Appendix A. A full topographic survey will be completed prior to construction of the project and will more accurately locate the OHWM.

4 EXISTING CONDITIONS

4.1 ONSITE AREAS (WITHIN AMEREN PROPERTY)

4.1.1 Review of Maps from Other Sources

Prior to, during, and after the site visit a variety of maps were consulted in order to assist PHE with the field work and determinations regarding potential wetlands and WOUS. These included:

- The USGS map (USDOI, 2001) is included as Figure A-1. An overlay of the areas that may be potentially disturbed is shown on the map. Since the USGS map is based on 2001 conditions, it is not completely reflective of current conditions. For example, the road to the ash ponds is not shown. Thus, the tree lines and topographic contours depicted in the vicinity of that road are not accurate based on current conditions.
- The National Wetlands Inventory (NWI) wetlands features (USF&W, 2010) are overlaid on a recent (2010) aerial photograph and included as Figure A-2. An additional overlay of the areas to be potentially disturbed is also shown on the map. No NWI wetlands are within the areas of potential disturbance. For reference purposes, the wetlands that were identified in the field (and discussed later in Section 4.2) are also shown in Figure A-2. As discussed in Section 4.2, hydric soils extended upslope from the flagged wetlands.
- The boundaries of the soil types in the Morgan County Soil Survey (USDA, 2006) are overlaid on a recent (2010) aerial photograph and included as Figure A-3. According to this mapping, which was based on aerials and field work that apparently predated construction of the Ash Road, there are no hydric soils within the areas of potential disturbance. For reference purposes, the wetlands that were identified in the field (and discussed in Section 4.2) are also shown in Figure A-3.
- The boundaries of the 100-year and 500-year floodplains (FEMA, 2011) are overlaid on a recent (2010) aerial photograph and included as Figure A-4. According to this mapping, which was apparently based on pre-2006 aerials that predated construction of the Ash Road, there is a large floodplain south of the main entrance to the facility. The FEMA map shows that the main entrance, while out of the 100-year floodplain, is within the 500-year floodplain. For reference purposes, the wetlands that were identified in the field (and discussed in Section 4.2) are also shown in Figure A-4.

4.1.2 General Onsite Description

Ameren's property has been subject to a variety of disturbances over the years. These include: construction of houses and other features (pre-Ameren); filling and construction of the Ameren facility (including the power plant and associated features, such as roads, parking lots, railroad lines, storage tanks, barge unloading facilities, etc.); and maintenance of the facility that includes periodic mowing of the open field areas.

A Vegetation Map is included as Figure A-5. The vegetation boundaries for the areas that would be potentially disturbed are overlaid on a 2010 aerial photograph. These areas are described below.

Area 2 is a wooded area approximately 4.9 acres in size between the Illinois River to the west and a dirt road (Front Street) leading from the Meredosia Power Station property to the north, offsite. Area 2 is on the right side of Photo 8. The canopy is generally closed. There is a scattered shrub layer and lush herbaceous layer. Trees in the area include elm (***Ulmus sp.***), ash (***Fraxinus sp.***), silver maple (***Acer saccharinum***), northern catalpa (***Catalpa speciosa***), red mulberry (***Morus rubra***), and a few black walnut (***Juglans nigra)***. Groundcover consists primarily of a ***Panicum*** grass and also includes Virginia creeper (***Parthenocissus quinquefolia***), catchweed bedstraw (***Galium aparine)***, giant ragweed (***Ambrosia trifida***), and a ***Pachysandra*** species. The soils are loamy sand and well drained.

Area 3 is a small (0.7 acre), heavily disturbed area adjacent to the Illinois River just north of the fenceline of the Meredosia Power Station. The area consists of a narrow area of fill along the fenceline, a rip-rap slope (see Photo 4) down to the flats along the river that are shown in Photos 5 and 6. Vegetation consists of patchy grassy areas with a few shrubs (e.g., eastern red cedar [***Juniperus virginiana***] and silver maple saplings) and other herbaceous vegetation (e.g., false aster [***Boltonia asteroides***]). The filled areas and steep slopes are gravelly and rocky, while the flats along the river are sandy.

Area 4 is an 8.4-acre wooded area on the east side of the dirt road (Front Street) and Area 2. Area 4 is on the left side of Photo 8. Vegetation is similar to Area 2. The differences include: the frequency of black locust (***Robinia pseudoacacia***), and the lack of silver maple. Groundcover is dominated by catchweed bedstraw and has pokeweed (***Phytolacca americana***) and poison ivy (***Toxicodendron radicans***) with the other species from Area 2. The soils are loamy sand and well drained.

Area 6 is a 6.9-acre field consisting of mowed grasses and other herbaceous vegetation adjacent to the Meredosia Power Station. The soils are loamy sand and well drained.

Area 7 is a 16.7-acre field that contains grassy/herbaceous vegetation in open areas that surround seven wooded islands (with an additional 4.8 acres), which are identified in Figure A-5 as ***Area 7A***. In the open areas vegetation consists of species such as prickly pear cactus, a milkweed species (***Asclepias sp.***), and multiple grasses. See Photos 13 and 14. The area contains a steep, linear low spot in the eastern part, roughly parallel to the access road to the ash ponds. See Photos 10 and 11 that have north and south views of this depression. Photo 12 is a view from the Ash Road down into the depression. As compared to the portion of the site at higher elevation, the most notable difference in vegetation is the presence of eastern cottonwood seedlings. The soils are loamy sand and well drained.

Areas 7A, the seven wooded areas totaling 4.8 acres imbedded in Area 7, contain tree species such as black locust, smooth sumac (***Rhus glabra***), sassafrass (***Sassafras albidum***), black oak, and mulberry (***Morus sp.***). Herbaceous vegetation in the wooded areas consists of species such as Virginia creeper, catchweed bedstraw, and greenbrier (***Smilax sp.***). These wooded areas are on the fringes of the aforementioned Photos 10 to 14. The soils are loamy sand and well drained.

Area 8 consists of mostly grassy/herbaceous vegetation in the open areas (8.6 acres) with a large wooded portion (6.8 additional arces on the eastern edge identified as ***Area 8A*** in Figure A-5) and two central wetland areas (0.6 additional acres identified as ***Area 8B*** in Figure A-5). The topography of the entire area creates a bowl effect for Area 8B (see Photo 15), though it is undulating, especially within much of the wooded area.

Vegetation in the open areas (Area 8) consists primarily of multiple grasses including sedge, black locust, and smooth sumac saplings. Trees in the wooded portion (***Area 8A***) consist primarily of black locust with species such as eastern cottonwood, black oak, eastern red cedar, and smooth sumac. Dogwood (***Cornus sp.***) and honeysuckle (***Lonicera sp.***) shrubs are also present. Herbs and vines include species, such as common pokeweed, Virginia creeper, poison ivy, prickly pear cactus, catchweed bedstraw, and grape. Vegetation in the wetland areas consists of herbaceous species, including cattail (***Typha sp.***) and sedges that are sometimes ringed by eastern cottonwood saplings in greater abundance at slightly higher elevations. The soils within the two wetland areas and immediately adjacent to the wetlands were clayey with a chroma of 1 or 2 and clearly hydric. The boundary of the wetlands was defined by the topography (hydrology) and changes in the vegetative community.

Area 9 consists of a relatively small area (0.8 acre) around the fuel unloading area. Vegetation consists only of trees, (primarily silver maple and willow (***Salix sp.***)), which were in the water of the Illinois River at the time of the site visit in May 2011. They are well below the elevation of the rest of the Meredosia Power Station Site. Because of the water level it was impossible to take any soil samples. The soils are loamy sand and well drained.

Area 10 is a rectangular field between the old ash ponds to the west and a wooded lot to the east (***Area 11***) that is 6.5 acres in size. It consists mostly of grassy/herbaceous vegetation with species such as sedges, ***Panicum***, ***Rubus*** species, and curly dock (***Rumex crispus***) covering most of the area with common pokeweed and milkweed around woodland edges. There are a few trees in the area such as black locust and black oak. The soils are loamy sand and well drained.

Area 11 consists of a 7.6-acre wooded area between two fields, Area 10 to the west and Area 12 to the east. The herbaceous layer is thick in some spots and more open on others. Trees in the area consist of species such as pignut hickory (***Carya glabra***), sassafrass, ash, silver maple, and smooth sumac. Herbaceous vegetation consists of species such as catchweed bedstraw, Virginia creeper, and common pokeweed. The soils are loamy sand and well drained.

Area 12 consists of an open area with vegetation consisting mainly of grasses such as purple tridens (***Tridens flavus***). Scattered smooth sumac saplings are also present. The soils are loamy sand and well drained.

4.1.3 Summary of Wetland Features

Two wetland areas were identified onsite – shown as Vegetation Community ***Area 8B*** in Figure A-5 and as Wetlands Areas ***PA*** (0.37 acres) and ***PB*** (0.26 acres) in Figures A-6 and A-7. Soils are hydric throughout. Standing water in large portions was observed at both areas on May 25, 26 and 27 with soils saturated to the surface in nearby areas. One pair of Wetland Determination Data Forms were recorded for each wetlands area (see Attachment C). Their locations are shown in Figure A-7.

Based on the FEMA maps, these wetlands are within the 100-year floodplain, associated with the Illinois River. A USACE representative conducted a site visit on August 16, 2011. In an e-mail follow-up to the site visit, dated August 18, 2011, USACE stated that they agreed with the boundaries of the delineated wetlands onsite and stated that these wetland areas are not isolated and would be considered under federal, USACE jurisdiction (Zobrist, 2011). Although there is no surface hydrologic connection to WOUS beyond their presence in the floodplain, USACE stated that there is a groundwater connection to the Illinois River, which allows the wetlands to be inundated due to river water level fluctuation.

The wetlands classification of these areas, following Cowardin et al. (1979), are as follows:

- System – Palustrine;
- Class – Emergent Wetland;
- Subclass – Persistent; and
- Dominance Type – Mud.

4.2 OFFSITE AREAS

4.2.1 Railroad Property at Southeast Corner

4.2.1.1 General Site Description

The area is shown as ***Area 14*** and ***Area 14A*** in Figure A-5. It is primarily a mowed field that is 24.7 acres consisting of various grasses, prickly pear cactus, and purple vetch that is bisected by a rail line that provides access to industrial properties to the west (see Photos 16 and 17). There is a small deciduous wooded area in the southwest corner (***Area 14A***) that is 0.9 acres in size. The young overstory is dominated by oaks and mulberry. The understory contains sassafras and black walnut seedlings, multiflora rose, and honeysuckle. The herbaceous layer includes grasses and Virginia creeper. The soils are loamy sand and well drained throughout both areas.

4.2.1.2 Summary of Wetland Features

There were no areas identified as wetlands on this property.

4.2.2 Railroad Property at Northeast Corner

4.2.2.1 General Site Description

The area is shown as ***Area 5*** in Figure A-5. Area 5 is a mostly grassy area that is 5.6 acres in size. It is dominated by herbaceous vegetation, but also contains two small wooded islands. The wooded areas consist of tree species such as eastern cottonwood, black locust, red mulberry, and black oak (***Quercus velutina***). Herbaceous vegetation within the wooded area consists of species such as Virginia creeper, poison ivy, and grape (***Vitis sp.***). The field areas goatsbeard (***Tragopogon pratensis***), chives (***Allium schoenoprasum***), prickly pear cactus (***Opuntia humifusa***), common ragweed (***Ambrosia artemisiifolia***), yellow sweet-clover (***Melilotus officinalis***), Ohio spiderwort (***Tradescantia ohiensis***), and multiple grass species including sedges (***Carex sp.***). The soils are loamy sand and well drained.

4.2.2.2 Summary of Wetland Features

There were no areas identified as wetlands on this property.

4.2.3 Village Property to the North

4.2.3.1 General Site Description

This area is shown as ***Area 1*** in Figure A-5. It is an approximate 4.4-acre area, the majority of which is a paved parking area adjacent to the Illinois River. There are three eastern cottonwoods (***Populus deltoides***) in the sandy beach between the parking lot and the river when the river is at or near normal pool elevation. The two northern trees are shown in Photo 1 and the southern one in Photo 2, which also shows the sandy beach. The southern end of Area 1 is a grassy swale that carries runoff to the river. The soils are loamy sand and well drained.

4.2.3.2 Summary of Wetland Features

There were no areas identified as wetlands on this property.

4.2.4 Offsite Area to the East

4.2.4.1 General Site Description

Area 13 consists of a gravel parking lot. Around the edges of the lot are areas of herbaceous/grassy vegetation. The site was gravel on top of a loamy sand and is well drained.

4.2.4.2 Summary of Wetland Features

There were no areas identified as wetlands on this property.

4.3 ILLINOIS RIVER ORDINARY HIGH WATER MARK

As discussed in Section 3.3, site observations were conducted in two areas along the banks of the Illinois River – Area 1 and Area 3 – that could be potentially disturbed during construction (see Figure A-5 and Photos 1 through 7). In reviewing the definition of the OHWM and the physical conditions at the two areas, a definitive opinion was not possible. The water level at the time of the site visit, while above the normal pool elevation (as evidenced by the inundation of large areas of non-aquatic vegetation) was still well below other water levels (as evidenced by the drift line in the middle of the parking lot, Photo 1 and aerial photographs from 2010 that show the entire parking lot under water).

During a site visit on August 16, 2011, a USACE representative identified the OHWM at the location as 440 feet above mean sea level, which is located well into the parking lot. Based on this determination, a 440-foot OHWM contour line was interpolated based on recent survey efforts (Figure A-9) and is shown in Figures A-2 through A-6 and A-8. A full topographic survey will be completed prior to construction of the project and will more accurately locate the OHWM.

INTENTIONALLY LEFT BLANK

5 REFERENCES

Benton & Associates, Inc. 2011. Survey Map with Spot Elevations for Ordinary High Water Mark. August 25, 2011.

Bull, J. and J. Farrand, Jr. 1977. The Audubon Society Field Guide to North American Birds, Eastern Region. New York: Alfred A. Knopf.

Cobb, Boughton. 1963. The Peterson Field Guide Series; A Field Guide to Ferns and their Related Families, Northeastern and a North America. Boston, MA: Houghton Mifflin Company.

Conant, Roger. 1975. The Peterson Field Guide Series; A Field Guide to Reptiles and Amphibians of Eastern and Central North America. Boston, MA: Houghton Mifflin Company.

Cowardin, L.M., V. Carter, F.C. Golet and E.T. Laroe. December 1979. Classification of wetlands and deepwater habitats of the United States (USFWS Office of Biological Service, FWS/OBL-79/31). Washington, DC: U.S. Government Printing Office.

Federal Emergency Management Agency. 2011. National Flood Hazard Layer for the State of Illinois – FIRM ID: 17171C0025C, effective August 8, 2009. Washington, DC. Map Service Center request submitted March 29, 2011, at http://www.msc.fema.gov

Gleason, H.A. and A. Cronquist. 1991. Manual of vascular plants of northeastern U.S. and adjacent Canada, second edition. Bronx, NY: The New York Botanical Garden.

Holmgren, Noel H. 1998. Illustrated companion to Gleason and Cronquist's Manual: Illustrations of the vascular plants of northeastern U.S. and adjacent Canada. Bronx, NY: The New York Botanical Garden.

Knobel, Edward. 1980. Field Guide to the Grasses, Sedges and Rushes of the United States. New York: Dover Publications, Inc.

Little, Elbert L. 1983. The Audubon Society Field Guide to North American Trees, Eastern Region. New York: Alfred A. Knopf.

Munsell. 2000 Munsell Soil Color Charts. New Windsor, NY. Gretagmacbeth.

Niering, W. A. and N. C. Olmstead. 1983. The Audubon Society Field Guide to North American Wildflowers, Eastern Region. New York: Alfred A. Knopf.

Peterson, R.T. and M. McKenny. 1968. A field guide to wildflowers. Boston, MA: The Houghton Mifflin Company.

URS. 2011a. Impact Areas. Map depicting potential impact areas at the Meredosia Power Station for the FutureGen 2.0 Project. Dated April 2011.

URS. 2011b. Ordinary High Water Mark (interpolated). November 10, 2011.

URS. 2011c. Impacted Areas Map with Ordinary High Water Mark Contour. November 10, 2011.

U.S. Army Corps of Engineers, Waterways Experiment Station, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual (Technical Report Y-87-1). Vicksburg, MS: U.S. Army Corps of Engineers.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2006. Soil Survey Geographic (SSURGO) database for Morgan County, Illinois. Fort Worth, Texas. Accessed May 19, 2011 at http://SoilDataMart.nrcs.usda.gov/

U.S. Department of Agriculture, Natural Resources Conservation Service, National Cartography & Geospatial Center. 2001. USDA-NRCS-NCGC Digital Raster Graphic MrSID Mosaic, USGS 1:24,000 Topographic Quadrangle Series Index – Meredosia Quadrangle. Fort Worth, Texas.

U.S. Department of the Interior, Geological Survey. 2001 7.5 Minute Series (Topographic) Meredosia Quadrangle Sheet.

U.S. Fish and Wildlife Service. 1988. National List of Plant Species that Occur in Wetlands: North Central (Region 3). May. Biological Report 88 (26.3).

U.S. Fish and Wildlife Service. 1988a. National List of Plant Species that Occur in Wetlands: Northeast (Region 1). May. Biological Report 88 (26.1).

U.S. Fish and Wildlife Service, Division of Habitat and Resource Conservation. 2010. Classification of Wetlands and Deepwater Habitats of the United States, WETDBA.CONUS_wet_poly for the State of Illinois. Washington, DC. Accessed on May 17, 2011at http://www.fws.gov/wetlands/data/DataDownload.html

Zobrist, Tyson. 2011. Email communication between T. Zobrist (U.S. Army Corps of Engineers, St. Louis District, Regulatory Branch) and Kenny Lynn (Ameren). August 18, 2011.

ATTACHMENT A

FIGURES

INTENTIONALLY LEFT BLANK

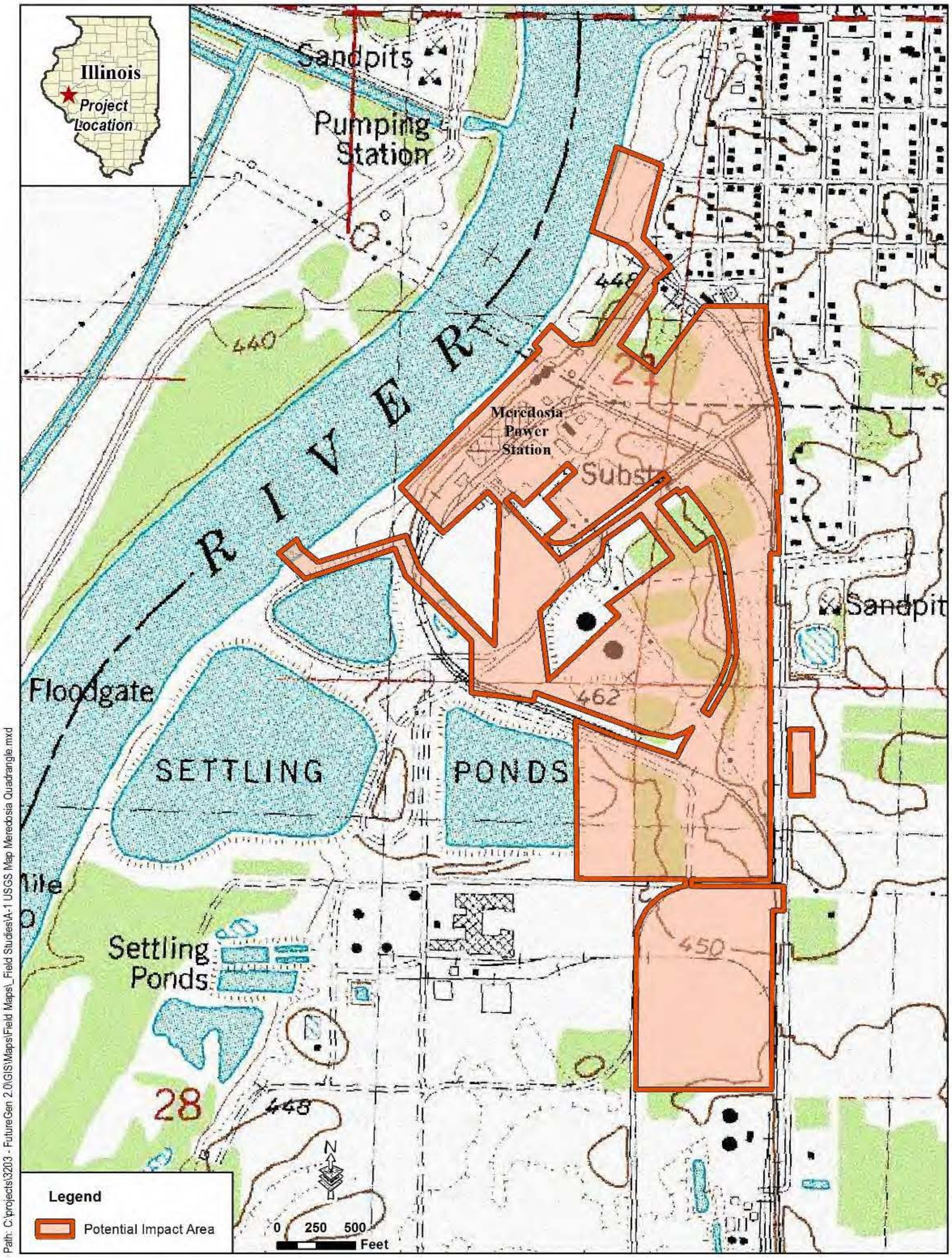


Figure A-1. USGS Map - Meredosia Quadrangle

(Source: USDOI, 2001)

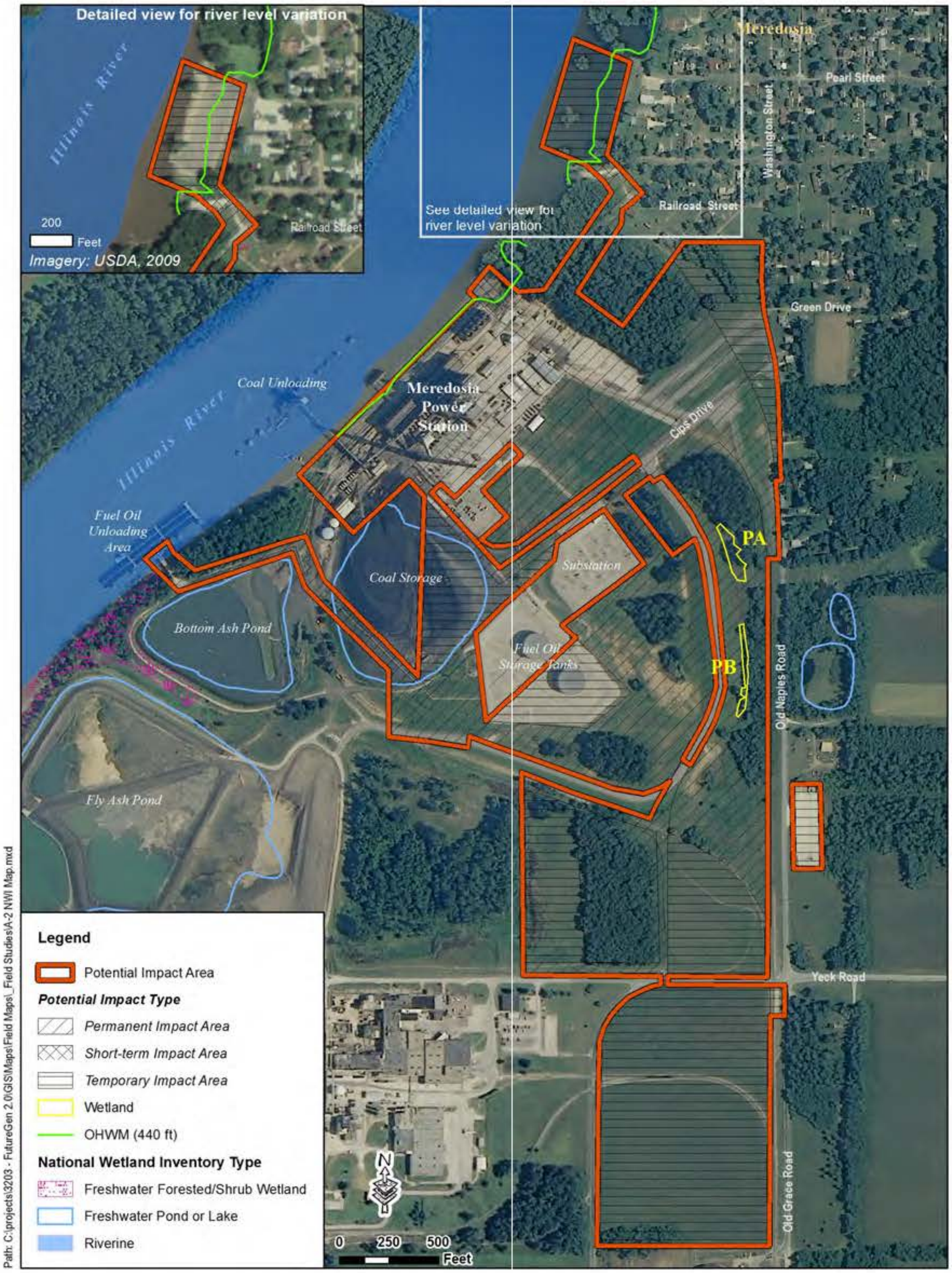


Figure A-2. National Wetlands Inventory Map

(Source: USF&W, 2010)

Figure A-3. Soils Map

(Source: USDA, Natural Resource Conservation Service, 2006)

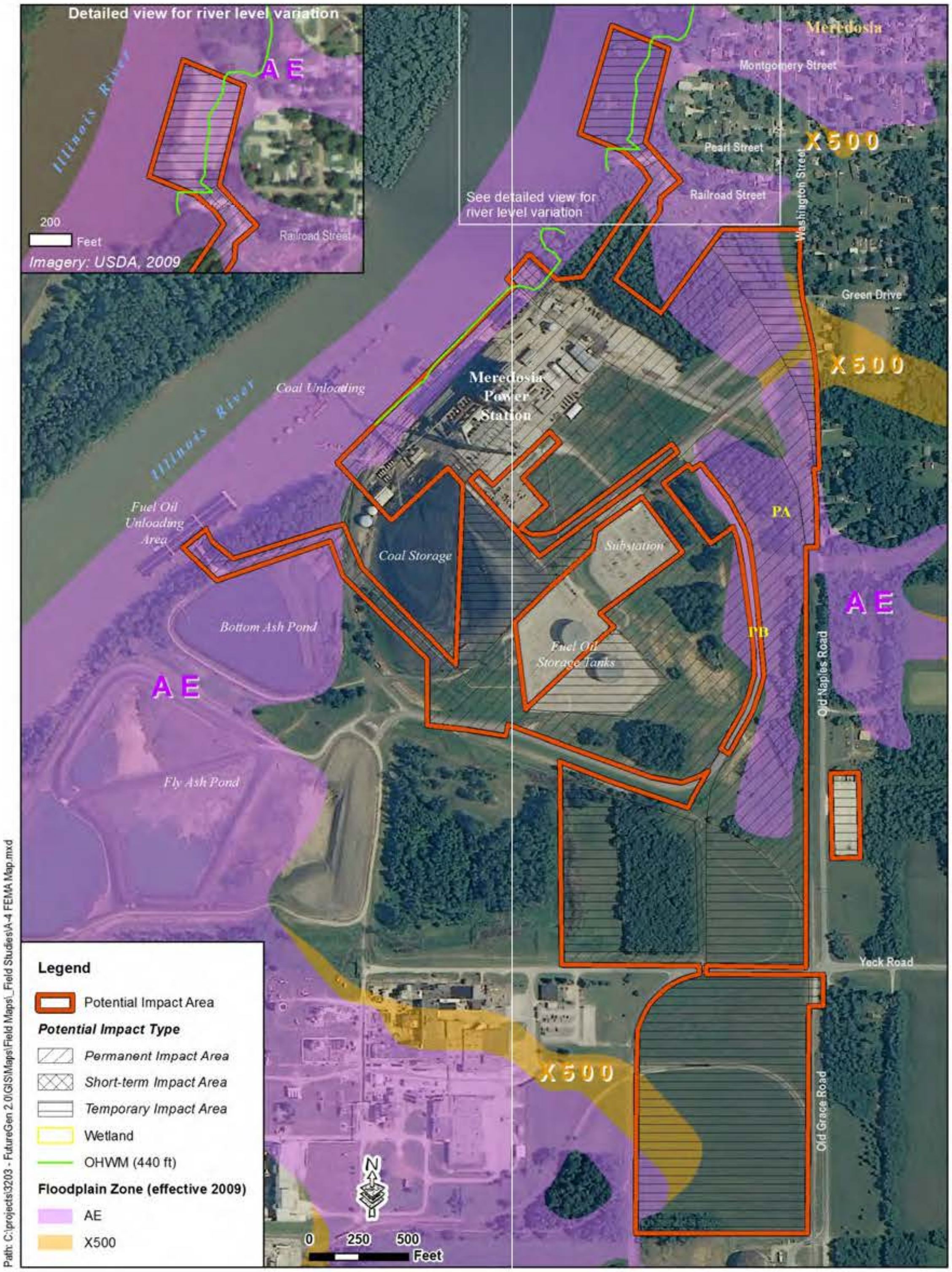


Figure A-4. FEMA Flood Insurance Rate Map

(Source: FEMA, 2011)

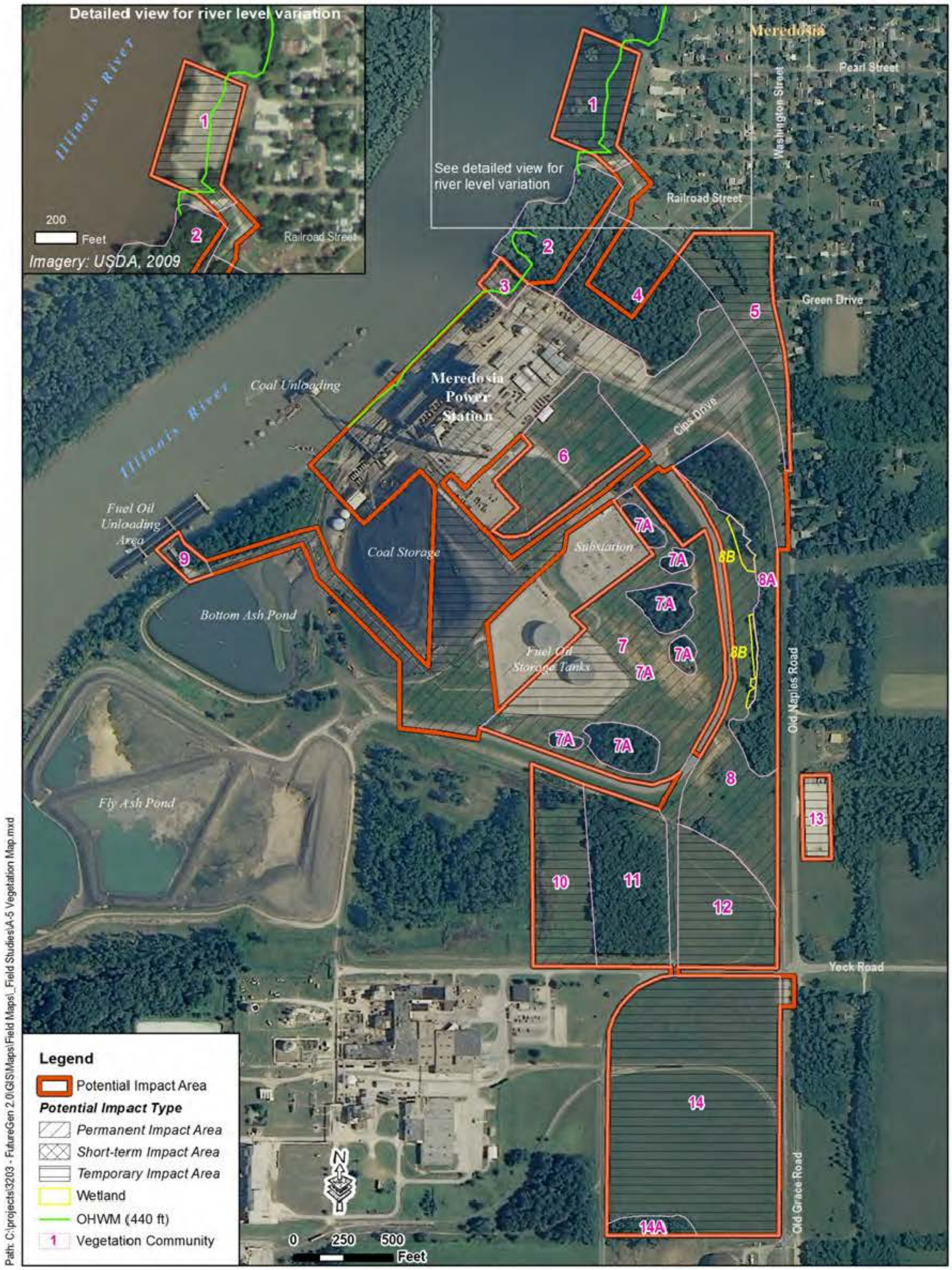


Figure A-5. Vegetation Map

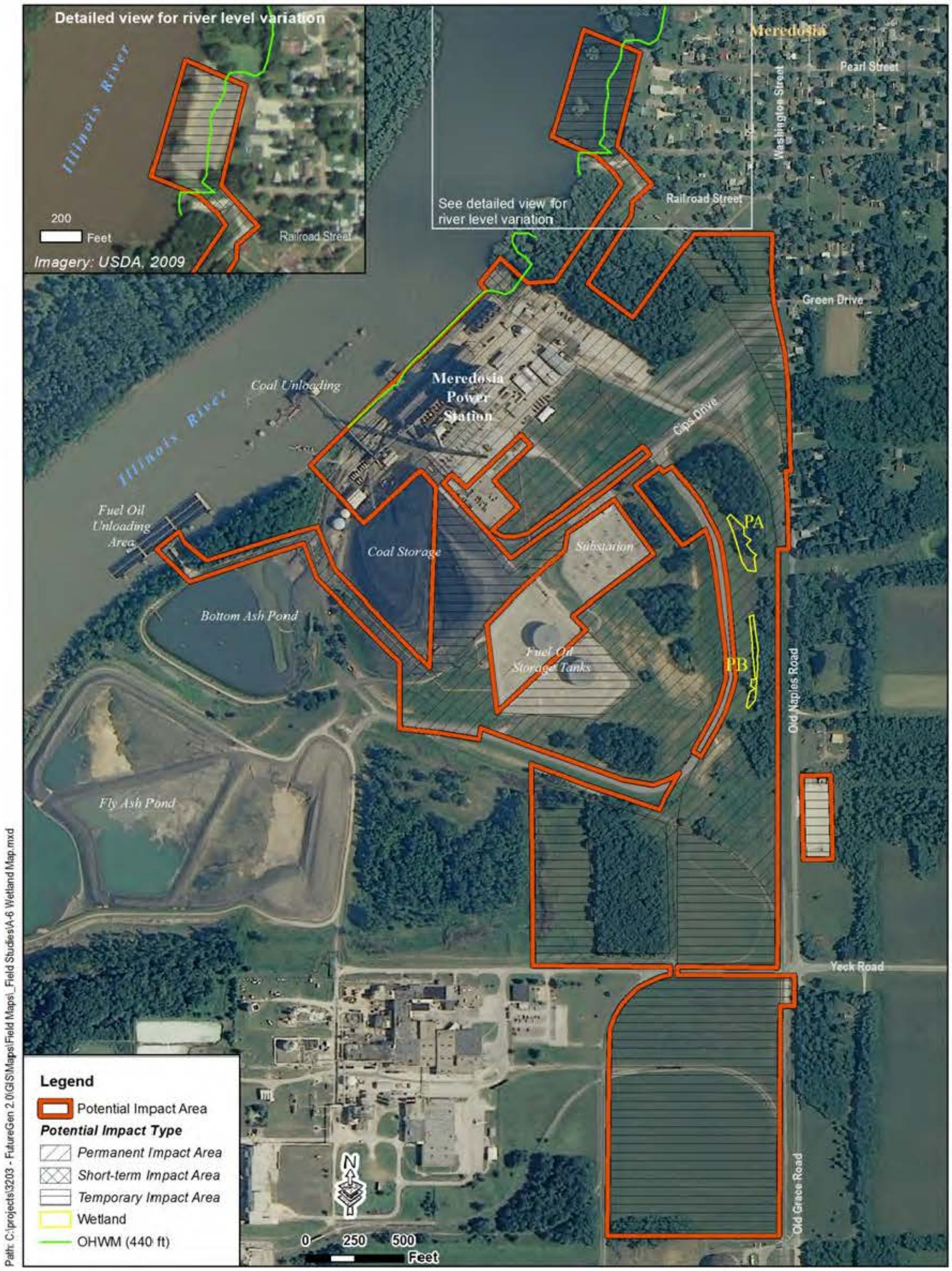


Figure A-6. Delineated Wetlands Map

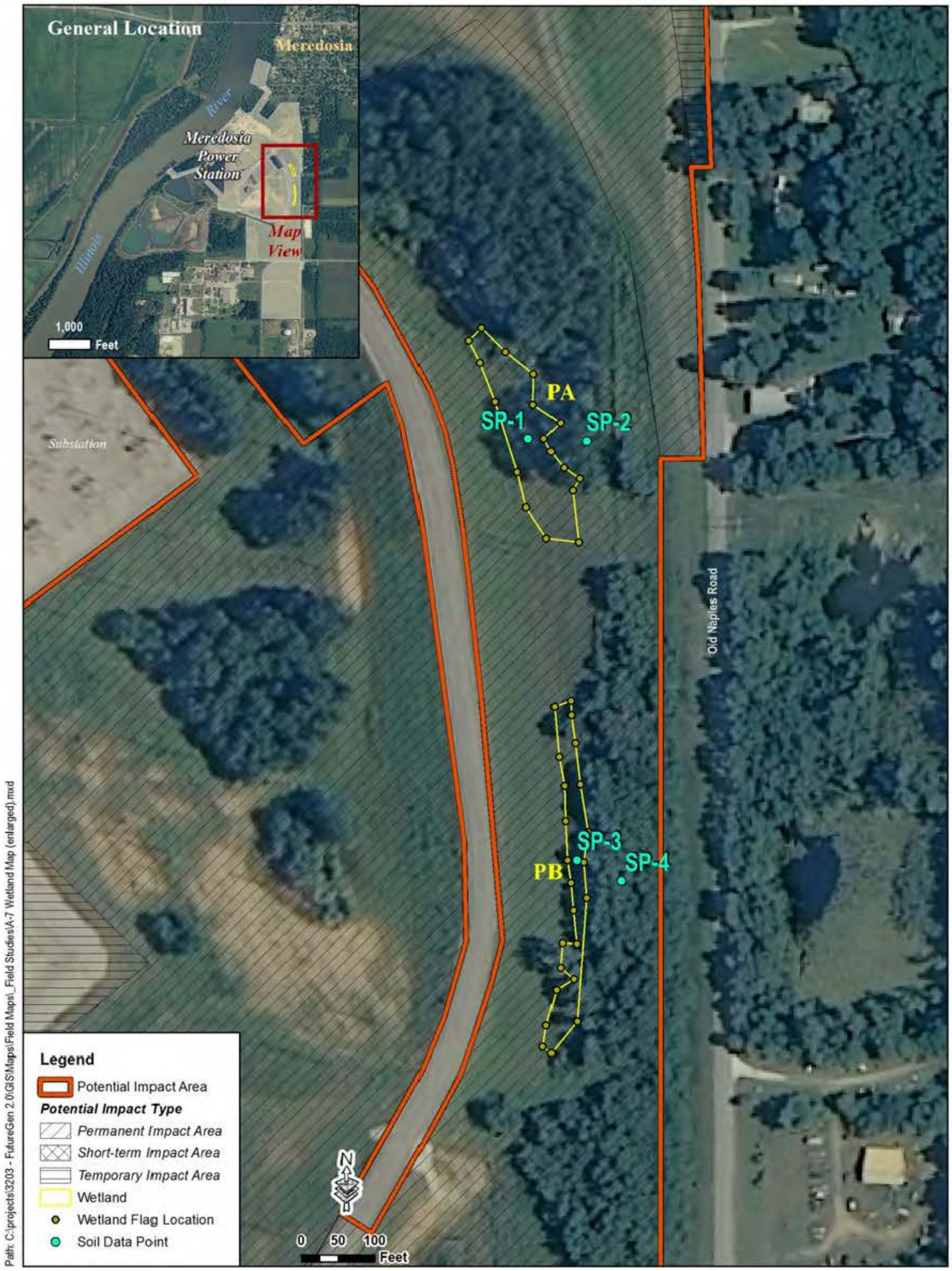


Figure A-7. Delineated Wetlands Map (enlarged)

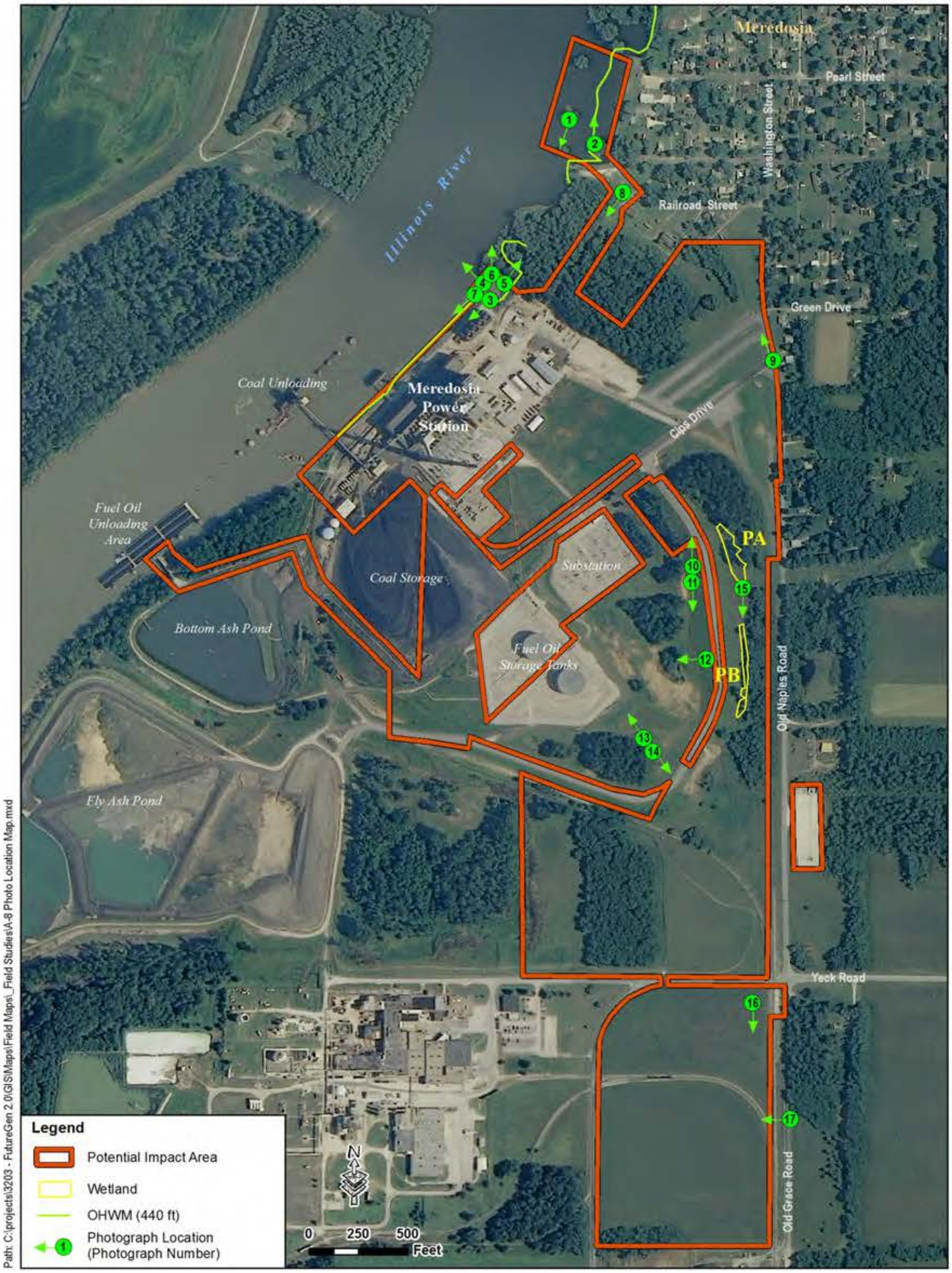


Figure A-8. Photograph Locations Map

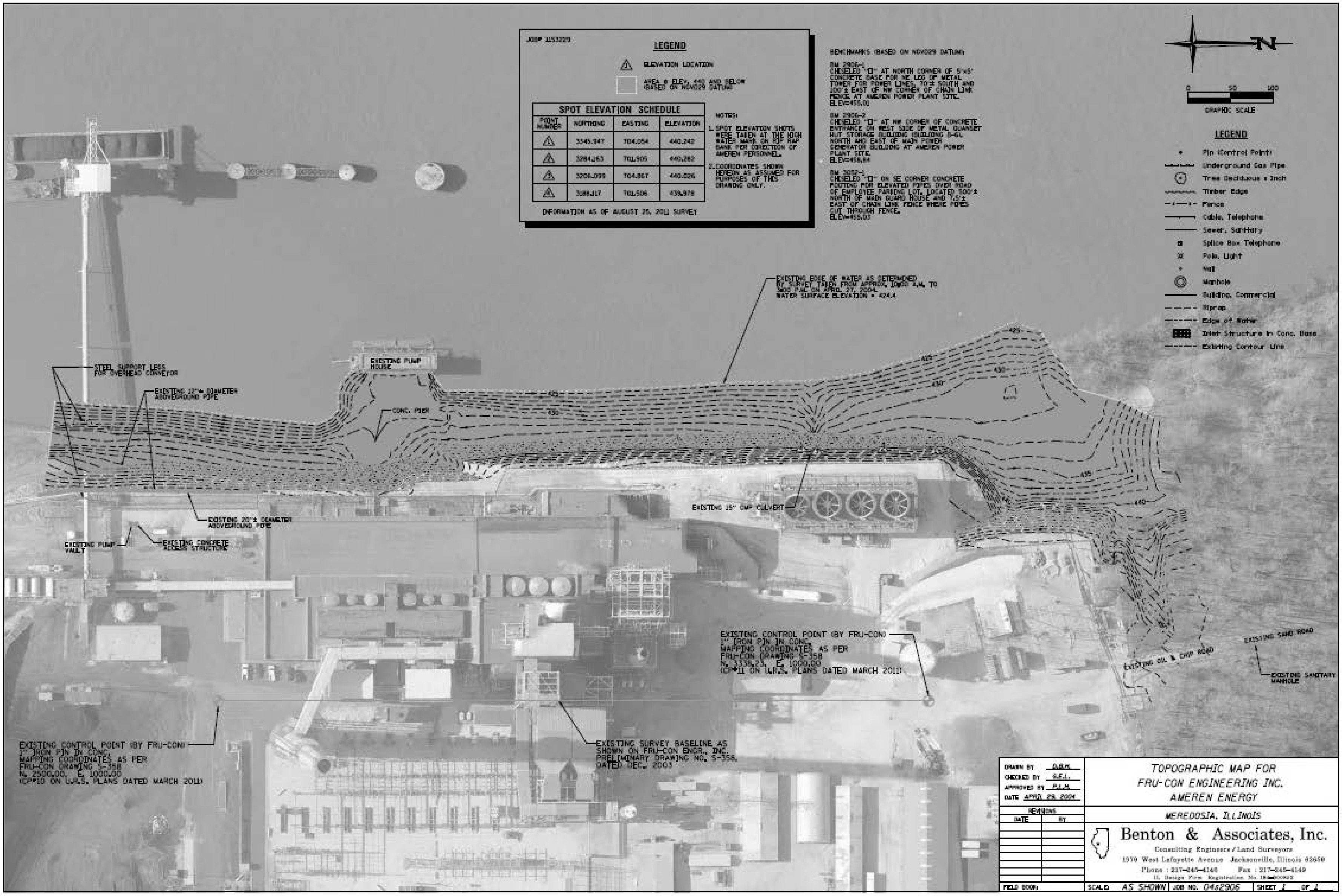


Figure A-9. Survey Map with Spot Elevations for Ordinary High Water Mark (Benton & Associates, Inc.)

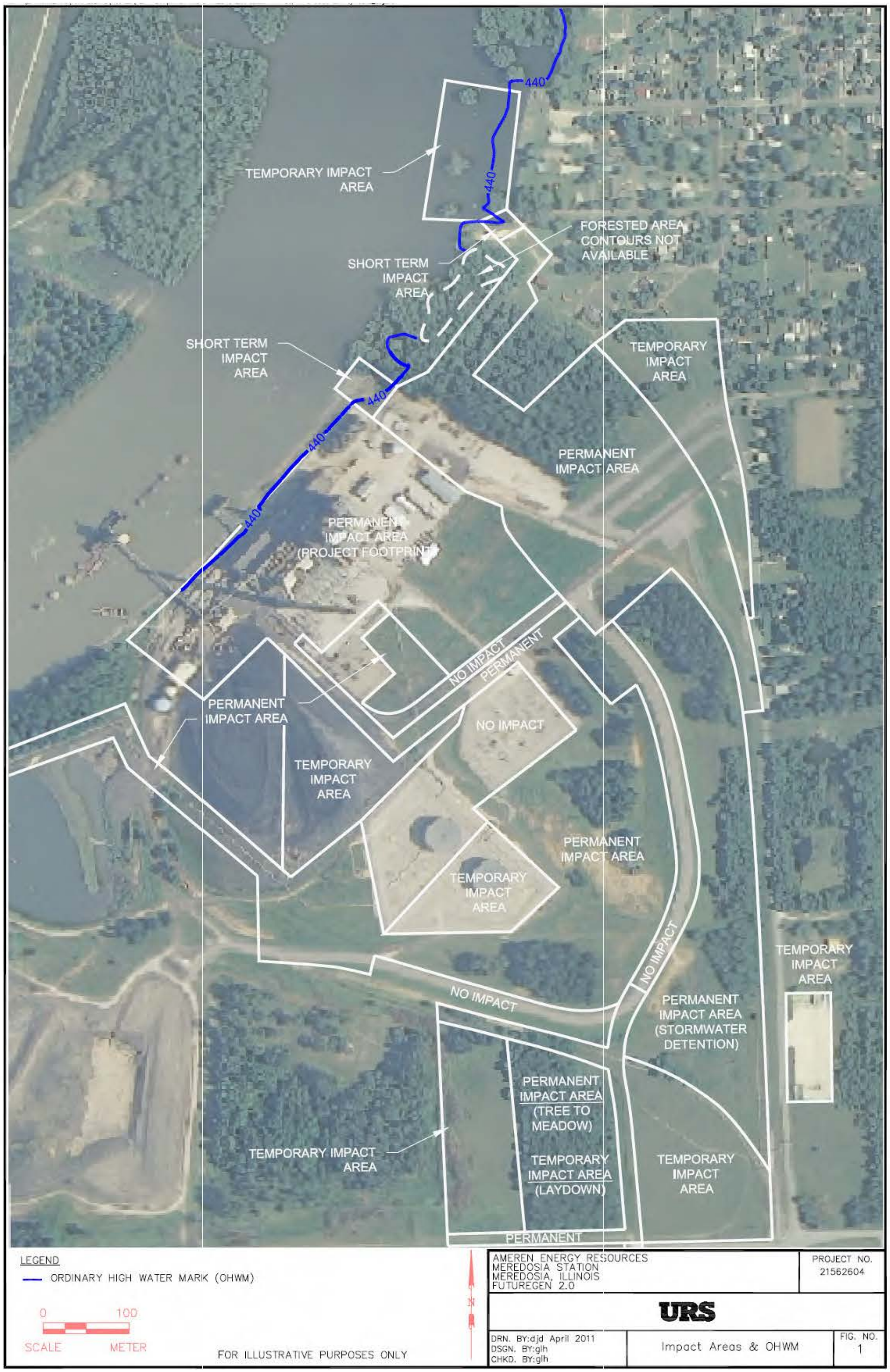


Figure A-10. Impacted Areas Map with Ordinary High Water Mark Contour (URS, 2011c)

ATTACHMENT B

SITE PHOTOGRAPHS
(May 25-26, 2011)

B-2

INTENTIONALLY LEFT BLANK

Photo 1. Drift Line Observed in parking lot at Village Property (Area 1).

Photo 2. Edge of parking lot and beach adjacent to boat ramp on Village Property (Area 1).

Photo 3. Existing rip-rap bank on west side of Ameren facility along the Illinois River.

Photo 4. View from top of bank towards the Illinois River.

Photo 5. View of Area 3 on north side of Ameren Site, looking northeast.

Photo 6. View of Area 3 on north side of Ameren Site, looking north.

Photo 7. Looking downstream from Area 3 at existing coal unloading operations.

Photo 8. View of existing trail (formerly Front Street) through the wooded area on the north side of the Ameren Site (between Areas 2 and 4).

Photo 9. View of Area 5, looking northeast from near the entrance to the Ameren facility.

Photo 10. View looking north along Ash Road in Area 7.

Photo 11. View looking south along Ash Road in Area 7.

Photo 12. View looking west across Area 7 from near Ash Road.

Photo 13. View looking northwest across a portion of Area 7 towards existing fuel oil storage tanks.

Photo 14. View looking southwest from Area 7 towards Area 8.

Photo 15. View of wetland area (PB), looking south.

Photo 16. Looking south across offsite Railroad Property (Area 14).

Photo 17. View of Area 14, looking west.

INTENTIONALLY LEFT BLANK

ATTACHMENT C

WETLAND DATA SHEETS

INTENTIONALLY LEFT BLANK

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: FutureGen 2.0/Meredosia Power Station City/County: Meredosia, Morgan County Sampling Date: May 26, 2011

Applicant/Owner: Ameren, Inc. State: IL Sampling Point: SP-1

Investigator(s): Becker, Crossan, Rua Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): ______

Slope (%): ______ Lat: 1148976 ft (N) Long: 2185597 ft (E) Datum: IL West SP NAD 83

Soil Map Unit Name: Plainfield loamy sand, 7 to 15 percent slopes (54D) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ______ No X

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ______	Is the Sampled Area within a Wetland?	Yes X No ______
Hydric Soil Present?	Yes X No ______		
Wetland Hydrology Present?	Yes X No ______		

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	______ = Total Cover		
Sapling/Shrub Stratum (Plot size: ______)			
1. Populus deltoides			FAC+
2. Typha sp.			OBL
3. Robinia pseudoacacia			FACU-
4.			
5.			
	______ = Total Cover		
Herb Stratum (Plot size: ______)			
1. Carex sp.			ID
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	______ = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	______ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	1	x 1 = 1
FACW species	0	x 2 = 0
FAC species	1	x 3 = 3
FACU species	1	x 4 = 4
UPL species	0	x 5 = 0
Column Totals:	3 (A)	8 (B)

Prevalence Index = B/A = 2.66

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ______

Remarks: (Include photo numbers here or on a separate sheet.)

US Army Corps of Engineers Midwest Region – Version 2.0

SOIL

Sampling Point: SP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 5/2	90	10YR 4/6	10	RM	M	Clay loam	
4 - 18+	10YR 4/2	70	10 YR 4/4	20	RM	M	Clay loam	
			10 YR 6/1	10	RM	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 4 - 6

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

US Army Corps of Engineers Midwest Region – Version 2.0

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: FutureGen 2.0/Meredosia Power Station City/County: Meredosia, Morgan County Sampling Date: May 26, 2011

Applicant/Owner: Ameren, Inc. State: IL Sampling Point: SP-2

Investigator(s): Becker, Crossan, Rua Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): ______

Slope (%): ______ Lat: 1148570 ft (N) Long: 2185621 ft (E) Datum: IL West SP NAD 83

Soil Map Unit Name: Plainfield loamy sand, 7 to 15 percent slopes (54D) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1. Robinia pseudoacacia			FACU-
2. Populus deltoides			FAC+
3. Cornus sp.			ID
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1. Populus deltoides			FAC+
2. Phytolacca americana			FAC-
3. Robinia pseudoacacia			FACU-
4. Lonicera sp.			ID
5.			
= Total Cover			
Herb Stratum (Plot size: ___)			
1. Parthenocissus quinquefolia			FAC-
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	4	x 3 = 12
FACU species	2	x 4 = 8
UPL species	0	x 5 = 0
Column Totals:	6 (A)	20 (B)

Prevalence Index = B/A = 3.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

US Army Corps of Engineers Midwest Region – Version 2.0

SOIL

Sampling Point: SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/4	100					Sand	
8 - 16	10YR 4/4	100					Sand	
16 - 20+	7.5 YR 5/6	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No X	Depth (inches): ______
Water Table Present?	Yes ______	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No X	Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

US Army Corps of Engineers Midwest Region – Version 2.0

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: FutureGen 2.0/Meredosia Power Station City/County: Meredosia, Morgan County Sampling Date: May 26, 2011

Applicant/Owner: Ameren, Inc. State: IL Sampling Point: SP-3

Investigator(s): Becker, Crossan, Rua Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): ______

Slope (%): ______ Lat: 1148545 ft (N)48 Long: 2185607 ft (E) Datum: IL West SP NAD 83

Soil Map Unit Name: Plainfield loamy sand, 7 to 15 percent slopes (54D) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1. Populus deltoides			FAC+
2. Rhus glabra			OBL
3. Robinia pseudoacacia			FACU-
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. Carex sp.			ID
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	1	x 1 = 1
FACW species	0	x 2 = 0
FAC species	1	x 3 = 3
FACU species	1	x 4 = 4
UPL species	0	x 5 = 0
Column Totals:	3 (A)	8 (B)

Prevalence Index = B/A = 2.66

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

US Army Corps of Engineers Midwest Region – Version 2.0

SOIL

Sampling Point: SP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 5/2	90	10YR 4/6	10	RM	M	Clay loam	
6 - 18+	10YR 4/2	80	10 YR 4/4	10	RM	M	Clay loam	
			10 YR 6/1	10	RM	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 4 - 6
Water Table Present?	Yes ___	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

US Army Corps of Engineers Midwest Region – Version 2.0

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: FutureGen 2.0/Meredosia Power Station City/County: Meredosia, Morgan County Sampling Date: May 26, 2011

Applicant/Owner: Ameren, Inc. State: IL Sampling Point: SP-4

Investigator(s): Becker, Crossan, Rua Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): ______

Slope (%): ______ Lat: 1148570 ft (N) Long: 2185624 ft (E) Datum: IL West SP NAD 83

Soil Map Unit Name: Plainfield loamy sand, 7 to 15 percent slopes (54D) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ______ No X

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______ No X	
Hydric Soil Present?	Yes ______ No X	**Is the Sampled Area**
Wetland Hydrology Present?	Yes ______ No X	**within a Wetland?** **Yes** ______ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. Robinia pseudoacacia			FACU-
2. Populus deltoides			FAC+
3. Cornus sp.			ID
4.			
5.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: ______)			
1. Populus deltoides			FAC+
2. Phytolacca americana			FAC-
3. Robinia pseudoacacia			FACU-
4. Lonicera sp.			ID
5.			
		= Total Cover	
Herb Stratum (Plot size: ______)			
1. Parthenocissus quinquefolia			FAC-
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
		= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1. Toxicodendron radicans			FAC+
2.			
		= Total Cover	

Remarks: (Include photo numbers here or on a separate sheet.)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 43% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	5	x 3 = 15
FACU species	2	x 4 = 8
UPL species	0	x 5 = 0
Column Totals:	7 (A)	22 (B)

Prevalence Index = B/A = 3.14

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ______ **No** X

US Army Corps of Engineers Midwest Region – Version 2.0

SOIL

Sampling Point: SP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/3	100					Sand loam	
6 - 18	10YR 4/4	100					Sand	
18 - 20+	7.5 YR 5/6	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Coast Prairie Redox (A16)
___ Dark Surface (S7)
___ Iron-Manganese Masses (F12)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: __________

Depth (inches): __________

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): __________
Water Table Present? Yes _____ No X Depth (inches): __________
Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): __________

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

US Army Corps of Engineers Midwest Region – Version 2.0

ATTACHMENT D

QUALIFICATIONS OF PREPARERS

INTENTIONALLY LEFT BLANK

A. Brook Crossan, Ph.D., P.E. – Senior Environmental Engineer
Ph.D., Geophysical Fluid Dynamics
M.S., Mechanical Engineering
B.S., Mechanical Engineering
37 years of experience with NEPA documentation and analysis on projects for federal agencies.

Anthony Becker – Environmental Scientist
M.S., Biology
B.S., Biology
5 years of experience in NEPA documentation and analysis and ecological investigations on projects for federal agencies.

Christopher Rua – Environmental Scientist
B.S., Environmental Planning & Design
9 years of experience in environmental compliance, due diligence, and field studies for land development and NEPA projects.

INTENTIONALLY LEFT BLANK

APPENDIX D2

PRELIMINARY JURISDICTIONAL DETERMINATION AND WETLANDS DELINEATION FOR THE PROPOSED FUTUREGEN SOIL-GAS MONITORING AND METEOROLOGICAL TOWER

INTENTIONALLY LEFT BLANK

Specialized Ecological Services

105 East Oak Street, Greenville, Illinois 62246
888-511-7735, 618-741-0426 (cell), bob@specialized-ecological.com

November 28, 2011

Tyson Zobrist
US Army Corps of Engineer
1222 Spruce Street
Saint Louis, MO 63103

Re: Jurisdictional Wetlands Survey
FutureGen Industrial Alliance, Incorporated
Soil-Gas Monitoring and Meteorological Tower Sites
Morgan County, Illinois

Dear Mr. Zobrist,

Enclosed is a copy of our report documenting the results of our survey for jurisdictional wetlands at the above referenced project in Morgan County, Illinois, for FutureGen Industrial Alliance of Washington, D.C. As indicated in our report, no jurisdictional wetlands were identified and no impacts to wetlands are anticipated from this project. I am also including the results of our survey for state and federal threatened and endangered species at the project site. As reported, no protected species were identified and no impacts to protected species are anticipated.

Please mail comments to:

FutureGen Alliance, Inc.
1101 Pennsylvania Avenue, NW
Sixth Floor
Washington, D.C. 20004
Contact Person: Mr. Ken Humphreys, CEO
Phone Number: (202) 280-6019

U.S. Department of Energy National Technology Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507
Contact Person: Mr. Cliff Whyte, NEPA Compliance Officer
Phone Number: (304) 285-2098

Please include myself and Amanda Stegen, Research Scientist, Battelle on any correspondence.
Amanda Stegen
Battelle
902 Battelle Blvd
P.O. Box 999
MSIN K3-66
Richland, Washington, 99352
amanda.stegen@pnl.gov
509-372-4511

Sincerely,
Specialized Ecological Services

Robert O. Rinella

Robert O. Rinella
Consulting Ecologist

Cc: Mr. Chris Burger, Patrick Engineering
Ms. Amanda Stegen, Battelle

Preliminary Jurisdictional Determination & Wetlands Delineation

Proposed FutureGen Soil-Gas Monitoring and Meteorological Tower

Morgan County, Illinois

Date: November 28, 2011

Prepared for FutureGen Alliance

under contract with:

Patrick Engineering
300 West Edwards Street, Suite 200
Springfield, Illinois 62704
(630)795-7200

Prepared by:

Specialized Ecological Services
P.O. Box 136
105 East Oak Street
Greenville, IL 62246

INTRODUCTION

This report documents an investigation of wetland concerns related to proposed construction of FutureGen Industrial Alliance, Inc. facilities near Jacksonville, Illinois. The current proposed action involves the installation of a meteorological tower and soil-gas collection network in support of the FutureGen 2.0 Morgan County carbon sequestration site. The network will provide samples of soil gas for evaluating baseline CO_2 concentrations and, once site operations begin, a means of assessing possible increases in CO_2 concentration or co-injected tracer compounds. The network includes one meteorological tower and seven soil-gas monitoring chambers.

Wetlands

The ecological functions and social values associated with wetland habitats afford them special regulatory protection. In keeping with the regulatory requirements of the Clean Water Act (CWA), wetlands on properties to be altered by commercial activities must be identified and impacts to those wetlands mitigated. As authorized by Section 404 of the CWA, the US Army Corps of Engineers (Corps) and US Environmental Protection Agency (EPA) jointly define wetlands as *"those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, the prevalence of vegetation typically adapted for life in saturated soil conditions* (Corps 33 CFR 328.3 and EPA 40 CFR 230.3)." This definition is currently the standard for jurisdictional wetland delineation. To be a jurisdictional wetland and therefore fall under federal and state regulatory limitations, an ecological community must exhibit three wetland characteristics:

(1) wetland hydrology,

(2) hydric soils, and

(3) hydrophytic vegetation.

<u>Hydrology</u>

Because hydrology is the most independent variable among the three-wetland criteria, its influence is extremely important. Hydrologic fluctuations not only affect soil formation (Buol and Rebertus 1988) and vegetation growth (Hutchinson 1975), but also every wetland function. Wetland hydrology is described by the Corps *as "inundation or saturation to the surface for at least 5% of the growing season in most years."* Saturation exists when the capillary fringe occurs within a major portion of the root zone (ie. within 12 inches of the soil surface). The growing season is defined as the portion of the year when soil temperature at 20 inches below the surface is above 41ºF (5ºC).

<u>Soils</u>

Wetland hydrology (saturation and/or inundation) results in soil anaerobiosis as biological and chemical processes deplete oxygen in the soil. Soils developed in anoxic conditions are called hydromorphic (Buol and Rebertus 1988) or hydric

(Megonigal, Patrick, and Faulkner 1993). The Natural Resource Conservation Service defines hydric soils as *"saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil* (SCS 1991).

Vegetation

For most species of vegetation, oxygen deprivation is an extreme condition limiting survival. For certain adapted species, however, anoxic rooting conditions are an environmental condition allowing them the ecological advantage. The National Technical Committee for Hydric Soils (SCS 1991) defines hydrophytic vegetation as *"plant life growing in water or on a saturated substrate that is at least periodically deficient in oxygen as a result of excessive water content."* The keystone to regulatory consideration of hydrophytic vegetation is inundation or saturation sufficient to exert a controlling influence on the plant species present. The Corps requires a predominance (>50%) of hydrophytic species.

In January of 2001, a U.S. Supreme Court ruling added another characteristic as a requirement for a wetland to come under the Corps regulatory jurisdiction. In essence, a wetland is now required to have a surface water connection to a "navigable waterway" in order to be protected by the wetland provisions of the CWA. This ruling was reinforced in the 2006 U.S. Supreme Court case, *United States v. Rapanos*.

State Wetlands Legislation

The Illinois Interagency Wetland Policy Act of 1989 establishes a state goal that there be, "no overall net loss of the state's existing wetland acres or their functional values due to state supported activities" (20 ILCS 830). To accomplish this goal, the Act established a review process for all projects being pursued by a state agency or being accomplished with state funds, that have the potential to adversely affect a wetland. This review consists of a two part process. Projects must first be reviewed by the Division of Natural Resources Review & Coordination to confirm if a wetland impact will occur. If it is determined there will not be an impact, the project will be approved and funds may be released. If it is determined an impact is going to occur, the entity requesting approval must prepare a plan which details how it will compensate for the impact before the project may move forward (20 ILCS 830). All compensation plans must be approved by IDNR. The Act does not require wetlands to have a surface water connection to a navigable waterway in order for those wetlands to fall within the state's regulatory jurisdiction.

The Illinois Rivers, Lakes, and Streams Act (615 ILCS 5) grants the IDNR Office of Water Resources (IDNR/OWR) the authority to regulate construction activities in floodplains. According to the Act, persons proposing such activities must first secure a permit from IDNR/OWR. Related regulations recognize six northeastern counties (Cook, DuPage, Kane, Lake, McHenry, and Will) separately from the rest of "downstate" Illinois. The purpose of both programs is to, "protect the rights, safety, and welfare of private and public landowners by the regulation of floodway development, [because] construction activities which restrict a stream's capacity to carry flood flows may result in channel instability and increased flood damages to neighboring properties" (State of Illinois 1994). The downstate regulatory program requires permits for construction in the floodway of any stream serving a tributary area of 640 acres in urban areas or 6,400 acres in rural areas. The Northeastern Illinois Program does not limit the tributary area (State of Illinois 1994). IDNR/OWR uses a joint application form entitled Protecting Illinois Waters for its floodplain, public waters, and dam safety permits.

STUDY AREA

Meteorological Tower

The meteorological tower will be installed on a small strip of pasture located approximately 230 feet west of the soil-gas monitoring station, SG-1 (Illustration 1). Planned coordinates are 90.060917W and 39.813090N.

Soil disturbance for the meteorological tower includes one concrete footing, approximately 2 feet wide, 2 feet long, and 3 feet deep. Also, a pad of landscape pavers (approximately 4 feet wide by 4 feet long) will be used to minimize vegetative growth around the tower and solar panel.

Soil-Gas Monitoring Network

The soil-gas monitoring network will consist of six spatially distributed monitoring locations (SG-1 through SG-6, Illustration 2), and one additional location at the site of an abandoned oil and gas well (SG-OGW-1, Illustration 2). A second abandoned well, SG-OGW-2, will be accessed for a one-time soil gas measurement but no permanent soil gas collector will be installed.

The soil gas monitoring points SG-1 through SG-6 are located adjacent to county roads on what is thought to be the public right–of-way between the road surface and private property. However, selected locations may actually extend onto private property. All locations are sited on high ground where saturation of the soil is least likely to occur. Monitoring point SG-OGW-1 is located in the middle of a fenced pasture.

The soil disturbance caused by installation of the soil-gas monitoring collector at each site will be approximately 2 feet wide, 2 feet long, and 3 feet deep.

Illustration 1: Proposed meteorological tower location.

Legend

Characterization Well

Soil Gas Monitoring Points

Primary Soil Gas Monitoring Point

Soil Gas Monitoring Point, abandonned Oil & Gas Well

Water Features

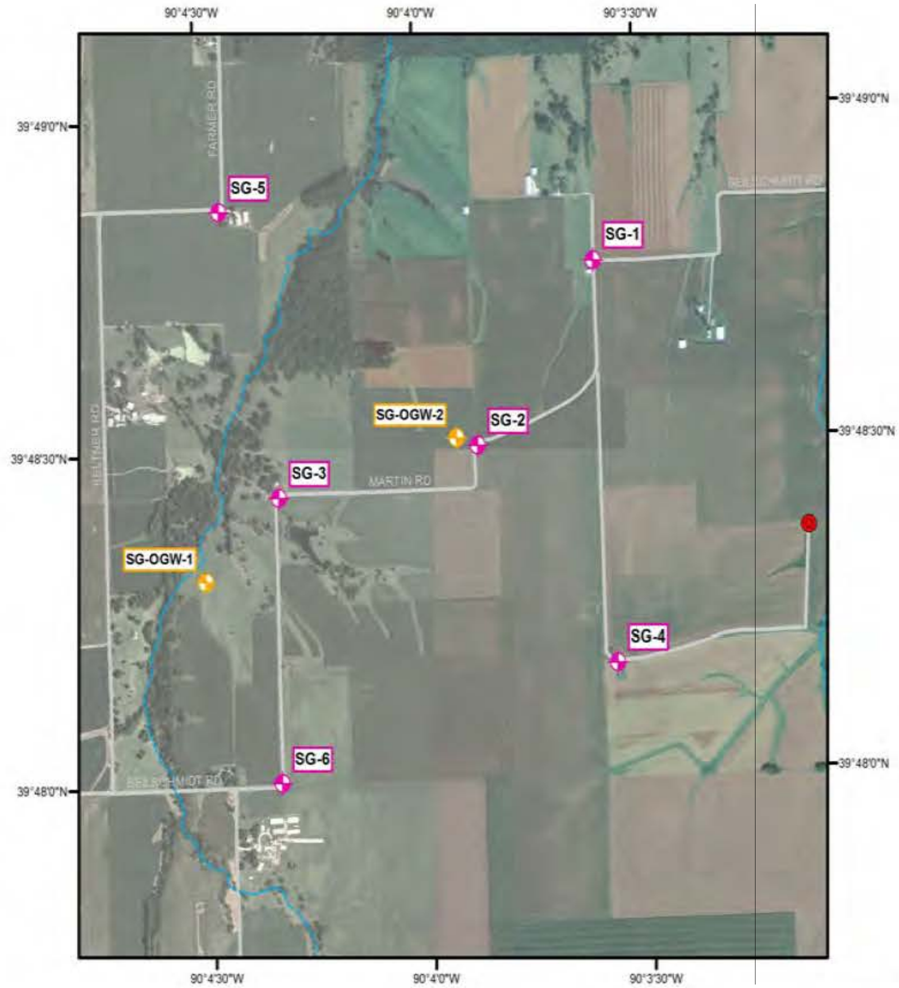
Rivers and Streams

Lakes

Roads Classification

State Routes

Local Roads



Coordinates of Soil Gas Monitoring Points

Label	Latitude	Longitude	Current Land Owner
SG-1	39.81286	-90.06011	Hoagland Harold E JR
SG-2	39.80831	-90.06467	M and G Farms Inc.
SG-3	39.80716	-90.07227	Martin Jean R Trustee Jean R Martin 1993 Trust
SG-4	39.80275	-90.05957	Martin Marvin L Trustee Marvin L Martin 1993 Trust
SG-5	39.81437	-90.07428	Keltner W Dale Mardelle Trustees Keltner trust
SG-6	39.80000	-90.07244	Martin Jean R Trustee Jean R Martin 1993 Trust

References of Soil Gas Monitoring Points (Abandoned Oil & Gas Wells)

Label	API	Status	Latitude	Longitude	Total Depth (ft)	Elevation (ft)	Company Name	Current Land Owner	Farm name
SG-OGW-1	121370036301	Junked and Abandoned, Plugged	39.805106	-90.075129	1400	610	Kuehling, Merle	Martin Jean R Trustee Jean R Martin 1993 Trust	MARTIN 1
SG-OGW-2	121370009900	Dry and Abandoned, No Shows	39.808508	-90.065474	1530	630	Horn, J. F. Oil Co.	Hoagland Harold E Jr	Beilschmidt, Wm. 1

FutureGEN 2.0
Date: 10/18/2011

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 0.125 0.25 0.5 Miles

0 0.2 0.4 0.8 Km

Illustration 2: Proposed locations of soil-gas monitoring points.

PURPOSE & PROCEDURE

The purpose of this investigation was to determine the extent of regulated wetlands at each of the soil-gas monitoring locations in the proposed network and at the proposed meteorological tower site. The wetlands investigation was conducted in conformation with the guidelines found in the Corps' Wetlands Delineation Manual (Environmental Laboratory 1987).

The following tasks have been completed and the results are reported below:

- Using available reference materials determine the presence of previously identified wetland hydrology, hydric soils, and/or hydrophytic vegetation.

- Perform a field survey to ground-truth data gathered through available references.

Preliminary Data Collection & Review

Prior to conducting the wetland determination, the following resources were reviewed:

US Fish & Wildlife Service National Wetland Inventory Map

The National Wetland Inventory (NWI) map data (USFWS 2011) for the project site were examined to obtain a preliminary estimate of potential wetlands occurring at the proposed power plant site, related new construction areas, and the region of influence. Given that wetland identification criteria differ between the US Fish & Wildlife Service (USFWS) and the Corps, wetlands shown on a NWI map may not be under the jurisdiction of the Corps. Similarly, jurisdictional wetlands may not always be identified on NWI maps. Consequently, wetland presence based on NWI maps alone cannot be assumed to be an accurate assessment of jurisdiction.

USGS Topographic Map

The project site was superimposed on the corresponding topographic map (updated in 1990) (Microsoft 2011). These maps indicate topography, land use, water bodies, drainage ways, and other basic information pertinent to the project area. Of obvious importance for wetland research is the topographic and hydrologic information available on USGS map.

National Cooperative Soil Survey

Soils maps from the National Cooperative Soil Survey website (NCSS 2011) were examined to determine the characteristics of soils at the project site. County hydric soils lists from Morgan County were also reviewed prior to fieldwork.

Field Survey

Pedestrian surveys for jurisdictional wetlands and protected species were conducted on the subject property on November 1, 2011. Surveys were performed by Specialized

Ecological Services' Consulting Ecologist, Robert Rinella. Vegetation identification was performed by Specialized Ecological Services' Senior Botanist, James Lang. Qualifications are provided in Attachment A.

Wetland field investigations were performed based on the guidelines of the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). The manual recommends a minimum of three transects through a project area aligned perpendicular to the longest axis. In this study, a single sample site was established at each soil-gas monitoring location. Because the ground cover of these areas was primarily cool-season turf grasses and common weeds and pasture grass and because the areas' sizes are limited, it was possible to observe any variance in habitat type from a single sampling point.

Routine Wetland Determination Data Forms were completed to characterize the jurisdictional wetland areas and adjacent uplands (Attachment B). At these locations, vegetation, hydrologic indicators, and soil conditions were recorded.

Vegetation

Plant identifications and nomenclature were based on *Flora of Missouri (*Steyermark 1963). The USFWS wetland indicator status of species follows Reed (1988).

Soils

Site-specific data were examined to determine the characteristics of soils of the project area. A Munsell soil color chart (Munsell Soil 1975) was used to describe soil color and other significant characteristics. Field observations were used to verify mapped soils survey information.

Hydrology

During field investigations, hydrologic indicators were observed and used to verify reference data shown on NWI maps, USGS topographic maps, soils surveys, and other sources. Specific field indicators may include, but are not limited to: inundation, saturation, watermarks, drift lines, sediment deposits, and water-stained leaves.

RESULTS

Preliminary Data Collection & Review

US Fish & Wildlife Service National Wetland Inventory Map

Review of the National Wetland Inventory (NWI) map (USFWS 2011) revealed only those wetland areas associated with Indian Creek. These are all well outside the project area. NWI and USGS topographic maps are provided in Attachment C.

USGS Topographic Map

USGS topographic maps revealed no waterways or wetlands within the project boundaries.

National Cooperative Soil Survey

Soils maps (NCSS 2011) show several soil types in the proposed project area. The soil map and county hydric soils list are included in Attachment D.

Four of the project areas are mapped with Ipava silt loam, 0 to 2 percent slopes. Ipava silt loam may contain hydric listed Denny, Sable, or Virden soils in depressions.

Field Survey

Vegetation

The project areas associated with the soil-gas monitoring wells contain primarily cool-season grasses and common weeds, but also areas of agricultural row crop.

Grassed Pasture and Road Right-of-Way

This terrestrial community was observed at all locations with the exception of SG-OGW-2. Various grasses (*Festuca arundinaceae, Setaria* spp.) and broadleaf weeds (e.g. *Plantago rugelii, Taraxacum officinale,* and *Trifolium* spp.) were the dominant herbaceous species. No woody species were observed.

Agricultural Row Crop

This terrestrial community type is most common throughout the project area. In season, it would be planted in agricultural row crops. During field observations, there were no live cultivated species present. Evidence of *Glycine max* and *Zea mays* from previous plantings was observed.

Soils

The soils observed coincide with those soils shown in the soil survey maps. The native vegetation of the majority of the project site would have been a mix of tall-grass prairie and deciduous hardwoods.

Hydrology

Indian Creek and its unnamed tributaries drain all areas of the proposed project site westward into the Illinois River. The Illinois River terminates in the Mississippi River.

Summary of Jurisdictional Areas

No jurisdictional wetlands were observed within the project area.

DISCUSSION

The impact of proposed FutureGen Industrial Alliance, Inc project was evaluated for the presence of jurisdictional wetlands and other U.S. waters during November 2011 by Specialized Ecological Services. This work was conducted using the standards of practice for wetland delineation.

No jurisdictional wetlands were observed in the study area. As proposed, the actions of this project should not have impacts to wetlands or require wetland fill permits.

LIMITS OF RESEARCH

As Cowardin et al. (1979) point out, *"there is no single, correct, indisputable, ecologically sound definition for wetlands, primarily because of the diversity of wetlands and because the demarcation between dry and wet environments lies along a continuum."* Wetlands, by their nature are dynamic systems. A single field investigation cannot possibly enable any investigator to have an absolutely complete understanding of the complex ecological interactions and components of a site. However, by combining information collected from many sources at many different times, a clearer understanding is attainable. The results and conclusions of this investigation represent the integration of all information and data currently available. Literature and map data were combined with on-site reconnaissance to assure that this report is complete, comprehensive, and accurately reflects conditions at the subject property.

Although every effort has been made to conduct this study according to the current standards of practice and to present the results clearly and completely, a one time sampling effort can only depict a 'snap-shot' of the complex biological, chemical, and ecological conditions at the study site. Sufficient support can be drawn from this sampling effort and associated analytical results, as well as from the scientific literature, for the discussion and conclusions provided herein.

LITERATURE CITED

20 ILCS 830. 1989. Inter agency Wetland Policy Act of 1989. *Illinois Public Act 86-157.*

615 ILCS 5. 1994. Illinois Rivers, Lakes, and Streams Act. *Illinois Public Act 86-1324.*

Buol, S. W., and R. A. Rebertus. 1988. "Soil Formation Under Hydromorphic Conditions." In *The ecology and Management of Wetlands, Vol. 1: Ecology of Wetlands.* pp 253-262. Timber Press, Portland, Oregon.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. La Roe. 1979. "Classification of Wetlands and Deepwater Habitats of the United States." FWS/OBS-79/31. U.S. Fish & Wildlife Service, Office of Biological Services, Washington, D.C.

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual." Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS.

Hutchinson, G. E. 1975. Limnological Botany. A Treatise on Limnology. John Wiley and Sons. New York.

Megonigal, J. P., W. H. Patrick, Jr., and S. P. Faulkner. "Wetland Identification in Seasonally Flooded Forest Soils: Soil Morphology and Redox Dynamics." *Soil Science Society of America Journal.* 57(1):140-149.

Mohlenbrock, R. H. 1986. Guide to the Vascular Flora of Illinois. Southern Illinois University. 507p.

Munsell Color. 1975. Munsell Soil Color Charts. Kollmorgan Corporation. Baltimore, MD.

National Cooperative Soil Service (NCSS). 2011. "*NCSS Web Soil Survey.*" Accessed November 6, 2011 at http://websoilsurvey.nrcs.usda.gov/app/ (last updated April 12, 2011).

Reed, P.B., Jr. 1988. "National List of Plant Species that Occur in Wetlands: National Summary." *U.S. Fish & Wildlife Service Biological Report* 88(24). U.S. Government Printing Office. Washington, D.C.

Soil Conservation Service (SCS). 1991. National List of Hydric Soils. National Technical Committee on Hydric Soils, US Department of Agriculture, Soil Conservation Service.

Taft, J. B., G. S. Wilhelm, D. M. Ladd, and L. A. Masters. 1997. "Floristic Quality Assessment for Vegetation in Illinois, a Method for Assessing Vegetation Integrity." *Erigenia*. 15:1-95.

Microsoft. 2011. Microsoft Research Web Site. Accessed November 6, 2011 at http://msrmaps.com/default.aspx (last updated November 6, 2011).

U.S. Department of Agriculture – Soil Conservation Service. 1975. Soil Taxonomy. Agriculture Handbook Number 436. U.S. Government Printing Office. Washington, D.C.

U.S. Fish and Wildlife Service (USFWS). 2011. *Wetlands Online Mapper*. Accessed November 6, 2011 at http://www.fws.gov/wetlands/Data/Mapper.html (last updated October 6, 2011).

Attachment A: Wetland Delineator Qualifications

Bob Rinella, Environmental Professional and Wetland Ecologist, Specialized Ecological Services. Three years with Southern Illinois University Cooperative Wildlife Research Laboratory, fifteen years with Specialized Ecological Services. Eighteen (18) years experience with environmental research including wetlands, plant biology, wildlife biology, and environmental planning. Master of Science in Environmental Studies at Southern Illinois University, Bachelor of Science in Biology at Jacksonville University.

James Lang, PhD., Senior Botanist, Specialized Ecological Services. Twenty five (25) years with Greenville College, thirteen years with Specialized Ecological Services. Over thirty five (35) years experience with plant biology and endangered species research. Doctorate in Botany at Iowa University, Master of Science in Botany and Bachelor of Arts in Science at University of Arkansas.

Eric Ahern, Environmental Technician, Specialized Ecological Services. Two years with Zahniser Institute for Environmental Studies, nine years with Specialized Ecological Services. Eleven (11) years experience in environmental research including lacustrine water quality studies, wetland restoration, and GIS/GPS mapping. Master of Science in Education at University of Phoenix and Bachelor of Arts in Biology at Greenville College.

ATTACHMENT B: WETLAND DATA

Reset Form | Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: Met Tower

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S25 T16N R9W

Landform (hillslope, terrace, etc.): flat pasture Local relief (concave, convex, none): concave

Slope (%): 0-2 Lat: 39.813090 Long: -90.060917 Datum: ______

Soil Map Unit Name: Tama silt loam, 5 to 10% slopes, eroded NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ______ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. *Festuca arundinaceae*		Y	facu+
2. *Phalaris arundinacea*		Y	facw+
3. *Setaria veridis*		Y	ni
4. *Taraxacum officinale*		N	facu
5. *Conyza canadensis*		N	fac-
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ______ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

SOIL

Sampling Point: Met Tower

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
-12	10YR/3/2	100						
12-18	10YR/4/3	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No __X__

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No __X__ Depth (inches): ______

Water Table Present? Yes ______ No __X__ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No __X__ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No __X__

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators were observed.

Reset Form | Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-1

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S25 T16N R9W

Landform (hillslope, terrace, etc.): roadside terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 39.81286 Long: -90.06011 Datum: ______

Soil Map Unit Name: Tama silt loam, 2-5% slopes NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: ___)			
1. *Festuca arundinaceae*		Y	facu+
2. *Setaria viridis*		Y	ni
3. *Trifolium pratense*		Y	facu+
4. *Taraxacum officinale*		N	facu
5. *Plantago rugelii*		N	fac
6.			
7.			
8.			
9.			
10.			
	___ = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

US Army Corps of Engineers Midwest Region – Interim Version

SOIL

Sampling Point: SG-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
-18	10YR/3/2	100	N/A					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** X

Remarks:
No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were observed.

Reset Form Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-2

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S25 T16N R9W

Landform (hillslope, terrace, etc.): roadside terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 39.80831 Long: -90.06467 Datum: ______

Soil Map Unit Name: Ipava silt loam, 0 to 2% slopes NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			

Sapling/Shrub Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			

Herb Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Festuca arundinaceae*		Y	facu+
2. *Setaria viridis*		Y	ni
3. *Taraxacum officinale*		N	facu
4. *unknown composite*		N	
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover			

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

SOIL

Sampling Point: SG-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
-18	10YR/3/2	100	N/A					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ________

Depth (inches): ________

Hydric Soil Present? **Yes** ______ **No** X

Remarks:
No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): ________

Water Table Present? Yes _____ No X Depth (inches): ________

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): ________

Wetland Hydrology Present? **Yes** ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were observed.

Reset Form Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-3

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S25 T16N R9W

Landform (hillslope, terrace, etc.): roadside terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 39.80716 Long: -90.07227 Datum: ______

Soil Map Unit Name: Rozetta silt loam, 2 to 5% slopes NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. *Festuca arundinaceae*		Y	facu+
2. *Setaria viridis*		Y	ni
3. *Trifolium purpureum*		Y	ni
4. *Tridens flavus*		Y	upl
5. *Saponaria officinalis*		N	facu
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

SOIL

Sampling Point: SG-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
-18	2.5YR/4/3	100	N/A					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks:

No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ______

Water Table Present? Yes ___ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ______

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators were observed.

Reset Form | Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-4

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S25 T16N R9W

Landform (hillslope, terrace, etc.): roadside terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 39.80275 Long: -90.05957 Datum: ______

Soil Map Unit Name: Ipava silt loam, 0 to 2% slopes NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ______ No X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. *Festuca arundinaceae*		Y	facu+
2. *Setaria pumila*		Y	fac
3. *Phytolacca americana*		Y	ni
4. *Leonurus cardiaca*		Y	ni
5. *Saponaria officinalis*		N	facu
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ______ No X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

SOIL

Sampling Point: SG-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
-18	7.5YR/3/1	100	N/A					pieces of brick present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? **Yes** ______ **No** X

Remarks:

No hydric soil indicators observed. Pieces of brick present due to proximity to hand-dug well.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): ______________

Water Table Present? Yes _____ No X Depth (inches): ______________

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): ______________

Wetland Hydrology Present? **Yes** ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators were observed.

Reset Form | Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-5

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S26 T16N R9W

Landform (hillslope, terrace, etc.): roadside terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 39.81437 Long: -90.07428 Datum:

Soil Map Unit Name: Rozetta silt loam, 2 to 5% slopes NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ___)			
1. *Festuca arundinaceae*		Y	facu+
2. *Setaria viridis*		Y	ni
3. *Setaria glauca*		Y	fac
4. *Taraxacum officinale*		N	facu
5. *Bromus inermis*		N	ni
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

SOIL

Sampling Point: SG-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
-18	10YR/3/2	100	N/A					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks:
No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______
Water Table Present? Yes ______ No X Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were observed.

Reset Form | Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-6

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S35 T16N R9W

Landform (hillslope, terrace, etc.): roadside terrace Local relief (concave, convex, none): none

Slope (%): 0 Lat: 39.80000 Long: -90.07244 Datum: ______

Soil Map Unit Name: Ipava silt loam, 0 to 2% slopes NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ______)			
1. *Festuca arundinaceae*		Y	facu+
2. *Setaria viridis*		Y	ni
3. *Setaria glauca*		Y	fac
4. *Bromus inermis*		Y	ni
5. *Saponaria officinalis*		Y	facu
6. *Taraxacum officinale*		N	facu
7. *unknown thistle*		N	
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

SOIL

Sampling Point: SG-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
-18	7.5YR/2.5/1	100	N/A					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ______ **No** X

Remarks:
No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ____________

Water Table Present? Yes ______ No X Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ____________

Wetland Hydrology Present? **Yes** ______ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were observed.

Reset Form Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-OGW-1

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S26 T16N R9W

Landform (hillslope, terrace, etc.): pasture, toe of hillside Local relief (concave, convex, none): concave to flat

Slope (%): <5 Lat: 39.805106 Long: -90.075129 Datum: ______

Soil Map Unit Name: Elco silt loam, 15 to 20% slopes, eroded NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	Is the Sampled Area within a Wetland? Yes ___ No X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ___)			
1. *Festuca arundinaceae*		Y	facu+
2. *Setaria viridis*		Y	ni
3. *Setaria glauca*		Y	fac
4. *Polygonum pensylvanicum*		N	facw+
5. *Conyza canadensis*		N	fac-
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present.

SOIL

Sampling Point: SG-OGW-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
-7	2.5YR/4/2	100	N/A					
7-10	10YR/5/6	100	N/A					
10-18	2.5YR/3/2	>90	7.5YR/3./4	7-10%	very fin	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 5 cm Mucky Peat or Peat (S3)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ Coast Prairie Redox (A16)
___ Iron-Manganese Masses (F12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ______ **No** __X__

Remarks:
No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ True Aquatic Plants (B14)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Gauge or Well Data (D9)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No __X__ Depth (inches): ____________
Water Table Present? Yes ______ No __X__ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No __X__ Depth (inches): ____________

Wetland Hydrology Present? **Yes** ______ **No** __X__

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were observed.

Reset Form | Print Form

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Soil-Gass Monitoring - Meteorological Tower City/County: Morgan Sampling Date: Nov. 1, 2011

Applicant/Owner: FutureGen Alliance State: Illinois Sampling Point: SG-OGW-2

Investigator(s): Robert Rinella, James Lang Section, Township, Range: S25 T16N R9W

Landform (hillslope, terrace, etc.): flat ag. field Local relief (concave, convex, none): none

Slope (%): 0 Lat: 39.808508 Long: -90.065474 Datum:

Soil Map Unit Name: Ipava silt loam, 0 to 2% slopes NWI or WWI classification: NI

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?		X
Wetland Hydrology Present?		X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:
Area has been recently disced.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ___)			
1. *Glycine max*		Y	ni
2. *Zea mays*		Y	ni
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)
No Trees, Saplings/Shrubs, or Woody Vines are present. This years crop appears to be soy beans with evidence of corn from previous years. No identifiable weeds or other vegetation.

US Army Corps of Engineers Midwest Region – Interim Version

SOIL

Sampling Point: SG-OGW-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
-18	2.5YR/2.5/1	100	N/A					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Iron-Manganese Masses (F12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No X

Remarks:
No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ____________

Water Table Present? Yes ______ No X Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No wetland hydrology indicators were observed.

ATTACHMENT C: NWI AERIAL AND USGS TOPOGRAPHIC MAPS

U.S. Fish and Wildlife Service

National Wetlands Inventory

FutureGen 2

Nov 15, 2011

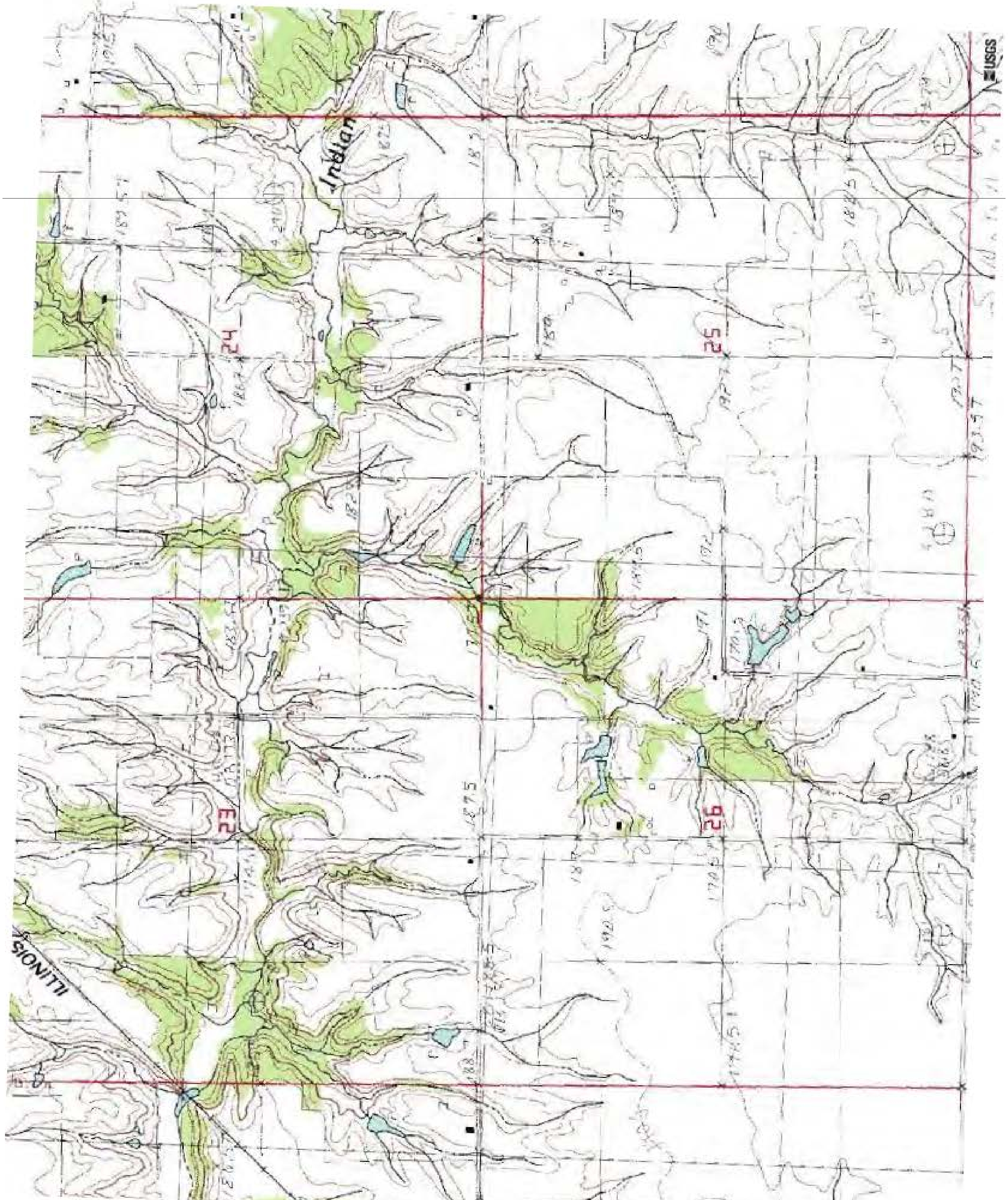
Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

Meteorological Tower & Soil Gas Monitoring Sites


Indian
24
25
23
26
ILLINOIS
USGS

Attachment D: Project Soils Map and Hydric Soils of Morgan County

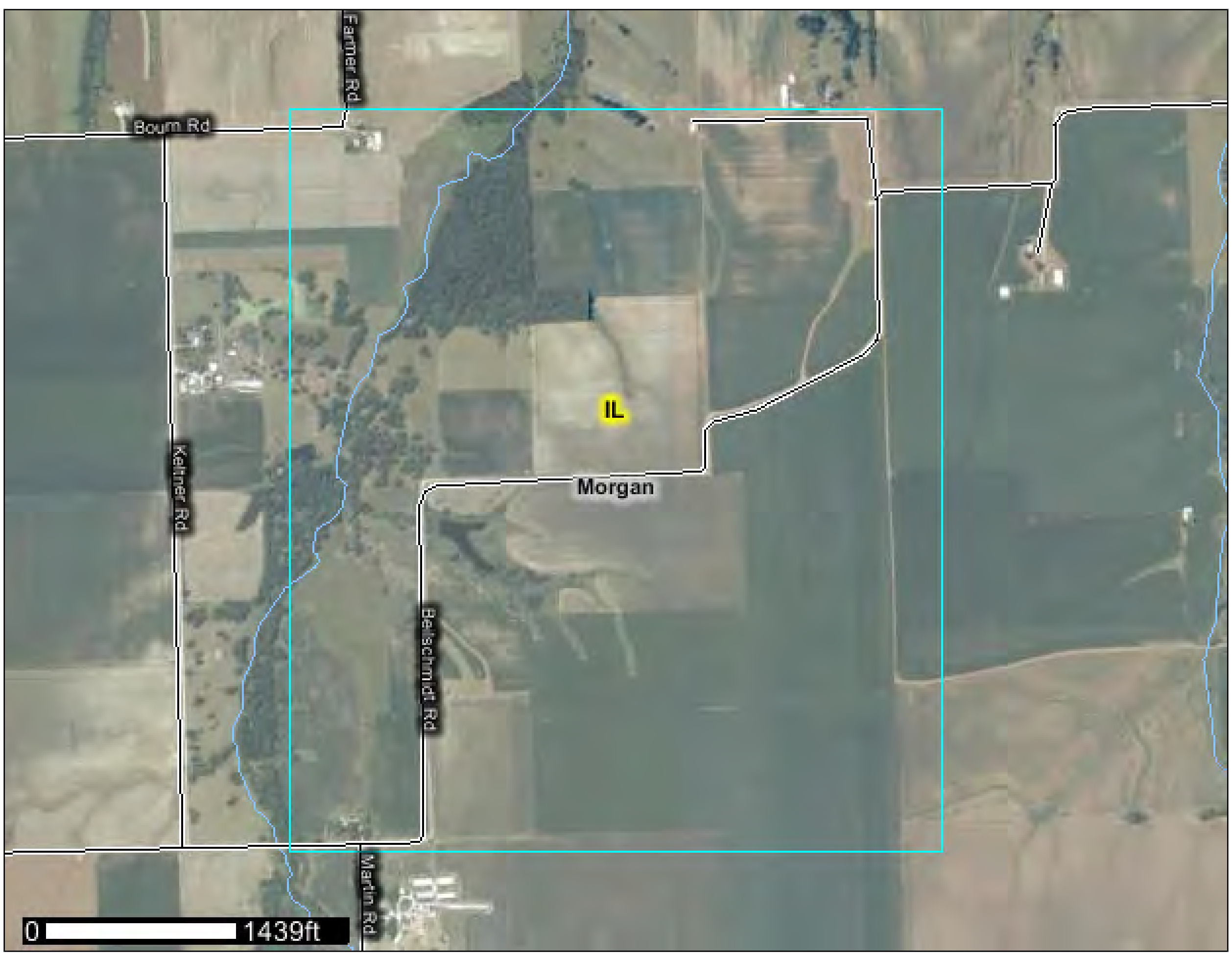
United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Morgan County, Illinois



November 15, 2011

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


90° 4' 40"
90° 3' 20"
39° 49' 8"
39° 49' 5"
750300
750600
750900
751200
751500
751800
4411500
4411200
4410900
4410600
4410300
4410000
4409700
4409400
39° 47' 45"
39° 47' 43"
90° 4' 43"
90° 3' 23"
Farmer Rd
Bourn Rd
Beilschmidt Rd
Martin Rd
257A
279B
451
279C2
119D2
279C3
119D2
279C2
259C2
36C2
36B
257A
36C2
68
W
19C3
43B
43A
119E2
45
68
36B
43B
Map Scale: 1:12,200 if printed on A size (8.5" x 11") sheet.
N
Meters
0
100
200
400
600
Feet
0
450
900
1,800
2,700

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:12,200 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 15N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morgan County, Illinois
Survey Area Data: Version 2, Jul 10, 2006

Date(s) aerial images were photographed: 6/20/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Morgan County, Illinois (IL137)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded	16.9	2.8%
36B	Tama silt loam, 2 to 5 percent slopes	30.8	5.0%
36C2	Tama silt loam, 5 to 10 percent slopes, eroded	6.7	1.1%
43A	Ipava silt loam, 0 to 2 percent slopes	217.7	35.6%
43B	Ipava silt loam, 2 to 5 percent slopes	20.9	3.4%
45	Denny silt loam	2.4	0.4%
68	Sable silty clay loam	37.4	6.1%
119D2	Elco silt loam, 10 to 15 percent slopes, eroded	30.1	4.9%
119E2	Elco silt loam, 15 to 20 percent slopes, eroded	36.0	5.9%
257A	Clarksdale silt loam, 0 to 3 percent slopes	20.9	3.4%
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded	5.8	1.0%
279B	Rozetta silt loam, 2 to 5 percent slopes	128.2	21.0%
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	22.6	3.7%
279C3	Rozetta silty clay loam, 5 to 10 percent slopes, severely eroded	18.3	3.0%
451	Lawson silt loam	15.1	2.5%
W	Water	1.6	0.3%
Totals for Area of Interest		**611.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Morgan County, Illinois

19C3—Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded

Map Unit Setting

Elevation: 440 to 670 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Sylvan and similar soils: 100 percent

Description of Sylvan

Setting

Landform: Ground moraines, loess hills
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Available water capacity: Very high (about 12.2 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 6 inches: Silty clay loam
6 to 25 inches: Silty clay loam
25 to 60 inches: Silt loam

36B—Tama silt loam, 2 to 5 percent slopes

Map Unit Setting

Elevation: 620 to 690 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Tama and similar soils: 100 percent

Description of Tama

Setting

Landform: Ground moraines, knolls
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water capacity: High (about 11.9 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 14 inches: Silt loam
14 to 55 inches: Silty clay loam
55 to 60 inches: Silt loam

36C2—Tama silt loam, 5 to 10 percent slopes, eroded

Map Unit Setting

Elevation: 440 to 670 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Tama and similar soils: 100 percent

Description of Tama

Setting

Landform: Ground moraines, knolls
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water capacity: High (about 11.7 inches)

Interpretive groups
Land capability (nonirrigated): 3e

Typical profile
0 to 9 inches: Silt loam
9 to 46 inches: Silty clay loam
46 to 60 inches: Silt loam

43A—Ipava silt loam, 0 to 2 percent slopes

Map Unit Setting
Elevation: 620 to 690 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition
Ipava and similar soils: 100 percent

Description of Ipava

Setting
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.5 inches)

Interpretive groups
Land capability (nonirrigated): 1

Typical profile
0 to 9 inches: Silt loam
9 to 54 inches: Silty clay loam
54 to 60 inches: Silt loam

Minor Components

Virden

Percent of map unit:
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear

Denny

Percent of map unit:
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

Sable

Percent of map unit:
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear

43B—Ipava silt loam, 2 to 5 percent slopes

Map Unit Setting

Elevation: 620 to 690 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Ipava and similar soils: 100 percent

Description of Ipava

Setting

Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.5 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 9 inches: Silt loam
9 to 54 inches: Silty clay loam
54 to 60 inches: Silt loam

Minor Components

Virden

Percent of map unit:
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear

Denny

Percent of map unit:
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

Sable

Percent of map unit:
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear

45—Denny silt loam

Map Unit Setting

Elevation: 620 to 690 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Denny and similar soils: 100 percent

Description of Denny

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water capacity: High (about 11.3 inches)

Interpretive groups
Land capability (nonirrigated): 3w

Typical profile
0 to 9 inches: Silt loam
9 to 17 inches: Silt loam
17 to 48 inches: Silty clay
48 to 60 inches: Silty clay loam

68—Sable silty clay loam

Map Unit Setting
Elevation: 620 to 690 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition
Sable and similar soils: 100 percent

Description of Sable

Setting
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum content: 30 percent
Available water capacity: Very high (about 12.2 inches)

Interpretive groups
Land capability (nonirrigated): 2w

Typical profile
0 to 17 inches: Silty clay loam
17 to 42 inches: Silty clay loam

42 to 60 inches: Silt loam

119D2—Elco silt loam, 10 to 15 percent slopes, eroded

Map Unit Setting

Elevation: 440 to 670 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Elco and similar soils: 100 percent

Description of Elco

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over paleosol formed in till

Properties and qualities

Slope: 10 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 54 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.4 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 5 inches: Silt loam
5 to 23 inches: Silty clay loam
23 to 60 inches: Silty clay loam

119E2—Elco silt loam, 15 to 20 percent slopes, eroded

Map Unit Setting

Elevation: 440 to 670 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Elco and similar soils: 100 percent

Description of Elco

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over paleosol formed in till

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 54 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.4 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 5 inches: Silt loam
5 to 23 inches: Silty clay loam
23 to 60 inches: Silty clay loam

257A—Clarksdale silt loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 620 to 690 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Clarksdale and similar soils: 100 percent

Description of Clarksdale

Setting

Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: High (about 11.0 inches)

Interpretive groups

Land capability (nonirrigated): 1

Typical profile

0 to 9 inches: Silt loam
9 to 19 inches: Silt loam
19 to 56 inches: Silty clay
56 to 60 inches: Silt loam

Minor Components

Virden

Percent of map unit:
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Linear

259C2—Assumption silt loam, 5 to 10 percent slopes, eroded

Map Unit Setting

Elevation: 680 to 1,020 feet
Mean annual precipitation: 29 to 35 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 160 to 180 days

Map Unit Composition

Assumption and similar soils: 100 percent

Description of Assumption

Setting

Landform: Ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over till

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 30 to 54 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.6 inches)

Interpretive groups
Land capability (nonirrigated): 3e

Typical profile
0 to 9 inches: Silt loam
9 to 36 inches: Silty clay loam
36 to 60 inches: Clay loam

279B—Rozetta silt loam, 2 to 5 percent slopes

Map Unit Setting
Elevation: 620 to 690 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition
Rozetta and similar soils: 100 percent

Description of Rozetta

Setting
Landform: Loess hills, ground moraines
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Properties and qualities
Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Very high (about 12.6 inches)

Interpretive groups
Land capability (nonirrigated): 2e

Typical profile
0 to 7 inches: Silt loam
7 to 15 inches: Silt loam
15 to 39 inches: Silty clay loam
39 to 60 inches: Silt loam

279C2—Rozetta silt loam, 5 to 10 percent slopes, eroded

Map Unit Setting

Elevation: 440 to 670 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Rozetta and similar soils: 100 percent

Description of Rozetta

Setting

Landform: Loess hills, ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Very high (about 12.4 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 9 inches: Silt loam
9 to 39 inches: Silty clay loam
39 to 60 inches: Silt loam

279C3—Rozetta silty clay loam, 5 to 10 percent slopes, severely eroded

Map Unit Setting

Elevation: 440 to 670 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Rozetta and similar soils: 100 percent

Description of Rozetta

Setting

Landform: Loess hills, ground moraines
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water capacity: High (about 11.9 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 5 inches: Silty clay loam
5 to 37 inches: Silty clay loam
37 to 60 inches: Silt loam

451—Lawson silt loam

Map Unit Setting

Elevation: 420 to 440 feet
Mean annual precipitation: 22 to 58 inches
Mean annual air temperature: 43 to 59 degrees F
Frost-free period: 150 to 190 days

Map Unit Composition

Lawson and similar soils: 100 percent

Description of Lawson

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water capacity: Very high (about 12.1 inches)

Interpretive groups
Land capability (nonirrigated): 3w

Typical profile
0 to 11 inches: Silt loam
11 to 35 inches: Silt loam
35 to 60 inches: Silt loam

Minor Components

Sawmill
Percent of map unit:
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

W—Water

Map Unit Composition
Water: 100 percent

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit

This rating indicates the proportion of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is designated as "all hydric," "partially hydric," "not hydric," or "unknown hydric," depending on the rating of its respective components.

"All hydric" means that all components listed for a given map unit are rated as being hydric, while "not hydric" means that all components are rated as not hydric. "Partially hydric" means that at least one component of the map unit is rated as hydric, and at least one component is rated as not hydric. "Unknown hydric" indicates that at least one component is not rated so a definitive rating for the map unit cannot be made.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part

(Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

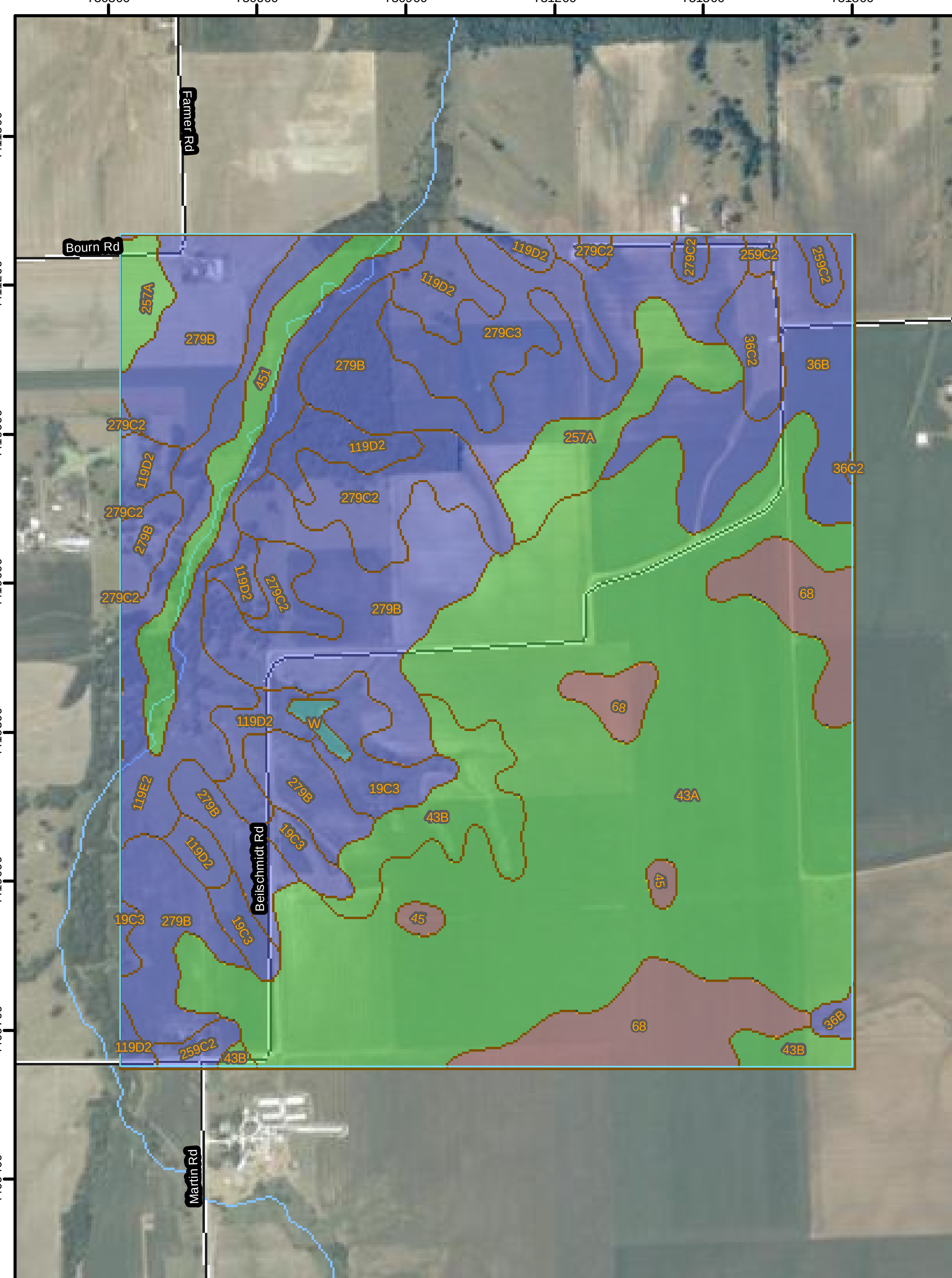
Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Custom Soil Resource Report
Map—Hydric Rating by Map Unit



Map Scale: 1:12,200 if printed on A size (8.5" x 11") sheet.

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- All Hydric
- Partially Hydric
- Not Hydric
- Unknown Hydric
- Not rated or not available

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:12,200 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 15N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morgan County, Illinois
Survey Area Data: Version 2, Jul 10, 2006

Date(s) aerial images were photographed: 6/20/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydric Rating by Map Unit

Hydric Rating by Map Unit— Summary by Map Unit — Morgan County, Illinois (IL137)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded	Not Hydric	16.9	2.8%
36B	Tama silt loam, 2 to 5 percent slopes	Not Hydric	30.8	5.0%
36C2	Tama silt loam, 5 to 10 percent slopes, eroded	Not Hydric	6.7	1.1%
43A	Ipava silt loam, 0 to 2 percent slopes	Partially Hydric	217.7	35.6%
43B	Ipava silt loam, 2 to 5 percent slopes	Partially Hydric	20.9	3.4%
45	Denny silt loam	All Hydric	2.4	0.4%
68	Sable silty clay loam	All Hydric	37.4	6.1%
119D2	Elco silt loam, 10 to 15 percent slopes, eroded	Not Hydric	30.1	4.9%
119E2	Elco silt loam, 15 to 20 percent slopes, eroded	Not Hydric	36.0	5.9%
257A	Clarksdale silt loam, 0 to 3 percent slopes	Partially Hydric	20.9	3.4%
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded	Not Hydric	5.8	1.0%
279B	Rozetta silt loam, 2 to 5 percent slopes	Not Hydric	128.2	21.0%
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	Not Hydric	22.6	3.7%
279C3	Rozetta silty clay loam, 5 to 10 percent slopes, severely eroded	Not Hydric	18.3	3.0%
451	Lawson silt loam	Partially Hydric	15.1	2.5%
W	Water	Unknown Hydric	1.6	0.3%
Totals for Area of Interest			**611.5**	**100.0%**

Rating Options—Hydric Rating by Map Unit

Aggregation Method: Absence/Presence

Tie-break Rule: Lower

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://soils.usda.gov/

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://soils.usda.gov/

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://soils.usda.gov/

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://soils.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.glti.nrcs.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://soils.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://soils.usda.gov/

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.

INTENTIONALLY LEFT BLANK

APPENDIX D3

PRELIMINARY JURISDICTIONAL DETERMINATION AND WETLANDS DELINEATION FOR THE PROPOSED FUTUREGEN DEVELOPMENT (STRATIGRAPHIC WELL)

INTENTIONALLY LEFT BLANK

Specialized Ecological Services

105 East Oak Street, Greenville, Illinois 62246
888-511-7735, 618-741-0426 (cell), bob@specialized-ecological.com

May 25, 2011

Tyson Zobrist
US Army Corps of Engineer
1222 Spruce Street
Saint Louis, MO 63103

Re: Jurisdictional Wetlands Survey
FutureGen Industrial Alliance, Incorporated
Site Characterization Well Locale
Morgan County, Illinois

Dear Mr. Zobrist,

Enclosed is a copy of our report documenting the results of our survey for jurisdictional wetlands at the above referenced project in Morgan County, Illinois, for FutureGen Industrial Alliance of Washington, D.C. As indicated in our report, no jurisdictional wetlands were identified and no impacts to wetlands are anticipated from this project. I am also including the results of our survey for state and federal threatened and endangered species at the project site. As reported, no protected species were identified and no impacts to protected species are anticipated.

Please mail comments to:

FutureGen Alliance, Inc.
1101 Pennsylvania Avenue, NW
Sixth Floor
Washington, D.C. 20004
Contact Person: Mr. Ken Humphreys, CEO
Phone Number: (202) 280-6019

U.S. Department of Energy National Technology Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507
Contact Person: Mr. Cliff Whyte, NEPA Compliance Officer
Phone Number: (304) 285-2098

Please include myself and Amanda Stegen, Research Scientist, Battelle on any correspondence.
Amanda Stegen
Battelle
902 Battelle Blvd
P.O. Box 999
MSIN K3-66
Richland, Washington, 99352
amanda.stegen@pnl.gov
509-372-4511

Sincerely,
Specialized Ecological Services

Robert O. Rinella

Robert O. Rinella
Consulting Ecologist

Cc: Mr. Chris Burger, Patrick Engineering
Ms. Amanda Stegen, Battelle

INTENTIONALLY LEFT BLANK

Preliminary Jurisdictional Determination & Wetlands Delineation

Proposed FutureGen Development
Morgan County, Illinois

Date: May 25, 2011

Prepared for FutureGen Alliance

under contract with:

Patrick Engineering
300 West Edwards Street, Suite 200
Springfield, Illinois 62704
(630)795-7200

Prepared by:

Specialized Ecological Services
P.O. Box 136
105 East Oak Street
Greenville, IL 62246

INTRODUCTION

This report documents an investigation of wetland concerns related to proposed construction of FutureGen Industrial Alliance, Inc. facilities near Jacksonville, Illinois. Our investigation includes two possible characterization pad areas (the Beilschmidt Property and the Hoagland Property), several truck pull-offs and road modifications on Beilschmidt Road, and widening and extending an existing farm access road.

Wetlands

The ecological functions and social values associated with wetland habitats afford them special regulatory protection. In keeping with the regulatory requirements of the Clean Water Act (CWA), wetlands on properties to be altered by commercial activities must be identified and impacts to those wetlands mitigated. As authorized by Section 404 of the CWA, the US Army Corps of Engineers (Corps) and US Environmental Protection Agency (EPA) jointly define wetlands as *"those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, the prevalence of vegetation typically adapted for life in saturated soil conditions* (Corps 33 CFR 328.3 and EPA 40 CFR 230.3)." This definition is currently the standard for jurisdictional wetland delineation. To be a jurisdictional wetland and therefore fall under federal and state regulatory limitations, an ecological community must exhibit three wetland characteristics:

(1) wetland hydrology,

(2) hydric soils, and

(3) hydrophytic vegetation.

<u>Hydrology</u>

Because hydrology is the most independent variable among the three-wetland criteria, its influence is extremely important. Hydrologic fluctuations not only affect soil formation (Buol and Rebertus 1988) and vegetation growth (Hutchinson 1975), but also every wetland function. Wetland hydrology is described by the Corps *as "inundation or saturation to the surface for at least 5% of the growing season in most years."* Saturation exists when the capillary fringe occurs within a major portion of the root zone (ie. within 12 inches of the soil surface). The growing season is defined as the portion of the year when soil temperature at 20 inches below the surface is above 41ºF (5ºC).

<u>Soils</u>

Wetland hydrology (saturation and/or inundation) results in soil anaerobiosis as biological and chemical processes deplete oxygen in the soil. Soils developed in anoxic conditions are called hydromorphic (Buol and Rebertus 1988) or hydric (Megonigal, Patrick, and Faulkner 1993). The Natural Resource Conservation Service defines hydric soils as *"saturated, flooded or ponded long enough during* *the growing season to develop anaerobic conditions in the upper part of the soil* (SCS 1991).

Vegetation

For most species of vegetation, oxygen deprivation is an extreme condition limiting survival. For certain adapted species, however, anoxic rooting conditions are an environmental condition allowing them the ecological advantage. The National Technical Committee for Hydric Soils (SCS 1991) defines hydrophytic vegetation as *"plant life growing in water or on a saturated substrate that is at least periodically deficient in oxygen as a result of excessive water content."* The keystone to regulatory consideration of hydrophytic vegetation is inundation or saturation sufficient to exert a controlling influence on the plant species present. The Corps requires a predominance (>50%) of hydrophytic species.

In January of 2001, a U.S. Supreme Court ruling added another characteristic as a requirement for a wetland to come under the Corps regulatory jurisdiction. In essence, a wetland is now required to have a surface water connection to a "navigable waterway" in order to be protected by the wetland provisions of the CWA. This ruling was reinforced in the 2006 U.S. Supreme Court case, *United States v. Rapanos*.

State Wetlands Legislation

The Illinois Interagency Wetland Policy Act of 1989 establishes a state goal that there be, "no overall net loss of the state's existing wetland acres or their functional values due to state supported activities" (20 ILCS 830). To accomplish this goal, the Act established a review process for all projects being pursued by a state agency or being accomplished with state funds, that have the potential to adversely affect a wetland. This review consists of a two part process. Projects must first be reviewed by the Division of Natural Resources Review & Coordination to confirm if a wetland impact will occur. If it is determined there will not be an impact, the project will be approved and funds may be released. If it is determined an impact is going to occur, the entity requesting approval must prepare a plan which details how it will compensate for the impact before the project may move forward (20 ILCS 830). All compensation plans must be approved by IDNR. The Act does not require wetlands to have a surface water connection to a navigable waterway in order for those wetlands to fall within the state's regulatory jurisdiction.

The Illinois Rivers, Lakes, and Streams Act (615 ILCS 5) grants the IDNR Office of Water Resources (IDNR/OWR) the authority to regulate construction activities in floodplains. According to the Act, persons proposing such activities must first secure a permit from IDNR/OWR. Related regulations recognize six northeastern counties (Cook, DuPage, Kane, Lake, McHenry, and Will) separately from the rest of "downstate" Illinois. The purpose of both programs is to, "protect the rights, safety, and welfare of private and public landowners by the regulation of floodway development, [because] construction activities which restrict a stream's capacity to carry flood flows may result in channel instability and increased flood damages to neighboring properties" (State of

Illinois 1994). The downstate regulatory program requires permits for construction in the floodway of any stream serving a tributary area of 640 acres in urban areas or 6,400 acres in rural areas. The Northeastern Illinois Program does not limit the tributary area (State of Illinois 1994). IDNR/OWR uses a joint application form entitled Protecting Illinois Waters for its floodplain, public waters, and dam safety permits.

STUDY AREA

Beilschmidt Characterization Pad

The Beilschmidt Characterization Pad is located approximately 6 miles north of Alexander, Illinois. This property occupies a 700 ft X 700 ft portion of the northeastern quarter of the southeastern quarter of Section 25, Township 16 North, Range 9 West, 3rd Prime Meridian, in Morgan County. The area of the site is approximately 11.25 acres. Topography within the site ranged between 540 and 570 feet msl. The property contains agricultural fields.

Hoagland Characterization Pad

The Hoagland Characterization Pad is also located approximately 6 miles north of Alexander, Illinois. This property occupies a 500 ft X 1340 ft portion of the eastern half of the northwestern quarter of Section 25, Township 16 North, Range 9 West, 3rd Prime Meridian, in Morgan County. The area of the site is approximately 15.38 acres. Topography within the site ranged between 540 and 570 feet msl. The property contains agricultural fields and grassed pasture.

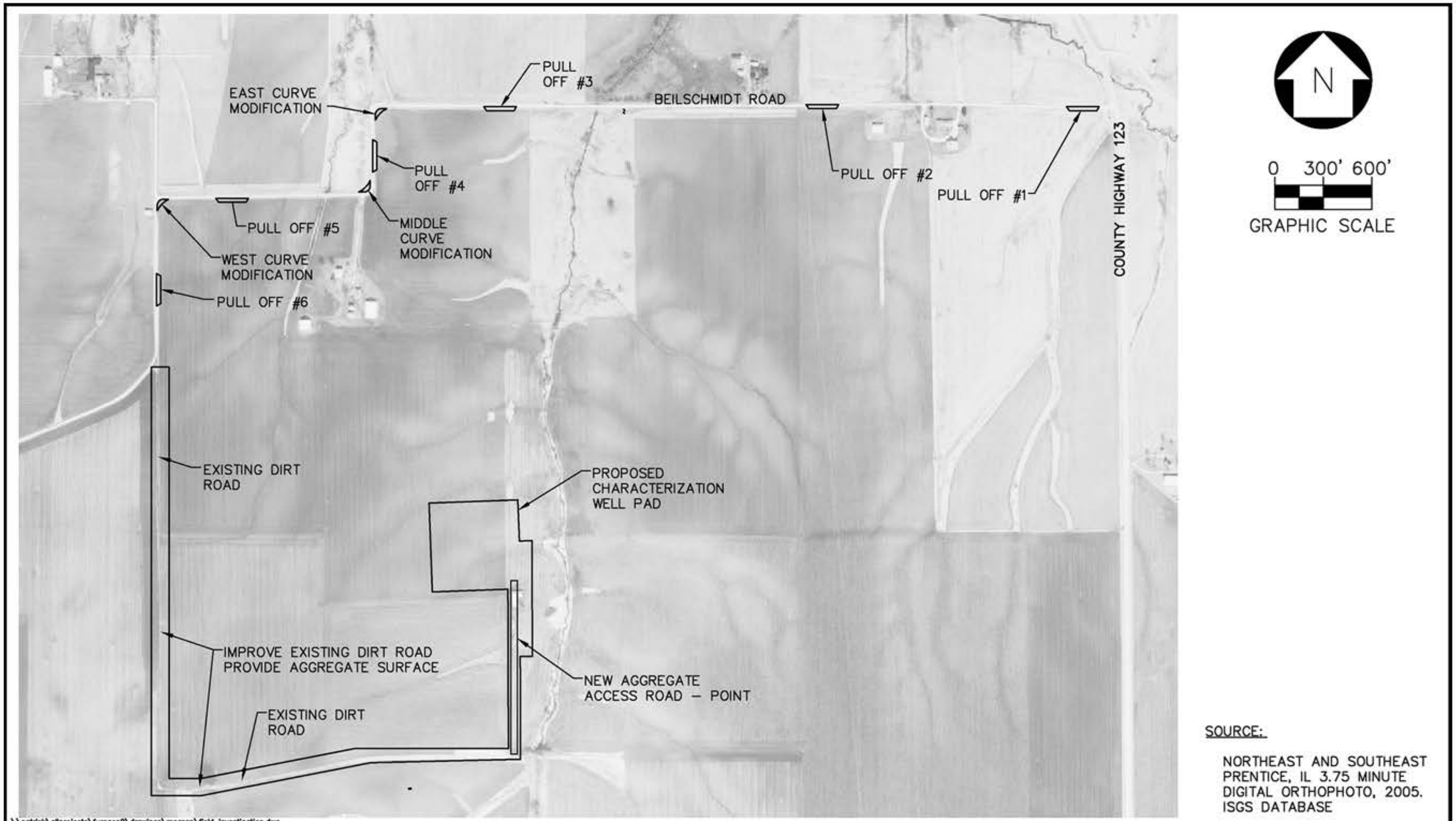
Beilschmidt Road Improvements

Improvements to Beilschmidt Road include 5 truck pull-off areas and modifications to three curves. These improvements are necessary to allow large trucks to safely access Characterization Pads during construction. The first truck pull-off is located at the intersection of County Highway 123 and Beilschmidt Road, on the south side of Beilschmidt Road. Another pull-off is located approximately 1750 feet west of County Highway 123 on the south side of Beilschmidt Road. A third pull-off is located approximately 3540 feet west of County Highway 123 on the south side of Beilschmidt Road. A fourth pull-off is located approximately 1 mile west of County Road 123 on the south side of Beilschmidt Road. The fifth truck pull-off is located adjacent to the Hoagland Characterization Pad on the east side of Beilschmidt Road. Each of these pull-off sites measures approximately 30 ft by 150 ft.

Between County Highway 123 and the existing farm access road (described below), Beilschmidt Road makes three 90º curves. Modifications to the road alignment would affect areas on the inside of these curves. The first corner area of impact includes a triangular area 150 feet wide by 150 feet long south and east of Beilschmidt road approximately 4500 feet west of County Highway 123. Approximately 500 feet south from the first curve, a second area of impact includes a triangular area 150 feet wide by 150 feet long on the north and west sides of Beilschmidt Road. Approximately 1350 feet further west, an area of impact approximately 150 feet wide by 150 feet long is located on the south and east sides of Beilschmidt Road.

Farm Road Improvement and Extension

The existing farm access road begins near the northwest corner of the Beilschmidt farm. This unnamed road extends south from its intersection with Beilschmidt Road for approximately 2580 feet along the wester border of the Beilschmidt farm. The road continues east, bisecting the Martin Property, approximately 2170 feet. An extension of this road northward approximately 870 feet, roughly parallel to the eastern border of the Beilschmidt farm, would allow access to the Beilschmidt Characterization Pad.



\\patrick\allprojects\furegen2\drawings\morgan\field investigation.dwg

PATRICK ENGINEERING INC.
300 W. EDWARDS ST. SUITE 200 TEL (217) 525-7050
SPRINGFIELD, IL 62704-1907 FAX (217) 525-7053
http://www.patrickengineering.com
PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000409

FUTUREGEN INDUSTRIAL ALLIANCE, INC
MORGAN COUNTY SITE

FIELD INVESTIGATION LOCATIONS

DATE:	5/24/11
PROJ. NO.:	21003.017
APP. BY:	JWD

PURPOSE & PROCEDURE

The purpose of this investigation was to determine the extent of regulated wetlands within the proposed characterization pad sites, Beilschmidt Road improvement areas, and areas affected by the improvement and extension of an existing farm access road. The wetlands investigation was conducted in conformation with the guidelines found in the Corps' Wetlands Delineation Manual (Environmental Laboratory 1987).

The following tasks have been completed and the results are reported below:

- Using available reference materials determine the presence of previously identified wetland hydrology, hydric soils, and/or hydrophytic vegetation.

- Perform a field survey to ground-truth data gathered through available references.

Preliminary Data Collection & Review

Prior to conducting the wetland determination, the following resources were reviewed:

<u>US Fish & Wildlife Service National Wetland Inventory Map</u>

The National Wetland Inventory (NWI) map data (USFWS 2011) for the project site were examined to obtain a preliminary estimate of potential wetlands occurring at the proposed power plant site, related new construction areas, and the region of influence. Given that wetland identification criteria differ between the US Fish & Wildlife Service (USFWS) and the Corps, wetlands shown on a NWI map may not be under the jurisdiction of the Corps. Similarly, jurisdictional wetlands may not always be identified on NWI maps. Consequently, wetland presence based on NWI maps alone cannot be assumed to be an accurate assessment of jurisdiction.

<u>USGS Topographic Map</u>

The project site was superimposed on the corresponding topographic map (updated in 1990) (Microsoft 2011). These maps indicate topography, land use, water bodies, drainage ways, and other basic information pertinent to the project area. Of obvious importance for wetland research is the topographic and hydrologic information available on USGS map.

<u>National Cooperative Soil Survey</u>

Soils maps from the National Cooperative Soil Survey website (NCSS 2011) were examined to determine the characteristics of soils at the project site. County hydric soils lists from Morgan County were also reviewed prior to fieldwork.

Field Survey

Pedestrian surveys for jurisdictional wetlands and protected species were conducted on the subject property on April 27, 2011. Surveys were performed by Specialized Ecological Services' Consulting Ecologist, Robert Rinella. Vegetation identification was performed by Specialized Ecological Services' Senior Botanist, James Lang. Qualifications are provided in Attachment A.

Wetland field investigations were performed based on the guidelines of the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). The manual recommends a minimum of three transects through a project area aligned perpendicular to the longest axis. In this case, three transects were aligned perpendicular to the western border of both the Beilschimdt and Hoagland Characterization Pads. For the areas affected by improvements to Beilschmidt Road, the entire length of each area was traversed. Similarly, the entire length of the farm access road and its proposed extension were traversed. Because the ground cover of these areas was primarily agricultural weeds and pasture grass and because the areas' widths are limited, it was possible to observe any variance in habitat type while walking the length of the corridors.

Within the proposed characterization pad sites, sample plots were established at each vegetation community along the transects. Routine Wetland Determination Data Forms were completed to characterize the jurisdictional wetland areas and adjacent uplands (Attachment B). At these locations, vegetation, hydrologic indicators, and soil conditions were recorded. In related areas affected by improvements to Beilschmidt Road and by the improvement and extension of an existing farm access road, Routine Wetland Determination Data Forms were completed for each vegetation community encountered.

<u>Vegetation</u>

Plant identifications and nomenclature were based on *Flora of Missouri (*Steyermark 1963). The USFWS wetland indicator status of species follows Reed (1988).

<u>Soils</u>

Site-specific data were examined to determine the characteristics of soils of the project area. A Munsell soil color chart (Munsell Soil 1975) was used to describe soil color and other significant characteristics. Field observations were used to verify mapped soils survey information.

<u>Hydrology</u>

During field investigations, hydrologic indicators were observed and used to verify reference data shown on NWI maps, USGS topographic maps, soils surveys, and other sources. Specific field indicators may include, but are not limited to: inundation, saturation, watermarks, drift lines, sediment deposits, and water-stained leaves.

RESULTS

Preliminary Data Collection & Review

US Fish & Wildlife Service National Wetland Inventory Map

Review of the National Wetland Inventory (NWI) map (USFWS 2011) revealed only those wetland areas associated with Indian Creek. These are all well outside the project area. NWI and USGS topographic maps are provided in Attachment C.

USGS Topographic Map

USGS topographic maps revealed the presence of an unnamed tributary to Indian Creek located on the eastern border of the Beilschmidt Property. This tributary is mapped flowing north across the Beilschmidt farm. This waterway is outside the project area; approximately 300 feet east of the Beilschmidt Characterization Pad boundary.

National Cooperative Soil Survey

Soils maps (NCSS 2011) show several soil types in the proposed project area. The soil map and county hydric soils list are included in Attachment D.

None of the soils associated with either the Beilschmidt Characterization Pad or Hoagland Characterization Pad are listed as hydric. A portion of of the Hoagland Characterization Pad site contains Clarksdale silt loam, 0 to 3 percent slopes which may contain hydric listed Virden soils in depressions.

None of the soils associated with Beilschmidt Road improvements are listed as hydric.

A small area of the farm access road is mapped with a Sable Silty Clay Loam. This soil type is listed as hydric. Another portion of the farm access road is mapped with Ipava silt loam, 0 to 2 percent slopes. Ipava silt loam may contain hydric listed Denny, Sable, or Virden soils in depressions.

Field Survey

Vegetation

The Beilschmidt Characterization Pad supports a single vegetation community, agricultural row crops. The Hoagland Characterization Pad supports pasture composed of cool season grasses and common weeds. Project areas associated with improvements to Beilschmidt Road support cool-season grasses and weeds common in road right-of-way. The project areas associated with the improvement and extension of the existing farm access road contain primarily cool-season grasses and common weeds, but also areas of agricultural row crop.

Agricultural Row Crop

This terrestrial community type is most common throughout the project area. In season, it would be planted in agricultural row crops. During field observations, there were no cultivated species present. Only bare soil and common agricultural weeds were observed. Common species observed include *Barbarea vulgaris, Capsella bursa-pastoris, Conium maculatum, Erigeron canadensis, Lamium amplexicaule, Rananculus abortivus,* and *Stellaria media.*

Grassed Pasture and Road Right-of-Way

This terrestrial community was observed at the Hoagland Characterization Pad, along Beilschmidt Road, and along the farm access road. Various grasses (*Festuca arundinaceae, Phalaris arundinacea, Setaria* spp.) and broadleaf weeds (*Barbarea vulgaris, Lamium amplexicaule, Rumex chrispus, Taraxacum officinale,* and *Thalaspia arvense*) were the dominant herbaceous species. No woody species were observed.

Soils

The soils observed coincide with those soils shown in the soil survey maps. The native vegetation of the majority of the project site would have been a mix of tall-grass prairie and deciduous hardwoods.

Hydrology

Indian Creek and its unnamed tributaries drain all areas of the proposed project site westward into the Illinois River. The Illinois River terminates in the Mississippi River.

Summary of Jurisdictional Areas

No jurisdictional wetlands were observed within the project area.

DISCUSSION

The impact of proposed FutureGen Industrial Alliance, Inc project was evaluated for the presence of jurisdictional wetlands and other U.S. waters during April and May 2011 by Specialized Ecological Services. This work was conducted using the standards of practice for wetland delineation.

No jurisdictional wetlands were observed in the study area. As proposed, the actions of this project should not have impacts to wetlands or require wetland fill permits.

LIMITS OF RESEARCH

As Cowardin et al. (1979) point out, *"there is no single, correct, indisputable, ecologically sound definition for wetlands, primarily because of the diversity of wetlands and because the demarcation between dry and wet environments lies along a continuum."* Wetlands, by their nature are dynamic systems. A single field investigation cannot possibly enable any investigator to have an absolutely complete understanding of the complex ecological interactions and components of a site. However, by combining information collected from many sources at many different times, a clearer understanding is attainable. The results and conclusions of this investigation represent the integration of all information and data currently available. Literature and map data were combined with on-site reconnaissance to assure that this report is complete, comprehensive, and accurately reflects conditions at the subject property.

Although every effort has been made to conduct this study according to the current standards of practice and to present the results clearly and completely, a one time sampling effort can only depict a 'snap-shot' of the complex biological, chemical, and ecological conditions at the study site. Sufficient support can be drawn from this sampling effort and associated analytical results, as well as from the scientific literature, for the discussion and conclusions provided herein.

LITERATURE CITED

20 ILCS 830. 1989. Inter agency Wetland Policy Act of 1989. *Illinois Public Act 86-157.*

615 ILCS 5. 1994. Illinois Rivers, Lakes, and Streams Act. *Illinois Public Act 86-1324.*

Buol, S. W., and R. A. Rebertus. 1988. "Soil Formation Under Hydromorphic Conditions." In *The ecology and Management of Wetlands, Vol. 1: Ecology of Wetlands.* pp 253-262. Timber Press, Portland, Oregon.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. La Roe. 1979. "Classification of Wetlands and Deepwater Habitats of the United States." FWS/OBS-79/31. U.S. Fish & Wildlife Service, Office of Biological Services, Washington, D.C.

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual." Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS.

Hutchinson, G. E. 1975. Limnological Botany. A Treatise on Limnology. John Wiley and Sons. New York.

Megonigal, J. P., W. H. Patrick, Jr., and S. P. Faulkner. "Wetland Identification in Seasonally Flooded Forest Soils: Soil Morphology and Redox Dynamics." *Soil Science Society of America Journal.* 57(1):140-149.

Mohlenbrock, R. H. 1986. Guide to the Vascular Flora of Illinois. Southern Illinois University. 507p.

Munsell Color. 1975. Munsell Soil Color Charts. Kollmorgan Corporation. Baltimore, MD.

National Cooperative Soil Service (NCSS). 2011. "*NCSS Web Soil Survey.*" Accessed May 1, 2011 at http://websoilsurvey.nrcs.usda.gov/app/ (last updated November 11, 2009).

Reed, P.B., Jr. 1988. "National List of Plant Species that Occur in Wetlands: National Summary." *U.S. Fish & Wildlife Service Biological Report* 88(24). U.S. Government Printing Office. Washington, D.C.

Soil Conservation Service (SCS). 1991. National List of Hydric Soils. National Technical Committee on Hydric Soils, US Department of Agriculture, Soil Conservation Service.

Taft, J. B., G. S. Wilhelm, D. M. Ladd, and L. A. Masters. 1997. "Floristic Quality Assessment for Vegetation in Illinois, a Method for Assessing Vegetation Integrity." *Erigenia*. 15:1-95.

Microsoft. 2011. Microsoft Research Web Site. Accessed May 3, 2011 at http://msrmaps.com/default.aspx (last updated May 3, 2011).

U.S. Department of Agriculture – Soil Conservation Service. 1975. Soil Taxonomy. Agriculture Handbook Number 436. U.S. Government Printing Office. Washington, D.C.

U.S. Fish and Wildlife Service (USFWS). 2011. *Wetlands Online Mapper*. Accessed May 3, 2011 at http://www.fws.gov/wetlands/Data/Mapper.html (last updated March 29, 2011).

ATTACHMENT A: WETLAND DELINEATOR QUALIFICATIONS

Bob Rinella, Environmental Professional and Wetland Ecologist, Specialized Ecological Services. Three years with Southern Illinois University Cooperative Wildlife Research Laboratory, fifteen years with Specialized Ecological Services. Eighteen (18) years experience with environmental research including wetlands, plant biology, wildlife biology, and environmental planning. Master of Science in Environmental Studies at Southern Illinois University, Bachelor of Science in Biology at Jacksonville University.

James Lang, PhD., Senior Botanist, Specialized Ecological Services. Twenty five (25) years with Greenville College, thirteen years with Specialized Ecological Services. Over thirty five (35) years experience with plant biology and endangered species research. Doctorate in Botany at Iowa University, Master of Science in Botany and Bachelor of Arts in Science at University of Arkansas.

Eric Ahern, Environmental Technician, Specialized Ecological Services. Two years with Zahniser Institute for Environmental Studies, nine years with Specialized Ecological Services. Eleven (11) years experience in environmental research including lacustrine water quality studies, wetland restoration, and GIS/GPS mapping. Master of Science in Education at University of Phoenix and Bachelor of Arts in Biology at Greenville College.

ATTACHMENT B: WETLAND DATA FORMS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Future Gen - Bulschmidt Rd Applicant/Owner: Investigator: B Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: grass roadside Transect ID: 1 Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinaceae	h	FACU+	9.		
2. Barbarea vulgaris	h	FAC	10.		
3. Taraxacum officinale	h	FACU	11.		
4. Setaria feberi	h	FACU+	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 25%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: — (in.)

Depth to Free Water in Pit: >18" (in.)

Depth to Saturated Soil: >18' (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: No indicator

SOILS

Map Unit Name (Series and Phase): Assumption silt loam, 10-15% slopes eroded

Drainage Class: moderately well

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed superactive mesic Oxyaquic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	7.5YR/3/2	N/A	N/A	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	

Is this Sampling Point Within a Wetland? Yes No (Circle)

Remarks:

This is the first truck pull-off E to W on Beilschmidt Rd from Co Hwy 123

Approved by HQUSACE 3/92

pull out 1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Beilschmidt Rd Applicant/Owner: Investigator: B Rikelt	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: grass roadside Transect ID: 1 Plot ID: 2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinacea	h	FACU+	9.		
2. Barbarea vulgaris	h	FAC	10.		
3. Setaria faberi	h	FACU+	11.		
4. Taraxacum officinale	h	FACU	12.		
5. Cirsium maculatum	h	FACU-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 20%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: >18 (in.) Depth to Saturated Soil: >18 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: no indicator

SOILS

Map Unit Name (Series and Phase): Tama silt loam 2-5% slopes
Drainage Class: well drained
Field Observations
Confirm Mapped Type? **Yes** No

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR/3/2	N/A	—	

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

no indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes **No** (Circle)
Wetland Hydrology Present? Yes **No**
Hydric Soils Present? Yes **No**

(Circle)
Is this Sampling Point Within a Wetland? Yes **No**

Remarks:

Truck pull of #2 E-W on Beilschmidt Rd from Co Hwy 123

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Beilschmidt Rd Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: grassed roadside Transect ID: 1 Plot ID: 3

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinaceae	h	FACU+	9.		
2. Setaria feberi	h	FACU+	10.		
3. Taraxacum officianale	h	FACU	11.		
4. Thafaspi arvense	h	NI	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: >18 (in.) Depth to Saturated Soil: >18 (in.)	

Remarks: no indicator

3

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 2-5% slopes

Drainage Class: well

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-16	A	10YR3/2			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	

Is this Sampling Point Within a Wetland? Yes No (Circle)

Remarks:

3rd truck pull-off on Beilschmidt Rd
E – W from CO Hwy 123

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen Beilschmidt Rd Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: grassed roadside Transect ID: 1 Plot ID: 4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinaceae	h	FACU+	9.		
2. Taraxacum officianale	h	FACU	10.		
3. Setaria feberi	h	FACU+	11.		
4. Lamium amplexicaule	h	N/I	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: >18 (in.) Depth to Saturated Soil: >18 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: no indicators

SOILS

Map Unit Name (Series and Phase): Elkhart silt loam, 5-10% slopes, eroded	Drainage Class: Well drained
Taxonomy (Subgroup): fine-silty, mixed superactive mesic Typic Argiudolls	Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR/3/3	N/A	—	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

No indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

1st 90° Corner on Beilschmidt Rd
E-W from Co Hwy 123

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Beilschmidd Rd + Future Gen Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: grass road war Transect ID: 1 Plot ID: 5

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinacea	h	FACU+	9.		
2. Taraxacum officinale	h	FACU	10.		
3. Setaria faberi	h	FACU+	11.		
4. Setaria glauca	h	FAC	12.		
5. Capsella bursa-pastoris	h	FAC-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 20%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: 7/8 (in.) Depth to Saturated Soil: 7/8 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 2-5% slopes

Drainage Class: well drained

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR/3/2			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

No indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)		(Circle)
Wetland Hydrology Present?	Yes No		
Hydric Soils Present?	Yes No	Is this Sampling Point Within a Wetland?	Yes No

Remarks:

Second 90° corner on Beilschmidt Rd E-W from Co Hwy 123

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Beilschmidt Rd Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: grass roadway Transect ID: 1 Plot ID: 6

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Fetuca arundinaceae	h	FACU+	9.		
2. Barbarea vulgaris	h	FAC	10.		
3. Cirsium vulgare	h	FACU-	11.		
4. Thalaspi arvense	h	NI	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 25%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: >18 (in.) Depth to Saturated Soil: >18 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: no indicators

B2 Appendix B Blank and Example Data Forms

6

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 2-5% slopes

Drainage Class: well drained

Field Observations

Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR/3/2			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

No indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)

Wetland Hydrology Present? Yes No

Hydric Soils Present? Yes No

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

4th Truck pull off on Beilschmidt Rd E-W from CA Hwy 123

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Future Gen - Beilschmidt Rd Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: grass meadow Transect ID: 1 Plot ID: 7

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundenacea	h	FACU+	9.		
2. Cirsium vulgare	h	FACU-	10.		
3. Taraxacum officinale	h	FACU	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: >18 (in.) Depth to Saturated Soil: >18 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: no indicator

B2 Appendix B Blank and Example Data Forms

7

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 2-5% slopes

Drainage Class: well drained

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	7.5YR/3/2	N/A		

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

no indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	
		(Circle)
Is this Sampling Point Within a Wetland?	Yes No	

Remarks:

3rd 90° corner on Beilschmidt Rd E-W from CO HWY 123

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Beilschmidt Rd Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: grass roadway Transect ID: 1 Plot ID: 8

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinaceae	h	FACU+	9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: — (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

no indicator

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 2-5% slopes

Drainage Class: well drained

Taxonomy (Subgroup): fine silty, mixed, superactive mesic Typic Argiudolls

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR/3/2	—	—	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

No indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	
Is this Sampling Point Within a Wetland?	Yes No	(Circle)

Remarks:

5th truck pull off on Beilschmidt Rd
E-W from Hwy 123

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Farm Rd Applicant/Owner: Investigator: B Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: grass roadway Transect ID: 1 Plot ID: 9

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinaceae	h	FACU+	9.		
2. Rumex crispus	h	FAC+	10.		
3. Taraxacum officinale	h	FACU	11.		
4. Setaria faberi	h	FACU+	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 25%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: >18" (in.) Depth to Saturated Soil: >18" (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: no indicators

SOILS

Map Unit Name (Series and Phase): Ipava silt loam, 0-2% slopes	Drainage Class: Somewhat poorly drained
Taxonomy (Subgroup): Fine, smectitic, mesic Aquic Argiudolls	Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-16	A	10YR/3/2	N/A	—	
16-20	B	10YR/4/3	N/A		

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	Is this Sampling Point Within a Wetland? Yes No

Remarks:

Farm access road - existing

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Future Gen - Farm access Rd Applicant/Owner: Investigator: B Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: Ag Transect ID: 1 Plot ID: 10

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Lamium amplexicaule	h	NI	9.		
2. Thalaspia arvense	h	NI	10.		
3. Unknown asteraceae			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: — (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

No indicators

B2 Appendix B Blank and Example Data Forms

10

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 5-10% slopes

Drainage Class: well drained

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive, mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-?	A	10YR/3/2			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)

Wetland Hydrology Present? Yes No

Hydric Soils Present? Yes No

(Circle)

Is this Sampling Point Within a Wetland? Yes No

Remarks:

Farm access road extension N accross Ag

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutreGen - Farm Access Applicant/Owner: Investigator: B Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: Grassed pasture Transect ID: 1 Plot ID: 11

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Phalaris arundinacea	h	FACW+	9.		
2. Festuca arundinacea	h	FACU+	10.		
3. Setaria faberi	h	FACU+	11.		
4. Cirsium vulgare	h	FACU-	12.		
5. Conium maculatum	h	FACW	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 40%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands
Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: 718 (in.) Depth to Saturated Soil: 718 (in.)	Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: no indicators

B2 Appendix B Blank and Example Data Forms

11

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 5-10% slope

Drainage Class: well drained

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive Mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
-18	A	7.5YR/3/2			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	

Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

Farm access road extension N grassed drainage way.

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Boilschmidt Applicant/Owner: Investigator: B. Rinella	Date: 29 April 11 County: Morgan State: Illinois
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: Ag Transect ID: 2 Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Lamium amplexicaule		NI	9.		
2. Thlaspi arvense		NI/FACU	10.		
3. Stellaria media		FACU	11.		
4. Capsella bursa-pastoris		FAC-	12.		
5. Conyza canadensis		FAC-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: Primarily tilled ag land

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: N/A (in.) Depth to Free Water in Pit: >18" (in.) Depth to Saturated Soil: >18" (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: No Indicators

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 2-5% slopes
Drainage Class: well drained
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup): fine-silty, mixed, superactive, mesic Typic Arguidolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-16		10YR/3/2	na		
16+		10YR/2/2	2.5YR/2.5/3	5-7% Very fine	

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? Yes No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

Balschmid characterization pad
top of hill

Approved by HQUSACE 3/92

Top of ag hill

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Beilschmidt Applicant/Owner: Investigator: B Rimelk	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Ag Transect ID: 3 Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Lamium amplexicaule	h	NI	9.		
2. Thalaspi arvense	h	NI	10.		
3. Stellaria media	h	FACU	11.		
4. Conyza Canadensis	h	FAC-	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: — (in.) Depth to Free Water in Pit: >18 (in.) Depth to Saturated Soil: >18 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks:

no indicators

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 5-10% slopes

Drainage Class: well drained

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-16	A	10YR/3/2	—		

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	Is this Sampling Point Within a Wetland? Yes No

Remarks:

Beilschmidt Characterization Pad
Transect 2

Approved by HQUSACE 3/92

Appendix B Blank and Example Data Forms B3

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen - Balschmidt Applicant/Owner: Investigator: B Rivett	Date: 27 April 11 County: Morgan State: Illinois
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: Ag Transect ID: 4 Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Setaria italica		FACU	9.		
2. Festuca arundinacea		FACU+	10.		
3. Cannabis sativa		FAC	11.		
4. Conium maculatum		FACW	12.		
5. Erigeron canadensis		FAC-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 40%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: - (in.) Depth to Free Water in Pit: 7/8 (in.) Depth to Saturated Soil: 7/8 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ✓ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: This is the lowest part / drainageway for the ag field

B2 Appendix B Blank and Example Data Forms

(14)

SOILS

Map Unit Name (Series and Phase): Tama silt loam 2-5% slopes

Drainage Class: moderately well

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic, Typic Argiudolls

Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18"		2.5Y/5/3	5YR/5/6	30% fine	

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: A horizon possibly eroded. Bare soil bottom of gully

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	~~Yes~~ No	

(Circle)

Is this Sampling Point Within a Wetland? Yes No

Remarks: Beilschmidt characterization pad bottom of gulley

Approved by HQUSACE 3/92

Ag drainageway

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Future Gen - Bailschmidt Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: Illinois
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: Stream side Transect ID: X Plot ID: X

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Gleditsia triacanthos		FAC	9. Salvia Hallica		FACU
2. Morus rubra		FAC-	10. Urtica dioica		FAC+
3.			11.		
4.			12.		
5. Festuca arundinacea		FACU	13.		
6. Galium concinnum		FACU	14.		
7. Conium maculatum		FACW	15.		
8. Cirsium vulgare		FACU-	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 38%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: ______ (in.) Depth to Free Water in Pit: 7/8" (in.) Depth to Saturated Soil: 7/8" (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: No indicator

15

SOILS

Map Unit Name (Series and Phase): Tama silt loam 2-5% slopes
Drainage Class: moderately - well
Field Observations
Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Hapludolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18"		10YR3/2	—		

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no Indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes No (Circle)
Wetland Hydrology Present? Yes No
Hydric Soils Present? Yes No

(Circle)
Is this Sampling Point Within a Wetland? Yes No

Remarks:

This area is not part of Project Area. Adjacent to unnamed trib to Indian creek

Approved by HQUSACE 3/92

creekside

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen Hoagland Applicant/Owner: Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: pasture Transect ID: 5 Plot ID: 7

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinaceae		FACU+	9. Barbarea vulgaris		FAC
2. Phalaris arundinacea		FACW	10.		
3. ~~Aed~~			11.		
4. Rumex crispus		FAC+	12.		
5. Taraxacum officinale		FACU	13.		
6. Thalaspia arvense		NI/FACU	14.		
7.			15.		
8. Lamium amplexicaule		NI	16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 3/7 43%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ✓ Drainage Patterns in Wetlands
Field Observations: Depth of Surface Water: N/A (in.) Depth to Free Water in Pit: >18 (in.) Depth to Saturated Soil: >18 (in.)	Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: This is a grassed watterway in a field.

SOILS

Map Unit Name (Series and Phase): Tama silt loam, 5-10% slopes

Drainage Class: well drained

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-18"	A	10YR/4/4	N/A		

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: no indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	

(Circle)

Is this Sampling Point Within a Wetland? Yes No

Remarks: Hoagland Characterization pad

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Future Gen - Hoagland Applicant/Owner: Investigator: B Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: pasture Transect ID: 10 Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Rumex crispus	h	FAC+	9.		
2. Taraxacum vulgare	h	FACU	10.		
3. Festuca arundenaceae	h	FACU+	11.		
4. Thalaspi arvense	h	NI	12.		
5. Stellaria media	h	FACU	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 20%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
 ___ Stream, Lake, or Tide Gauge
 ___ Aerial Photographs
 ___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: — (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
 ___ Inundated
 ___ Saturated in Upper 12 Inches
 ___ Water Marks
 ___ Drift Lines
 ___ Sediment Deposits
 ___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
 ___ Oxidized Root Channels in Upper 12 Inches
 ___ Water-Stained Leaves
 ___ Local Soil Survey Data
 ___ FAC-Neutral Test
 ___ Other (Explain in Remarks)

Remarks: no indicator

B2 Appendix B Blank and Example Data Forms

17

SOILS

Map Unit Name (Series and Phase): Tama silt loam 5-10% slope	Drainage Class: well
Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls	Field Observations Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
-12"	A	10YR/3/2	NA		
12-18	B	10YR/4/3			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	Is this Sampling Point Within a Wetland? Yes No

Remarks:

Hoagland Characterization Pad

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Future Gen - Hoagland Applicant/Owner: ______ Investigator: B. Rinella	Date: 27 April 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? **Yes** No Is the site significantly disturbed (Atypical Situation)? Yes **No** Is the area a potential Problem Area? Yes **No** (If needed, explain on reverse.)	Community ID: pasture Transect ID: 7 Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinaceae	h	FACU+	9.		
2. Capsella bursa-pastoris		FAC-	10.		
3. Taraxacum vulgare	h	FACU	11.		
4. Thalaspi arvense	h	NI	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: -- (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

no indicator

SOILS

Map Unit Name (Series and Phase): Tama silt loam 5-10% slope
Drainage Class: well
Field Observations
Confirm Mapped Type? Yes No

Taxonomy (Subgroup): fine-silty, mixed, superactive mesic Typic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-16	A	7.5YR/3/1			

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

no indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No	(Circle)
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	

(Circle)

Is this Sampling Point Within a Wetland? Yes No

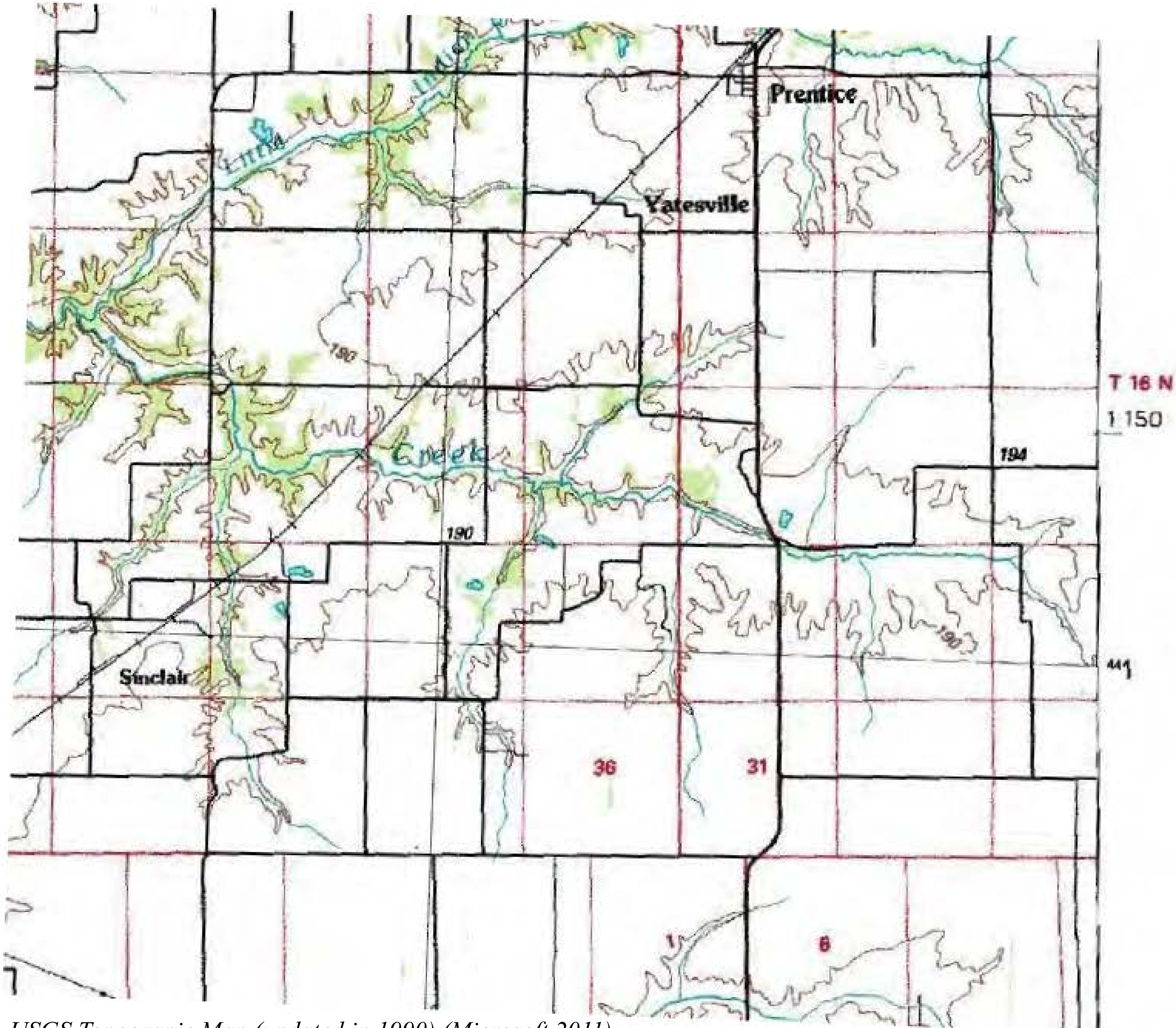
Remarks:

Hoagland characterization pad

Approved by HQUSACE 3/92

ATTACHMENT C: NWI AERIAL AND USGS TOPOGRAPHIC MAPS

National Wetland Inventory Map (USFWS 2011).



USGS Topograpic Map (updated in 1990) (Microsoft 2011).

ATTACHMENT D: PROJECT SOILS MAP AND HYDRIC SOILS OF MORGAN COUNTY

Soil Map—Morgan County, Illinois
(FutureGen Project Site)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:11,200 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 15N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morgan County, Illinois
Survey Area Data: Version 2, Jul 10, 2006

Date(s) aerial images were photographed: 6/20/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Morgan County, Illinois (IL137)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
8E2	Hickory loam, 15 to 30 percent slopes, eroded	1.2	0.2%
36B	Tama silt loam, 2 to 5 percent slopes	223.6	33.8%
36C2	Tama silt loam, 5 to 10 percent slopes, eroded	103.7	15.7%
43A	Ipava silt loam, 0 to 2 percent slopes	206.4	31.2%
68	Sable silty clay loam	30.3	4.6%
119D3	Elco silty clay loam, 10 to 15 percent slopes, severely eroded	2.1	0.3%
257A	Clarksdale silt loam, 0 to 3 percent slopes	1.8	0.3%
259C2	Assumption silt loam, 5 to 10 percent slopes, eroded	4.7	0.7%
259D2	Assumption silt loam, 10 to 15 percent slopes, eroded	23.8	3.6%
279B	Rozetta silt loam, 2 to 5 percent slopes	4.2	0.6%
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	0.6	0.1%
451	Lawson silt loam	0.0	0.0%
567C2	Elkhart silt loam, 5 to 10 percent slopes, eroded	60.0	9.1%
Totals for Area of Interest		**662.2**	**100.0%**

HYDRIC SOILS LIST
MORGAN AND SCOTT COUNTIES, ILLINOIS: Detailed Soil Map Legend

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria				Acres
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria	
8E2: HICKORY LOAM, 15 TO 30 PERCENT SLOPES, ERODED	HICKORY	No	---	---	---	---	---	21,274
8E3: HICKORY CLAY LOAM, 15 TO 30 PERCENT SLOPES, SEVERELY ERODED	HICKORY	No	---	---	---	---	---	1,584
8F: HICKORY SILT LOAM, 20 TO 50 PERCENT SLOPES	HICKORY	No	---	---	---	---	---	14,182
17A: KEOMAH SILT LOAM, 0 TO 3 PERCENT SLOPES	KEOMAH	No	---	---	---	---	---	11,661
	VIRDEN	Yes	depression	2B3	YES	NO	NO	---
19C3: SYLVAN SILTY CLAY LOAM, 5 TO 10 PERCENT SLOPES, SEVERELY ERODED	SYLVAN	No	---	---	---	---	---	8,235
19D2: SYLVAN SILT LOAM, 10 TO 15 PERCENT SLOPES, ERODED	SYLVAN	No	---	---	---	---	---	2,576
19D3: SYLVAN SILTY CLAY LOAM, 10 TO 15 PERCENT SLOPES, SEVERELY ERODED	SYLVAN	No	---	---	---	---	---	4,225
19E2: SYLVAN SILT LOAM, 15 TO 30 PERCENT SLOPES, ERODED	SYLVAN	No	---	---	---	---	---	1,954
19E3: SYLVAN SILTY CLAY LOAM, 15 TO 30 PERCENT SLOPES, SEVERELY ERODED	SYLVAN	No	---	---	---	---	---	1,829
26: WAGNER SILT LOAM	WAGNER	Yes	backswamp	2B3	YES	NO	NO	1,162
30F: HAMBURG SILT LOAM, 20 TO 35 PERCENT SLOPES	HAMBURG	No	---	---	---	---	---	3,532
30G: HAMBURG SILT LOAM, 35 TO 60 PERCENT SLOPES	HAMBURG	No	---	---	---	---	---	1,705

HYDRIC SOILS LIST--Continued
MORGAN AND SCOTT COUNTIES, ILLINOIS: Detailed Soil Map Legend

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria	Acres
36B: TAMA SILT LOAM, 2 TO 5 PERCENT SLOPES	TAMA	No	---	---	---	---	---	39,234
36C2: TAMA SILT LOAM, 5 TO 10 PERCENT SLOPES, ERODED	TAMA	No	---	---	---	---	---	7,361
37A: WORTHEN SILT LOAM, 0 TO 2 PERCENT SLOPES	WORTHEN	No	---	---	---	---	---	4,299
37B: WORTHEN SILT LOAM, 2 TO 5 PERCENT SLOPES	WORTHEN	No	---	---	---	---	---	1,655
37C: WORTHEN SILT LOAM, 5 TO 12 PERCENT SLOPES	WORTHEN	No	---	---	---	---	---	609
43A: IPAVA SILT LOAM, 0 TO 2 PERCENT SLOPES	IPAVA	No	---	---	---	---	---	88,203
	DENNY	Yes	depression	2B3	YES	NO	NO	---
	SABLE	Yes	depression	2B3	YES	NO	NO	---
	VIRDEN	Yes	depression	2B3	YES	NO	NO	---
43B: IPAVA SILT LOAM, 2 TO 5 PERCENT SLOPES	IPAVA	No	---	---	---	---	---	9,346
	DENNY	Yes	depression	2B3	YES	NO	NO	---
	SABLE	Yes	depression	2B3	YES	NO	NO	---
	VIRDEN	Yes	depression	2B3	YES	NO	NO	---
45: DENNY SILT LOAM	DENNY	Yes	ground moraine	2B3	YES	NO	NO	280
49: WATSEKA LOAMY SAND	WATSEKA	No	---	---	---	---	---	384
	AMBRAW	Yes	depression	2B3	YES	NO	NO	---
50: VIRDEN SILTY CLAY LOAM	VIRDEN	Yes	ground moraine	2B3	YES	NO	NO	12,439
53B: BLOOMFIELD LOAMY SAND, 2 TO 7 PERCENT SLOPES	BLOOMFIELD	No	---	---	---	---	---	433
53D: BLOOMFIELD LOAMY SAND, 7 TO 18 PERCENT SLOPES	BLOOMFIELD	No	---	---	---	---	---	779

HYDRIC SOILS LIST--Continued
MORGAN AND SCOTT COUNTIES, ILLINOIS: Detailed Soil Map Legend

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria	Acres
53E: BLOOMFIELD LOAMY SAND 18 TO 35 PERCENT SLOPES	BLOOMFIELD	No	---	---	---	---	---	1,124
54B: PLAINFIELD LOAMY SAND, 2 TO 7 PERCENT SLOPES	PLAINFIELD	No	---	---	---	---	---	3,416
	Orio	Yes	depression	2B3	YES	NO	NO	---
54D: PLAINFIELD LOAMY SAND, 7 TO 15 PERCENT SLOPES	PLAINFIELD	No	---	---	---	---	---	1,157
	Orio	Yes	depression	2B3	YES	NO	NO	---
68: SABLE SILTY CLAY LOAM	SABLE	Yes	ground moraine	2B3	YES	NO	NO	36,615
71: DARWIN SILTY CLAY	DARWIN	Yes	flood plain	2B3	YES	NO	NO	9,544
73A: ROSS LOAM, 0 TO 3 PERCENT SLOPES	ROSS	No	---	---	---	---	---	150
	Beaucoup	Yes	depression	2B3	YES	NO	NO	---
78A: ARENZVILLE SILT LOAM, 0 TO 3 PERCENT SLOPES	ARENZVILLE	No	---	---	---	---	---	4,575
81: LITTLETON SILT LOAM	LITTLETON	No	---	---	---	---	---	3,580
	Wagner	Yes	depression	2B3	YES	NO	NO	---
87: DICKINSON SANDY LOAM	DICKINSON	No	---	---	---	---	---	576
88B: SPARTA LOAMY SAND, 1 TO 6 PERCENT SLOPES	SPARTA	No	---	---	---	---	---	2,274
	Orio	Yes	depression	2B3	YES	NO	NO	---
107: SAWMILL SILTY CLAY LOAM	SAWMILL	Yes	flood plain	2B3	YES	NO	NO	1,427
119D2: ELCO SILT LOAM, 10 TO 15 PERCENT SLOPES, ERODED	ELCO	No	---	---	---	---	---	8,096

HYDRIC SOILS LIST--Continued
MORGAN AND SCOTT COUNTIES, ILLINOIS: Detailed Soil Map Legend

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria	Acres
119D3: ELCO SILTY CLAY LOAM, 10 TO 15 PERCENT SLOPES, SEVERELY ERODED	ELCO	No	---	---	---	---	---	1,811
119E2: ELCO SILT LOAM, 15 TO 20 PERCENT SLOPES, ERODED	ELCO	No	---	---	---	---	---	4,187
131B: ALVIN FINE SANDY LOAM, 2 TO 7 PERCENT SLOPES	ALVIN	No	---	---	---	---	---	535
	Orio	Yes	depression	2B3	YES	NO	NO	---
131D: ALVIN FINE SANDY LOAM, 7 TO 15 PERCENT SLOPES	ALVIN	No	---	---	---	---	---	404
150B: ONARGA FINE SANDY LOAM, 1 TO 5 PERCENT SLOPES	ONARGA	No	---	---	---	---	---	1,103
172A: HOOPESTON SANDY LOAM, 0 TO 3 PERCENT SLOPES	HOOPESTON	No	---	---	---	---	---	1,889
	Ambraw	Yes	depression	2B3	YES	NO	NO	---
180: DUPO SILT LOAM	DUPO	No	---	---	---	---	---	3,614
	Sawmill	Yes	depression	2B3	YES	NO	NO	---
200: ORIO SANDY LOAM	ORIO	Yes	flood plain	2B3	YES	NO	NO	833
242B: KENDALL SILT LOAM, 1 TO 5 PERCENT SLOPES	KENDALL	No	---	---	---	---	---	375
244: HARTSBURG SILTY CLAY LOAM	HARTSBURG	Yes	ground moraine	2B3	YES	NO	NO	4,093
257A: CLARKSDALE SILT LOAM, 0 TO 3 PERCENT SLOPES	CLARKSDALE	No	---	---	---	---	---	8,985
	Virden	Yes	depression	2B3	YES	NO	NO	---
259C2: ASSUMPTION SILT LOAM, 5 TO 10 PERCENT SLOPES, ERODED	ASSUMPTION	No	---	---	---	---	---	3,134

HYDRIC SOILS LIST--Continued
MORGAN AND SCOTT COUNTIES, ILLINOIS: Detailed Soil Map Legend

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria				Acres
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria	
259D2: ASSUMPTION SILT LOAM, 10 TO 15 PERCENT SLOPES, ERODED	ASSUMPTION	No	---	---	---	---	---	1,265
279B: ROZETTA SILT LOAM, 2 TO 5 PERCENT SLOPES	ROZETTA	No	---	---	---	---	---	59,291
279C2: ROZETTA SILT LOAM, 5 TO 10 PERCENT SLOPES, ERODED	ROZETTA	No	---	---	---	---	---	12,340
279C3: ROZETTA SILTY CLAY LOAM, 5 TO 10 PERCENT SLOPES, SEVERELY ERODED	ROZETTA	No	---	---	---	---	---	10,702
280B: FAYETTE SILT LOAM, 2 TO 5 PERCENT SLOPES	FAYETTE	No	---	---	---	---	---	4,284
280C2: FAYETTE SILT LOAM, 5 TO 10 PERCENT SLOPES, ERODED	FAYETTE	No	---	---	---	---	---	5,257
280D2: FAYETTE SILT LOAM, 10 TO 15 PERCENT SLOPES, ERODED	FAYETTE	No	---	---	---	---	---	6,989
280D3: FAYETTE SILTY CLAY LOAM, 10 TO 15 PERCENT SLOPES, SEVERELY ERODED	FAYETTE	No	---	---	---	---	---	4,029
280E2: FAYETTE SILT LOAM, 15 TO 30 PERCENT SLOPES, ERODED	FAYETTE	No	---	---	---	---	---	6,190
284: TICE SILT LOAM	TICE	No	---	---	---	---	---	1,193
	Beaucoup	Yes	depression	2B3	YES	NO	NO	---
288: PETROLIA SILT LOAM	PETROLIA	Yes	flood plain	2B3	YES	NO	NO	986
302: AMBRAW CLAY LOAM	AMBRAW	Yes	flood plain	2B3	YES	NO	NO	4,585
333: WAKELAND SILT LOAM	WAKELAND	No	---	---	---	---	---	8,305
	Sawmill	Yes	depression	2B3	YES	NO	NO	---

HYDRIC SOILS LIST--Continued
MORGAN AND SCOTT COUNTIES, ILLINOIS: Detailed Soil Map Legend

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria	Acres
415: ORION SILT LOAM	ORION	No	---	---	---	---	---	3,718
	Sawmill	Yes	depression	2B3	YES	NO	NO	---
451: LAWSON SILT LOAM	LAWSON	No	---	---	---	---	---	13,719
	Sawmill	Yes	depression	2B3	YES	NO	NO	---
533: URBAN LAND	URBAN LAND	Unranked	---	---	---	---	---	218
567C2: ELKHART SILT LOAM, 5 TO 10 PERCENT SLOPES, ERODED	ELKHART	No	---	---	---	---	---	7,783
588: SPARTA LOAMY SAND, LOAMY SUBSTRATUM	SPARTA	No	---	---	---	---	---	1,043
	Orio	Yes	depression	2B3	YES	NO	NO	---
682A: MEDWAY LOAM, 0 TO 3 PERCENT SLOPES	MEDWAY	No	---	---	---	---	---	2,173
864: PITS, QUARRY	PITS	Unranked	---	---	---	---	---	115
915D2: ELCO-URSA SILT LOAMS, 10 TO 15 PERCENT SLOPES, ERODED	ELCO	No	---	---	---	---	---	332
	URSA	No	---	---	---	---	---	211
915E2: ELCO-URSA SILT LOAMS, 15 TO 30 PERCENT SLOPES, ERODED	ELCO	No	---	---	---	---	---	459
	URSA	No	---	---	---	---	---	292
962D3: SYLVAN-BOLD COMPLEX, 10 TO 15 PERCENT SLOPES, SEVERELY ERODED	SYLVAN	No	---	---	---	---	---	1,067
	BOLD	No	---	---	---	---	---	711
962E2: BOLD-SYLVAN SILT LOAMS, 15 TO 35 PERCENT SLOPES, ERODED	BOLD	No	---	---	---	---	---	3,223

HYDRIC SOILS LIST--Continued
MORGAN AND SCOTT COUNTIES, ILLINOIS: Detailed Soil Map Legend

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Hydric soils criteria: Meets saturation criteria	Hydric soils criteria: Meets flooding criteria	Hydric soils criteria: Meets ponding criteria	Acres
	SYLVAN	No	---	---	---	---	---	2,148
962E3: BOLD-SYLVAN COMPLEX, 15 TO 35 PERCENT SLOPES, SEVERELY ERODED	BOLD	No	---	---	---	---	---	2,576
	SYLVAN	No	---	---	---	---	---	1,717
2036B: TAMA-URBAN LAND COMPLEX, 2 TO 5 PERCENT SLOPES	TAMA	No	---	---	---	---	---	632
	URBAN LAND	Unranked	---	---	---	---	---	506
2036C: TAMA-URBAN COMPLEX, 5 TO 10 PERCENT SLOPES	TAMA	No	---	---	---	---	---	296
	URBAN	Unranked	---	---	---	---	---	267
	Sable	Yes	depression	2B3	YES	NO	NO	---
2043A: IPAVA-URBAN LAND COMPLEX, 0 TO 3 PERCENT SLOPES	IPAVA	No	---	---	---	---	---	859
	URBAN LAND	Unranked	---	---	---	---	---	687
	Sable	Yes	depression	2B3	YES	NO	NO	---
2244: HARTSBURG-URBAN LAND COMPLEX, 0 TO 3 PERCENT SLOPES	HARTSBURG	Yes	ground moraine	2B3	YES	NO	NO	122
	URBAN LAND	Unranked	---	---	---	---	---	98
3070: BEAUCOUP SILTY CLAY LOAM, FREQUENTLY FLOODED	BEAUCOUP	Yes	flood plain	2B3	YES	NO	NO	3,160
7070: BEAUCOUP SILTY CLAY LOAM, RARELY FLOODED	BEAUCOUP	Yes	flood plain	2B3	YES	NO	NO	7,387
W: WATER	WATER	Unranked	---	---	---	---	---	4,860

APPENDIX D3 ADDENDUM

PRELIMINARY JURISDICTIONAL DETERMINATION AND WETLANDS DELINEATION FOR THE PROPOSED FUTUREGEN DEVELOPMENT (STRATIGRAPHIC WELL)

INTENTIONALLY LEFT BLANK

INTRODUCTION

This addendum updates an investigation of wetland concerns related to proposed construction of FutureGen Industrial Alliance, Inc. facilities near Jacksonville, Illinois. Our previous investigation, dated 25 May 2011, included two possible characterization pad areas (the Beilschmidt Property and the Hoagland Property), several truck pull-offs and road modifications on Beilschmidt Road, and widening and extending an existing farm access road. The project plan was recently modified to accommodate a temporary water line extending from Beilschmidt Road southward to the Beilschmidt characterization pad.

Project Description

The temporary waterline will begin just outside an existing water meter located south Beilschmidt Road approximately 3,250 feet west of County Road 123. An existing pipe has been stubbed out of the meter pit and is extending out of the ground. Above ground, the temporary waterline will be connected to the stub with a valve and a backflow preventer. The temporary water line will then extended approximately 3,077 feet southward on the grass surface immediately east of the agriculture field. Immediately east of the drilling pad the piping will turn westward into the agricultural field and extend to the pad where a second valve will be placed.

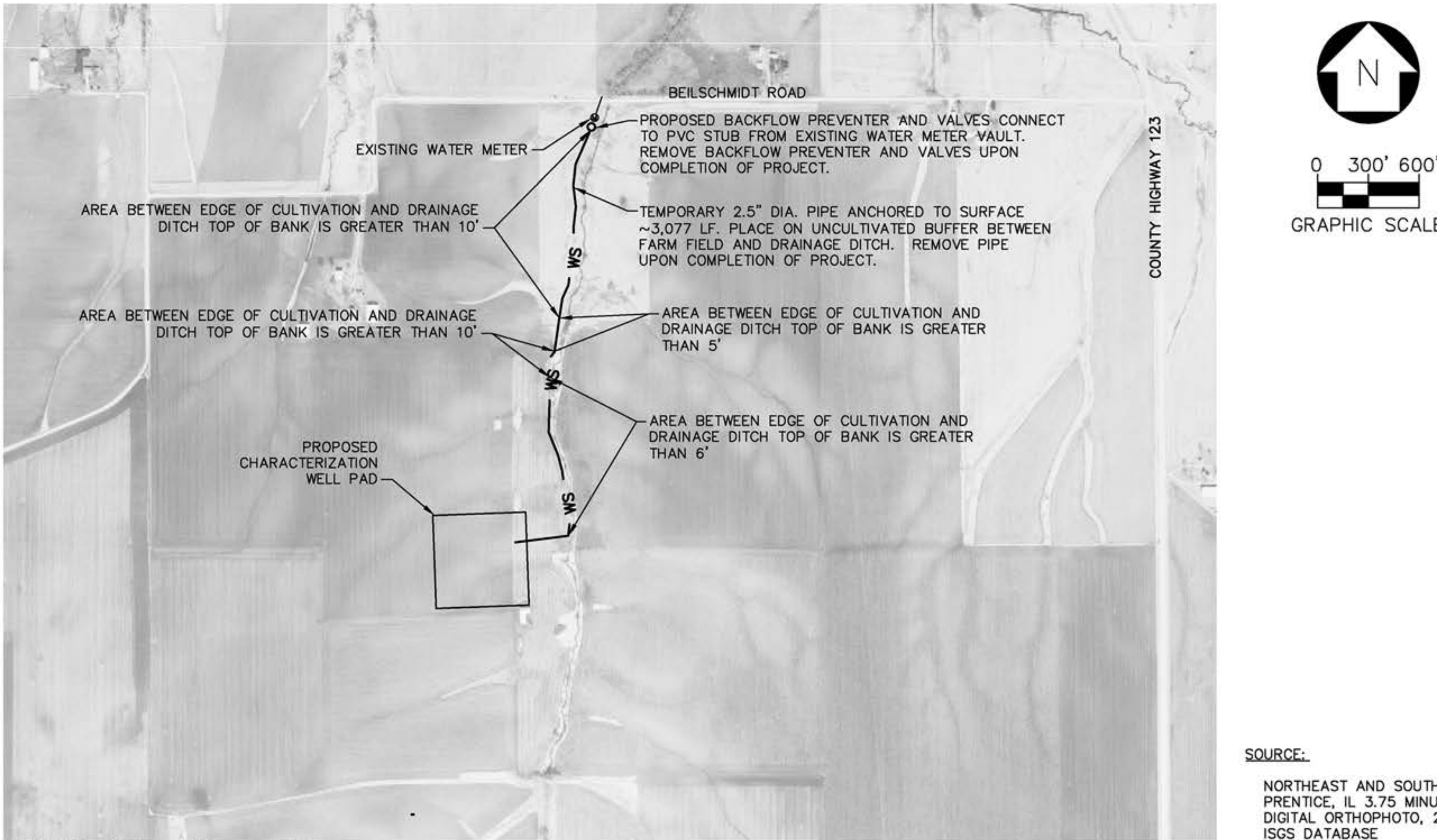
In areas where the grass strip between the edge of cultivation and the top of the bank of the drainage ditch is greater than 10 feet a low ground pressure single seat all terrain vehicle will be used to transport pipe, fittings, and other necessary items. In other areas all materials will be hand carried. The water line will be either “Lay Flat Hose” or Schedule 40 PVC pipe. In either case, the pipeline will be staked with bent rebar or wooden stakes in order to keep the water line in place.

Upon completion of the drilling operations the temporary water line, valves, backflow preventer and staking will be completely removed from site. No above-ground piping will remain. The only subsurface disturbance will be at the meter where the section of piping extending upwards from the pit will be cut off and capped below ground.

STUDY AREA

Temporary Water Supply to Beilschmidt Characterization Pad

The temporary waterline will extend southward from an existing water meter located on the south side of Beilschmidt Road to the Beilschmidt Characterization Pad; a distance of approximately 3,077 feet. Activities related to the placement of this water line will affect the grass buffer zone immediately east of the agriculture field. The vegetation of this area is dominated by cool-season grass. Common weeds and trees are present but not prevalent.



SOURCE:

NORTHEAST AND SOUTHEAST PRENTICE, IL 3.75 MINUTE DIGITAL ORTHOPHOTO, 2005. ISGS DATABASE

\\patrick\allprojects\furegen2\drawings\morgan\field investigation waterline.dwg

	PATRICK ENGINEERING INC. 300 W. EDWARDS ST. SUITE 200 TEL. (217) 525-7050 SPRINGFIELD, IL 62704-1907 FAX (217) 525-7053 http://www.patrickengineering.com PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000409	FUTUREGEN INDUSTRIAL ALLIANCE, INC MORGAN COUNTY SITE **TEMPORARY WATER LINE FIELD INVESTIGATION MAP**	DATE: 6/1/11 PROJ. NO.: 21003.017 APP. BY: JWD

PURPOSE & PROCEDURE

Pedestrian survey for the area described in this Addendum was completed on 1 June 2011 by Specialized Ecological Services' personnel, Robert Rinella and James Lang and Patrick Engineering's, Jeff Deckard. As recommended by the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) the entire length of the proposed water supply pipeline was traversed. Sample plots were established at each vegetation community type. Each community type was characterized using Routine Wetland Determination Data Forms (Attachment A). Because the ground cover of the area was primarily pasture grass with common weeds and and because the area's width is limited, it was possible to observe any variance in vegetation community type while walking the length of the area.

Otherwise, the purpose and procedure of this research are identical to that described in our original report, dated 25 May 2011.

RESULTS

Preliminary Data Collection & Review

National Wetland Inventory maps, USGS topographic map, and soils surveys used for this research are identical to those described in our original report, dated 25 May 2011.

US Fish & Wildlife Service National Wetland Inventory Map

No new data.

USGS Topographic Map

No new data.

National Cooperative Soil Survey

Now new data.

Field Survey

Vegetation

The temporary water line area-of-impact supports a grassed buffer zone composed of cool season grasses and common weeds. Trees are also intermittently present.

Grassed Buffer Zone

Tall fescue (*Festuca arundinacea)* is the most common species. All other species are present with clumped distribution. Other common herbaceous species include various grasses *(Phalaris arundinacea, Setaria* spp.) and broadleaf weeds (*Solidago gigantea, Conium maculatum, Cirsium vulgare, Impatiens capensis, Ambrosia trifida, Thalaspi arvense*). Woody species are present as isolated individuals or in small groupings (2-10 individuals). Common tree species include *Maclura pomifera, Morus rubra* and *Gleditsia triacanthos.*

Soils

The soils observed coincide with those soils shown in the soil survey maps. The native vegetation of the project site would have been tall-grass prairie.

Hydrology

No new data.

Summary of Jurisdictional Areas

No jurisdictional wetlands were observed within the project area.

DISCUSSION

The impact of proposed FutureGen Industrial Alliance, Inc project was evaluated for the presence of jurisdictional wetlands and other U.S. waters during early-June 2011 by Specialized Ecological Services. This work was conducted using the standards of practice for wetland delineation. No jurisdictional wetlands were observed in the study area. As proposed, the actions of this project should not impact wetlands or require wetland fill permits.

Although the non-jurisdictional grassed buffer is typically more than 10 feet wide, it is approximately 5 feet wide (between the tilled ground and the top of the unnamed tributary channel) at its thinnest point. Construction activity should be restricted to that smallest width to protect the integrity of the tributary channel. The grassed buffer is not jurisdictional wetland and its vegetation is not sensitive; however, this area does act as an important barrier, protecting the waterway. Construction impacts should be minimized. Materials could be hand delivered or delivered on a low ground pressure single seat all-terrain vehicle without adversely impacting the vegetation in this area.

LITERATURE CITED

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual." Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS.

National Cooperative Soil Service (NCSS). 2011. "*NCSS Web Soil Survey.*" Accessed June 1, 2011 at http://websoilsurvey.nrcs.usda.gov/app/ (last updated November 11, 2009).

Soil Conservation Service (SCS). 1991. National List of Hydric Soils. National Technical Committee on Hydric Soils, US Department of Agriculture, Soil Conservation Service.

Microsoft. 2011. Microsoft Research Web Site. Accessed May 3, 2011 at http://msrmaps.com/default.aspx (last updated May 3, 2011).

U.S. Fish and Wildlife Service (USFWS). 2011. *Wetlands Online Mapper*. Accessed May 3, 2011 at http://www.fws.gov/wetlands/Data/Mapper.html (last updated March 29, 2011).

ATTACHMENT A: WETLAND DATA FORMS

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen Applicant/Owner: Investigator: B. Rinella, J. Lang	Date: 7 June 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: A-1 Transect ID: 1 Plot ID: 1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca arundinacea	h	FACU+	9.		
2. Phalaris arundinacea	h	FACW+	10.		
3. Solidago gigantea	h	FACW	11.		
4. Conium maculatum	h	FACW	12.		
5. Cirsium vulgare	h	FACU-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 60%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: N/A (in.) Depth to Free Water in Pit: >20" (in.) Depth to Saturated Soil: >20" (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks: no indicators

A1.1

SOILS

Map Unit Name (Series and Phase): Assumption silt loam, 10-15% slopes, eroded
Drainage Class: moderately well
Field Observations
Confirm Mapped Type? Yes No

Taxonomy (Subgroup): Fine silty, mixed, superactive mesic Oxyaquic Argiudolls

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-14	A	10YR/3/2	N/A	—	
14-20	B	10YR/4/3	N/A	—	

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
___ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer in Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

no indicators

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

Approved by HQUSACE 3/92

A1.1

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: FutureGen Applicant/Owner: Investigator: B Rinella, J. Lang	Date: 1 June 11 County: Morgan State: IL
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: A-1 Transect ID: 1 Plot ID: 2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Festuca Arundinacea	h	FACU+	9.		
2. Solidago gigantea	h	FACW	10.		
3. Cirsium vulgare	h	FACU-	11.		
4. Thalaspi arvense	h	NI	12.		
5.			13.		
6. Maclura pomifera	c	FACU	14.		
7. Morus rubra	a	FAC-	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 17%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks): ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available Field Observations: Depth of Surface Water: N/A (in.) Depth to Free Water in Pit: >20 (in.) Depth to Saturated Soil: >20 (in.)	Wetland Hydrology Indicators: Primary Indicators: ___ Inundated ___ Saturated in Upper 12 Inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits ___ Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12 Inches ___ Water-Stained Leaves ___ Local Soil Survey Data ___ FAC-Neutral Test ___ Other (Explain in Remarks)

Remarks:
no indicator

B2 Appendix B Blank and Example Data Forms

A1.2

SOILS

Map Unit Name (Series and Phase): Assumption silt loam, 10-15% slope, eroded
Drainage Class: moderately well

Taxonomy (Subgroup): fine silty, mixed superactive, mesic Oxyaquic Argiudolls

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/ Size/Contrast	Texture, Concretions, Structure, etc.
0-16	A	10 YR/3/2	—	—	
16-20	B	10 YR/4/4	—		

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks:

No indicator

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes No (Circle)	
Wetland Hydrology Present?	Yes No	
Hydric Soils Present?	Yes No	Is this Sampling Point Within a Wetland? (Circle) Yes No

Remarks:

Approved by HQUSACE 3/92

A1.2

APPENDIX E

Biological Surveys

E1 – An Investigation for Illinois Chorus Frogs *(Pseudacris streckeri illinoensis)* and Possible Impacts

E2 – An Investigation of Potential Habitat for Regal Fritillary Butterfly *(Speyeria idalia)*

E3 – Protected Species Survey for Proposed FutureGen Soil-Gas Monitoring and Meteorological Tower

E4 – Protected Species Survey for Proposed FutureGen Development (Stratigraphic Well)

for the

Draft Environmental Impact Statement
FutureGen 2.0 Project
Meredosia, Illinois (Morgan County)

DOE/EIS-0460D
April 2013

INTENTIONALLY LEFT BLANK

APPENDIX E1

AN INVESTIGATION FOR ILLINOIS CHORUS FROGS, *Pseudacris streckeri illinoensis* AND POSSIBLE IMPACTS FOR THE FUTUREGEN 2.0 PROJECT/ MEREDOSIA ENERGY CENTER MORGAN COUNTY ILLINOIS

INTENTIONALLY LEFT BLANK

AN INVESTIGATION FOR

ILLINOIS CHORUS FROGS, *Pseudacris streckeri illinoensis*

AND POSSIBLE IMPACTS

FOR THE

FUTUREGEN 2.0 PROJECT/ MEREDOSIA ENERGY CENTER

MORGAN COUNTY ILLINOIS

July 2012

Vernon L. LaGesse Jr.
1619 S. Pasfield
Springfield, IL 62704


Illinois Chorus Frog. Photo by: Chris Young, State Journal Register

PROJECT

The U.S. Department of Energy (DOE) is preparing an Environmental Impact Statement (EIS) for the FutureGen 2.0 Project. The FutureGen Project is a public-private partnership, with costs shared by DOE, the FutureGen Industrial Alliance (Alliance), and other project partners. The Project consists of the repowering of an existing electricity generator with clean coal technologies integrated with a pipeline that would transport carbon dioxide (CO_2) to a sequestration site where it would be injected and stored in a deep geologic formation. As currently envisioned, the Alliance would be responsible for constructing and operating an advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at the Meredosia Energy Center in west central Illinois, which is currently owned by Ameren Energy Resources. A concentrated and compressed CO_2 stream produced in the process would be transferred to a pipeline for transmission to the Alliance's proposed storage location located approximately 30 miles east of the Meredosia Energy Center.

Historic occurrences of the Illinois Chorus Frog (ICF), *Pseudacris streckeri illinoensis*, were known to be in the proposed project area. To document where ICFs did occur, this study was conducted to assist in any future permitting required for the FutureGen Project. This report addresses both the energy center and the CO_2 pipeline and storage portions of the FutureGen Project.

PROJECT LOCATIONS

The Meredosia Energy Center lies just south of the Village of Meredosia, Illinois. The proposed CO_2 pipeline from the power plant to the proposed CO_2 storage site cross the east side of the Illinois River Valley heading across to the bluff line and across central Morgan County in Illinois. The ICF study area for the FutureGen Project is located within the Illinois/Mississippi Sand Areas Natural Division and portions of the Grand Prairie Natural Division (IDNR 2005). The sand prairies of Meredosia, Illinois are some of the most southerly sand prairies in Illinois. For this report, only the Illinois River Valley, the east bluff-line and the upland area along Illinois Route 67 to areas around Chaplin, Illinois were surveyed. The remainder of the proposed pipeline route would not be located within ICF habitat and thus is outside of the ICF study area.

MEREDOSIA ENERGY CENTER

The Meredosia Energy Center is located just south of the Village of Meredosia, Illinois and covers 263-acres along the east side of the Illinois River. The features of the plant include a power plant, coal stock pile areas, cinder areas, and settling pools. The plant area includes approximately 72-acres of degraded sand prairie.

PIPELINE

Outside the energy center fence-line, a study area was identified along the proposed pipeline alignment for 10-miles, from the Meredosia Energy Center entrance, through the floodplain, and along the proposed pipeline alignment east to areas near Chaplin, Illinois. Also, all ICF Habitat Model sites within 3-miles of this study area were monitored.

ILLINOIS CHORUS FROG (ICF)

The Illinois Chorus Frog is a small early spring resident of central Illinois in areas that have sandy soils. ICFs found near Meredosia, Illinois are currently known as *Pseudacris streckeri* *illinoensis*, a locally found subspecies that is listed as threatened in Illinois, under the endangered species act. The frogs use sand prairies and remnants such as agricultural fields and waste areas as habitat. They burrow in sand and emerge after heavy early spring rains to breed in nearby flooded fields, ditches and other vernal pools, then they return under the sand (Phillips 1999).

ICF SURVEY METHODS

Nocturnal audible surveys were conducted in March 2012, to determine the presence/absence of Illinois Chorus Frogs within the project boundaries. Surveys started after 19:30 hours on evenings with air temperatures over 50 degrees Fahrenheit, during times ICF's were known to be out calling. A known ICF reference site (Illinois Sands Area) was also monitored to confirm that ICFs were calling within this same region of Illinois. For this study, areas south of Beardstown were used as the reference site. Surveys were conducted by automobile, by driving to each location, turning the automobile off and listen for breeding frogs calling. Weather, temperature, time, and frog results were recorded from each survey point for this investigation. Survey points were laid out during daylight hours to locate possible ICF habitat and to confirm the ICF Habitat Model (IDNR 2009) locations (See Map #1). The ICF Habitat Model was created by Illinois Department of Natural Resources in 2008 and 2009. It is based on the presence of small ponds and hydric sandy soils and on the occurrence of a wet spring weather pattern.

On the Meredosia Energy Center site, ten survey points were established: three along the Illinois River, two along the northern settling pond, and four along the east side of the plant (See Map #2) where the pipeline is to be located, to monitor for calling ICFs.

Along the proposed pipeline route, 30 survey points were established and monitored. These included surrounding ICF Habitat Model areas and opportunistic points along 10-miles of the proposed pipeline alignment back through to the town of Chaplin on Illinois Route 67 (See Map #3 and 4).

RESULTS

Surveys were conducted on the evenings of 15, 19, 23 & 24 March 2012. Only three species of amphibians were heard calling during this investigation. The Plains Leopard Frog, *Rana blairi* was heard calling from the Illinois River. The American Toad, *Bufo americanus*, and the Western Chorus Frog, *Pseudacris triserrata*, were heard calling from the very southern settling pond and from a small creek (points 29) north of Chaplin.

No ICFs were documented during this survey, including within the ICF Habitat Model zones. This is possibly due to high temperatures and drought conditions present this spring. All historic occurrences occur within the predicted ICF Habitat Model zones. The ICF Habitat model shows no potential habitat to be impacted along the alignment except for P-133. I believe this is a slight mapping error and P-133 should be connected to the settling pool on the plant. Also within this survey, all ICF Habitat Model areas that could be driven to, were investigated for a three-mile buffer of the Meredosia Energy Center and the first 10 miles of the proposed CO_2 pipeline route.

One perceived flaw in the ICF Habitat Model is that it does not consider roadside or agricultural ditch habitat. There is one potential ICF Habitat east of the Meredosia Energy Center along Yeck Road. There is a small agricultural ditch south of where Yeck Road curves north. It did not have much water present this spring, but during a wet year, this would be a possible breeding pool. Two other ICF investigators from IDNR have monitored that same ditch for the past two years and had negative results for the presence of ICF's (Personal conversation with Eric Golden 2012).

DISCUSSION AND RECOMMENDATIONS

No ICFs were documented in this survey. The closest active breeding pool observed during this survey is located south of Beardstown, Illinois, which is over 12 miles away from the study area.

As for P-133, I do not believe it to have proper ICF habitat because of its lack of any wetland vegetation or sandy soils. No other habitat was observed on the Meredosia Energy Center site, the proposed pipeline alignment, or the bluffs on the east side of the Illinois River Valley.). More ICF monitoring may be required if there is a wet spring before or during construction to reconfirm the absence of any ICF impacts.

LITERATURE CITED

IDNR. 2005. Illinois Wildlife Action Plan. Illinois Department of Natural Resources. Springfield, IL.

IDNR. 2008. Illinois Chorus Frog Habitat Model. Illinois Department of Natural Resources, Springfield, IL.

Phillips, C.A., R. A. Brandan, and E. O Mall. 1999. *Field Guide of Amphibians and Reptiles of Illinois*, Illinois Natural History Survey, Manual #8, 300pp.

APPENDIXES

MEREDOSIA ENERGY CENTER
ILLINOIS CHORUS FROG DATA SHEET LaGesse & Associates Inc.
2012DATE: __3-15-2012______
INVESTIGATORS: ___V. LaGesse______________________________

Survey #	North	West	ICF HAB #	ICF +/-	Temp	Time	Weather
Samp-1	39-49.28.40N	90-33.54.83W		NEG	77	19:49	Light rain
Samp-2	39-49.28.08N	90-33.57.99W		NEG	77	19:52	LF
Samp-3	39-49.20.55N	90-34.08.11W		NEG	74	19:56	Light winds
Samp-4	39-49.14.62N	90-34.18.45W	P133	NEG	74	20:01	Light winds
Samp-5	39-49.09.65N	90-34.18.44W	P133	NEG	74	20:06	WC
Samp-6	39-49.09.03N	90-34.10.61W		NEG	74	20:10	Light winds
Samp-7	39-49.07.42N	90-34.05.14W		NEG	74	20:14	Light winds
Samp-8	39-49.04.04N	90-33.47.86W		NEG	74	20:18	Light winds
Samp-9	39-49.14.42N	90-33.44.09W		NEG	74	20:23	Light winds
Samp-10	39.49.18.05N	90-33-45.55W		NEG	74	20:27	Calm

DATE: __3-19-2012______
INVESTIGATORS: ___V. LaGesse______________________________

Survey #	North	West	ICF HAB #	ICF +/-	Temp	Time	Weather
Samp-1	39-49.28.40N	90-33.54.83W		NEG	77	20:05	Light winds
Samp-2	39-49.28.08N	90-33.57.99W		NEG	77	20:11	AT
Samp-3	39-49.20.55N	90-34.08.11W		NEG	77	20:16	Light winds
Samp-4	39-49.14.62N	90-34.18.45W	P133	NEG	77	20:21	Light winds
Samp-5	39-49.09.65N	90-34.18.44W	P133	NEG	77	20:35	WC
Samp-6	39-49.09.03N	90-34.10.61W		NEG	77	20:40	Windy
Samp-7	39-49.07.42N	90-34.05.14W		NEG	77	20:44	Windy
Samp-8	39-49.04.04N	90-33.47.86W		NEG	77	20:49	Windy
Samp-9	39-49.14.42N	90-33.44.09W		NEG	77	20:54	Windy
Samp-10	39.49.18.05N	90-33-45.55W		NEG	77	21:00	Windy

DATE: __3-24-2012______
INVESTIGATORS: ___V. LaGesse______________________________

Survey #	North	West	ICF HAB #	ICF +/-	Temp	Time	Comments
Samp-1	39-49.28.40N	90-33.54.83W		NEG	68	19:50	Light breeze
Samp-2	39-49.28.08N	90-33.57.99W		NEG	68	19:55	Light breeze
Samp-3	39-49.20.55N	90-34.08.11W		NEG	68	20:00	Light breeze
Samp-4	39-49.14.62N	90-34.18.45W	P133	NEG	68	20:05	Light breeze
Samp-5	39-49.09.65N	90-34.18.44W	P133	NEG	68	20:10	Light breeze
Samp-6	39-49.09.03N	90-34.10.61W		NEG	68	20:15	Light breeze
Samp-7	39-49.07.42N	90-34.05.14W		NEG	68	20:20	Light breeze
Samp-8	39-49.04.04N	90-33.47.86W		NEG	68	20:25	Light breeze
Samp-9	39-49.14.42N	90-33.44.09W		NEG	68	20:30	Light breeze
Samp-10	39.49.18.05N	90-33.45.55W		NEG	68	20:35	Light breeze

WC=Western Chorus, AT=American Toad, LF Plains Leopard Frog

ALLIANCE PIPELINE ILLINOIS CHORUS FROG SURVEY DATA SHEET

ILLINOIS CHORUS FROG DATA SHEET LaGesse & Associates Inc. 2012
DATE: __3-15-2012______
INVESTIGATORS: ___V. LaGesse

Survey #	North	West	ICF HAB #	ICF +/-	Temp	Time	Comments
1	39-49.27.21N	90-33.40.85W		NEG	76	20:42	Light winds
2	39-49.10.13N	90-33.39.63W	P132	NEG	76	20:44	Light winds
3	39-48.54.82N	90-33.39.32W		NEG	76	20:46	Light winds
4	39-48.24.26N	90-33.38,11W	P129	NEG	73	20:49	Light winds
5	39-47.24.06N	90-33.19.09W	P124	NEG	67	22:25	Light winds
6	39-48.55.10N	90-33.17.85W		NEG	73	20:52	Light winds
7	39-48.55.48N	90-33.08.18W		NEG	73	20:54	Light winds
8	39-48.54.89N	90-32.38.80W	Ditch	NEG	73	20:57	Light winds
9	39-49.07.63N	90-32.25.75W		NEG	74	20:59	Light winds
10	39-49.20.85N	90-32.23.26W	HS18	NEG	74	21:01	Light winds
11	39-49.07.52N	90-32.05.61W		NEG	74	21:03	Light winds
12	39-49.07.47N	90-31.28.11W		NEG	74	21:05	Light winds
13	39-49.06.86N	90-31.01.86W	Creek	NEG	72	21:07	Light winds
14	39-48.59.46N	90-30.53.92W		NEG	72	21:09	Light winds
15	39-48.54.60N	90-30.32.20W	HW100	NEG	72	21:11	Light winds
16	39-48.49.44N	90-30.34.85W		NEG	71	21:13	Light winds
17	39-48.45.15N	90-30.35.71W		NEG	71	21:15	Light winds
18	39-48.27.97N	90-30.42.75W	P128	NEG	70	21:17	Light winds
19	39-48.20.92N	90-30.48.27W	P127	NEG	70	21:20	Light winds
20	39-50.25.23N	90-30.55.35W	P135	NEG	67	21:29	Light winds
21	39-49.57.35N	90-29.40.10W	HS12	NEG	68	21:36	Light winds
22	39-48.39.9N	90-30.13.44W		NEG	68	21:42	Light winds
23	39-48.08.75N	90-29.44.03W		NEG	69	21:46	Light winds
24	39-47.54.43N	90-29.12.93W		NEG	70	21:49	Light winds
25	39-47.37.97N	90-27.30.43W		NEG	70	21:51	Light winds
26	39-47.20.18N	90-26.42.54W		NEG	69	21:53	Light winds
27	39-47.16.84N	90-47.16.84W		NEG	66	21:55	Light winds
28	39-47.16.71N	90-25.22.45W		NEG	65	21:58	Light winds
29	39-47.19.10N	90-25.10.79W		NEG	65	22:00	Light winds
30	39-47.10.31N	90-24.17.45W		NEG	65	22:15	Light winds

COMMENTS:

ALLIANCE PIPELINE ILLINOIS CHORUS FROG SURVEY DATA SHEET
ILLINOIS CHORUS FROG DATA SHEET LaGesse & Associates Inc. 2012
DATE: __3-19-2012______
INVESTIGATORS: ___V. LaGesse

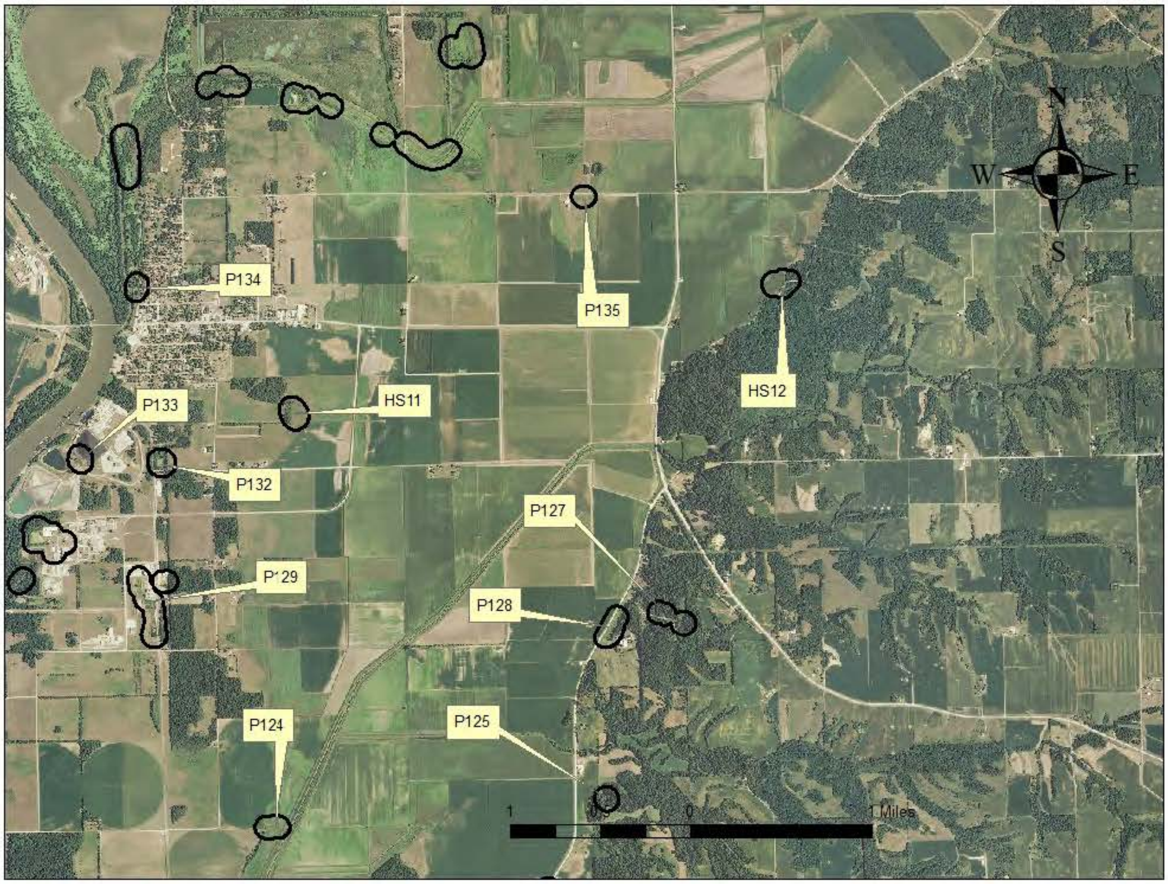
Survey #	North	West	ICF HAB #	ICF +/-	Temp	Time	Comments
1	39-49.27.21N	90-33.40.85W		NEG	77	21:05	Windy
2	39-49.10.13N	90-33.39.63W	P132	NEG	77	21:08	Windy
3	39-48.54.82N	90-33.39.32W		NEG	77	21:10	Windy
4	39-48.24.26N	90-33.38,11W	P129	NEG	74	21:13	Windy
5	39-47.24.06N	90-33.19.09W	P124	NEG	74	21:34	Windy
6	39-48.55.10N	90-33.17.85W		NEG	76	21:16	Windy
7	39-48.55.48N	90-33.08.18W		NEG	77	21:18	Windy
8	39-48.54.89N	90-32.38.80W	Ditch	NEG	78	21:20	Windy
9	39-49.07.63N	90-32.25.75W		NEG	78	21:23	Windy
10	39-49.20.85N	90-32.23.26W	HS18	NEG	78	21:25	Windy
11	39-49.07.52N	90-32.05.61W		NEG	74	21:40	Windy
12	39-49.07.47N	90-31.28.11W		NEG	74	21:43	Windy
13	39-49.06.86N	90-31.01.86W	Creek	NEG	76	21:45	Windy
14	39-48.59.46N	90-30.53.92W		NEG	76	21:47	Windy
15	39-48.54.60N	90-30.32.20W	HW100	NEG	75	21:49	Windy
16	39-48.49.44N	90-30.34.85W		NEG	75	21:51	Windy
17	39-48.45.15N	90-30.35.71W		NEG	75	21:53	Windy
18	39-48.27.97N	90-30.42.75W	P128	NEG	73	21:56	Windy
19	39-48.20.92N	90-30.48.27W	P127	NEG	73	21:59	Windy
20	39-50.25.23N	90-30.55.35W	P135	NEG	73	22:05	Windy
21	39-49.57.35N	90-29.40.10W	HS12	NEG	74	22:17	Windy
22	39-48.39.9N	90-30.13.44W		NEG	73	22:20	Windy
23	39-48.08.75N	90-29.44.03W		NEG	73	22:22	Windy
24	39-47.54.43N	90-29.12.93W		NEG	73	22:25	Windy
25	39-47.37.97N	90-27.30.43W		NEG	73	22:28	WC
26	39-47.20.18N	90-26.42.54W		NEG	72	22:30	Windy
27	39-47.16.84N	90-47.16.84W		NEG	71	22:33	Windy
28	39-47.16.71N	90-25.22.45W		NEG	71	22:38	WC
29	39-47.19.10N	90-25.10.79W		NEG	71	22:40	WC, AT
30	39-47.10.31N	90-24.17.45W		NEG	71	22:45	Windy

COMMENTS: WC= WESTERN CHORUS FROG, AT= AMERICAN TOAD

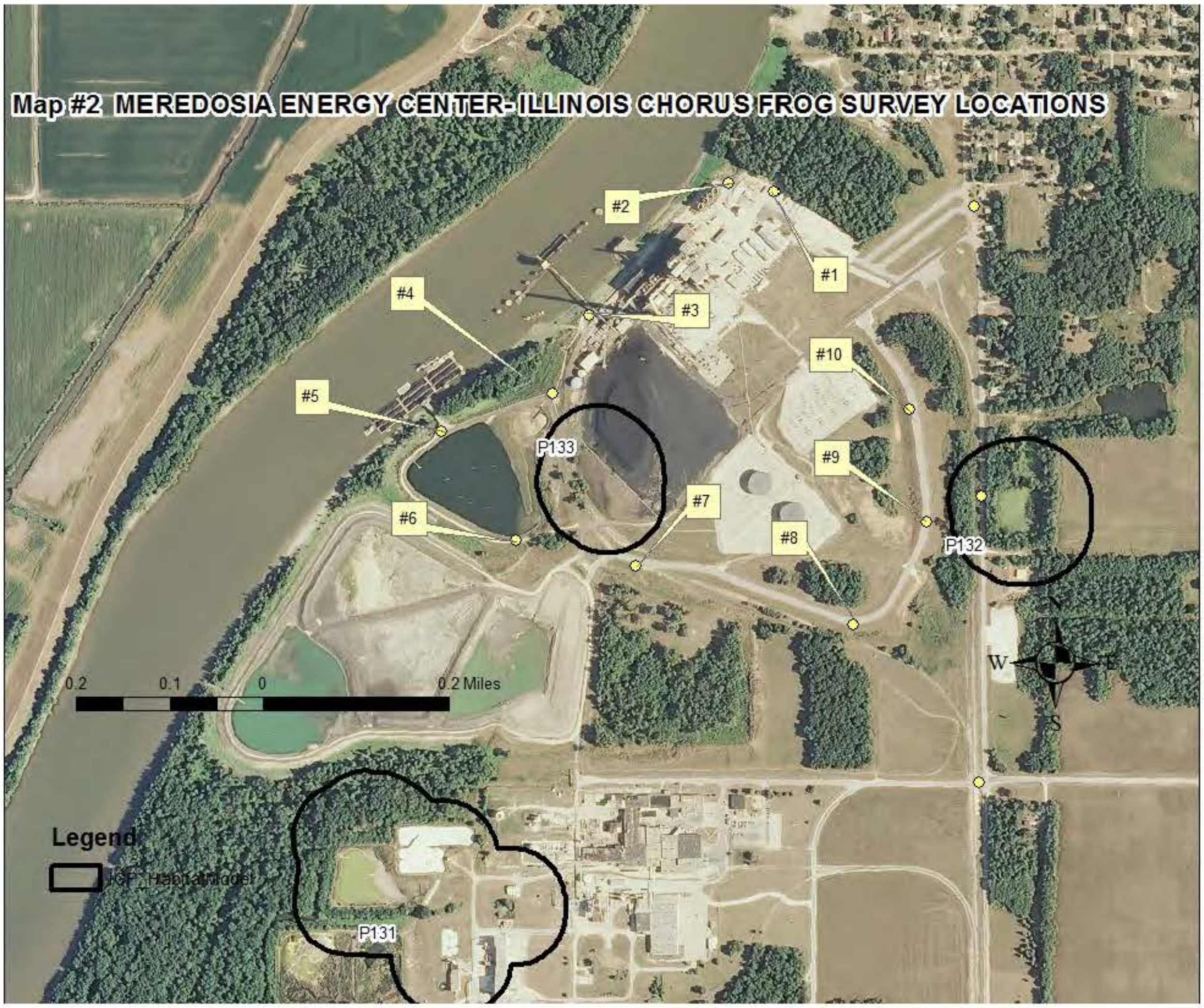
ALLIANCE PIPELINE ILLINOIS CHORUS FROG SURVEY DATA SHEET
ILLINOIS CHORUS FROG DATA SHEET LaGesse & Associates Inc. 2012
DATE: __3-23-2012______
INVESTIGATORS: ___V. LaGesse

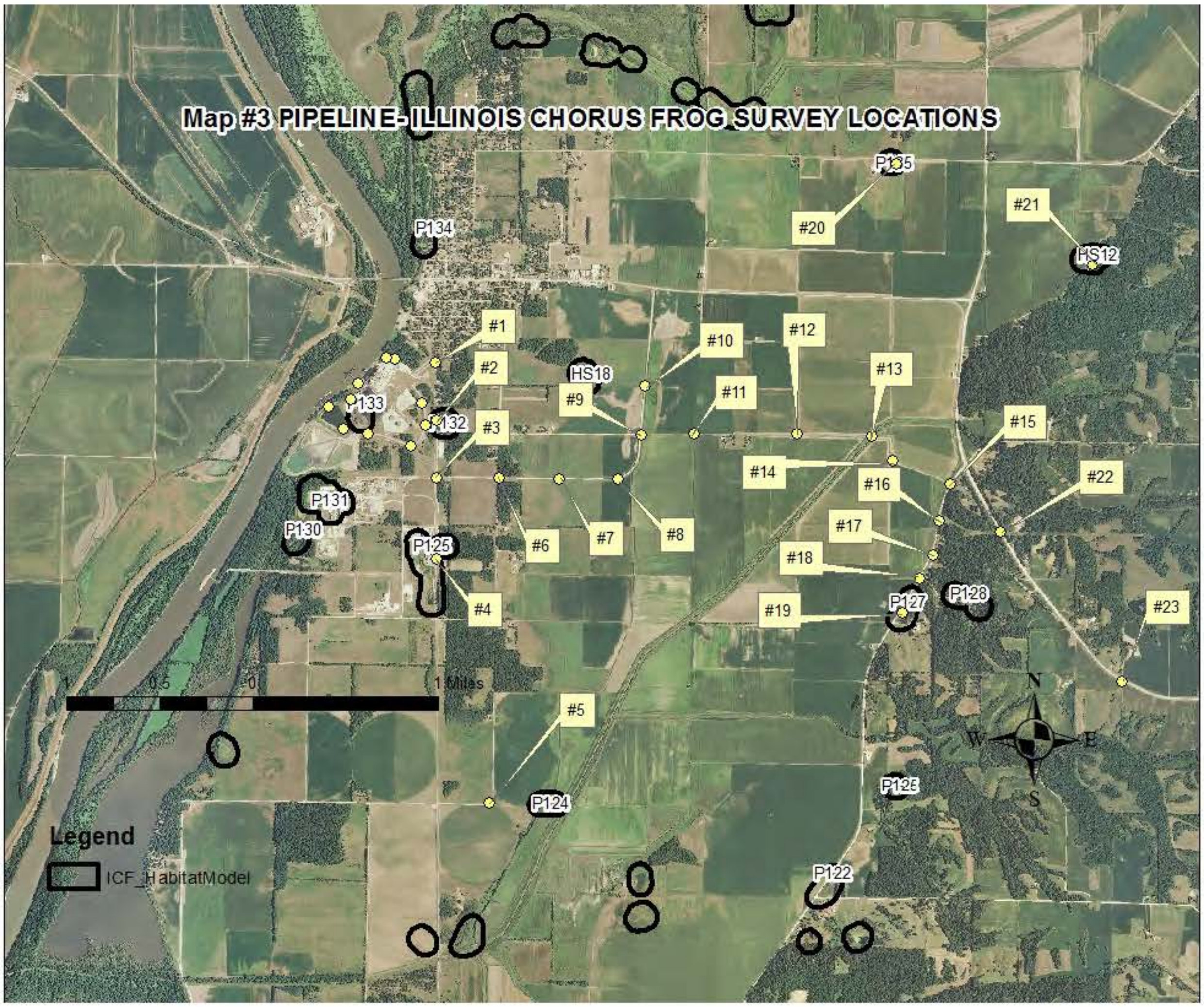
Survey #	North	West	ICF HAB #	ICF +/-	Temp	Time	Comments
1	39-49.27.21N	90-33.40.85W		NEG	58	20:41	Calm
2	39-49.10.13N	90-33.39.63W	P132	NEG	58	20:43	Calm
3	39-48.54.82N	90-33.39.32W		NEG	60	20:45	Calm
4	39-48.24.26N	90-33.38,11W	P129	NEG	60	20:49	Calm
5	39-47.24.06N	90-33.19.09W	P124	NEG	55	20:52	Calm
6	39-48.55.10N	90-33.17.85W		NEG	59	20:54	Calm
7	39-48.55.48N	90-33.08.18W		NEG	54	20:56	Calm
8	39-48.54.89N	90-32.38.80W	Ditch	NEG	54	20:58	Calm
9	39-49.07.63N	90-32.25.75W		NEG	54	21:00	Calm
10	39-49.20.85N	90-32.23.26W	HS18	NEG	54	21:02	Calm
11	39-49.07.52N	90-32.05.61W		NEG	55	21:04	Calm
12	39-49.07.47N	90-31.28.11W		NEG	55	21:06	Calm
13	39-49.06.86N	90-31.01.86W	Creek	NEG	55	21:08	Calm
14	39-48.59.46N	90-30.53.92W		NEG	55	21:10	Calm
15	39-48.54.60N	90-30.32.20W	HW100	NEG	55	21:12	Calm
16	39-48.49.44N	90-30.34.85W		NEG	55	21:17	Calm
17	39-48.45.15N	90-30.35.71W		NEG	52	21:30	Calm
18	39-48.27.97N	90-30.42.75W	P128	NEG	53	21:36	Calm
19	39-48.20.92N	90-30.48.27W	P127	NEG	54	21:38	Calm
20	39-50.25.23N	90-30.55.35W	P135	NEG	55	21:40	Calm
21	39-49.57.35N	90-29.40.10W	HS12	NEG	55	21:42	Calm
22	39-48.39.9N	90-30.13.44W		NEG	56	21:44	Calm
23	39-48.08.75N	90-29.44.03W		NEG	55	21:46	Calm
24	39-47.54.43N	90-29.12.93W		NEG	55	21:48	Calm
25	39-47.37.97N	90-27.30.43W		NEG	56	21:50	Calm
26	39-47.20.18N	90-26.42.54W		NEG	56	21:52	Calm
27	39-47.16.84N	90-47.16.84W		NEG	53	21:54	Calm
28	39-47.16.71N	90-25.22.45W		NEG	51	21:58	Calm
29	39-47.19.10N	90-25.10.79W		NEG	51	21:59	WC, AT
30	39-47.10.31N	90-24.17.45W		NEG	52	22:02	Calm

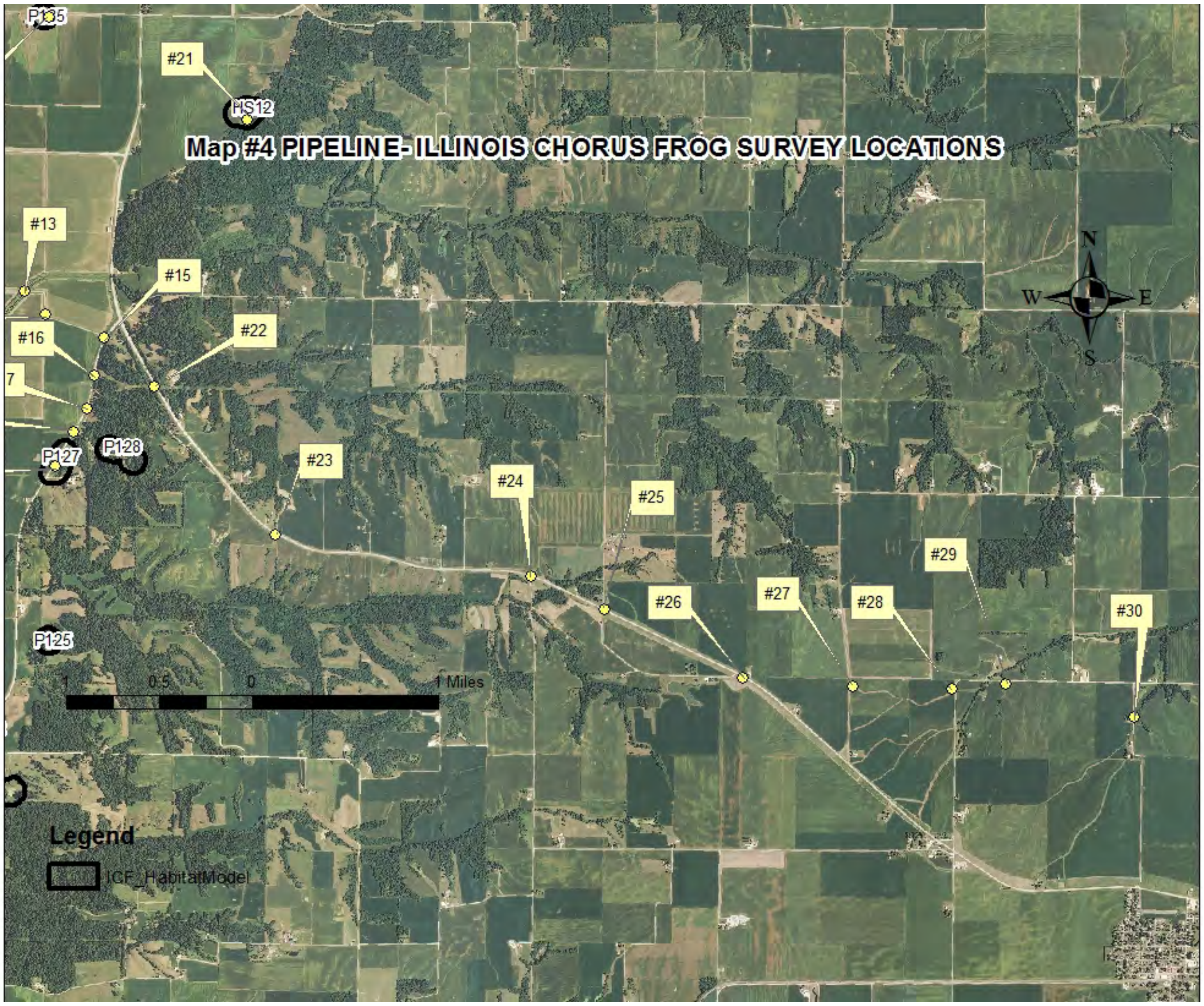
COMMENTS: WC=WESTERN CHORUS FROG, AT=AMERICAN TOAD



MAP # 1. ILLINOIS CHORUS FROG HABITAT MODEL LOCATIONS


Map #2 MEREDOSIA ENERGY CENTER- ILLINOIS CHORUS FROG SURVEY LOCATIONS
#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
P133
P132
P131
0.2
0.1
0
0.2 Miles
N
W
E
S
Legend
ICF_HabitatModel


Map #3 PIPELINE- ILLINOIS CHORUS FROG SURVEY LOCATIONS
P134
P135
#20
#21
HS12
#1
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
#12
#13
#14
#15
#16
#17
#18
#19
#22
#23
HS18
133
P132
P131
P130
P125
P127
P128
P124
P122
N
S
W
E
1 Miles
0.5
0
Legend
ICF_HabitatModel


Map #4 PIPELINE- ILLINOIS CHORUS FROG SURVEY LOCATIONS
#21
HS12
P135
#13
#15
#16
#22
7
P127
P128
#23
#24
#25
#26
#27
#28
#29
#30
P125
N
W
E
S
1
0.5
0
1 Miles
Legend
ICF_HabitatModel

APPENDIX E2

AN INVESTIGATION OF POTENTIAL HABITAT FOR REGAL FRITILLARY BUTTERFLY
Speyeria idalia
FUTUREGEN / MEREDOSIA ENERGY CENTER PROJECT
MORGAN COUNTY ILLINOIS

INTENTIONALLY LEFT BLANK

An Investigation of Potential Habitat for Regal Fritillary Butterfly *Speyeria idalia*

Futuregen / Meredosia Energy Center Project
Morgan County Illinois

July 1, 2012

Vernon L. LaGesse Jr.
1619 S. Pasfield
Springfield, IL 62704

Female regal fritillary butterfly- Meredosia Energy Center 2012, Photo by: Vern LaGesse

Contents

1.0 Project

The U.S. Department of Energy (DOE) is preparing an Environmental Impact Statement (EIS) for the FutureGen 2.0 Project. The FutureGen Project is a public-private partnership, with costs shared by DOE, the FutureGen Industrial Alliance (Alliance), and other project partners. The Project consists of the repowering of an existing electricity generator with clean coal technologies integrated with a pipeline that would transport carbon dioxide (CO_2) to a sequestration site where it would be injected and stored in a deep geologic formation. As currently envisioned, the Alliance would be responsible for constructing and operating an advanced oxy-combustion system to repower an existing steam turbine generator (Unit 4) at the

Meredosia Energy Center (MEC) in west-central Illinois, which is currently owned by Ameren Energy Resources. A concentrated and compressed CO_2 stream produced in the process would be transferred to a pipeline for transmission to the Alliance's proposed storage location located approximately 30 miles east of the Meredosia Energy Center.

Historic occurrences of the Illinois state threatened regal fritillary butterfly, *Speyeria idalia*, (Drury), have been recorded in the Illinois River Valley in the vicinity of the proposed project. This study was conducted to document the occurrence of the regal fritillary and potential habitat within the project area and to assist in any future permitting required for the FutureGen project. The investigation also documented occurrences of state listed species within the project area. This report addresses both the Meredosia Energy Center and the proposed pipeline corridor in the Illinois River Valley.

2.0 Project Locations

This project lies just south of the town of Meredosia, Illinois, and crosses the east side of the Illinois River Valley heading across to the bluff line and across central Morgan County in Illinois. The project is located within the Illinois/Mississippi Sand Areas Natural Division and portions of the Grand Prairie Natural Division (IDNR 2005; Schwegman 1997). The sand prairies of Meredosia, Illinois, are some of the most southerly sand prairies in Illinois. Suitable habitat for the regal fritillary butterfly occurs in the Illinois River Valley and areas east to the bluff-line. These areas were the focus of the surveys and this report.

2.1 Meredosia Energy Center

The Meredosia Energy Center is located just south of the town of Meredosia, Illinois, and covers 263 acres along the east side of the Illinois River. The features of the plant include a power plant, coal stock pile areas, cinder areas, and settling pools. The plant area includes approximately 72 acres of degraded sand prairie. This 72-acre site was investigated for the presence/absence of the regal fritillary butterflies.

2.2 Pipeline

The proposed pipeline runs east from the MEC to central Morgan County. It is proposed to cross a 62-acre Conservation Reserve Program (CRP) grassland field in the Illinois River Valley that has been planted with warm season grasses. This is the only suitable regal fritillary habitat within the proposed pipeline route. A 300 foot corridor (15.7 acres) of the planting was investigated for the presence/absence of the regal fritillary butterflies.

3.0 Regal Fritallary Butterfly

3.1 Introduction-Regal Fritillary Butterfly

The regal fritillary has been historically documented from 33 states. Historic loss, fragmentation, and degradation of prairie landscape have been the primary factors contributing to the decline of the regal fritillary populations. The regal fritillary is listed as endangered in Michigan, New York, Ohio, Indiana, and Wisconsin; and is listed as threatened in Illinois; and is listed as a species of concern in four states. It is presumed extirpated in seven states, and possibly extirpated in an additional ten states (Selby 2007).

Regal fritillary populations have declined in Illinois, causing this butterfly to be listed as threatened under the Illinois Endangered Species Act (Herkert 1992). .Currently, Mason and Cass counties contain the largest known metapopulations of regal fritillary butterflies in Illinois (Wiker 2004). Large populations exist around the towns of Meredosia, Beardstown, and Arenzville, in Cass and Morgan Counties, in the Illinois River Valley.

The purpose of this study was to document suitable habitat within the study area by surveying the occurrences of regal fritillary butterflies and their host plant populations.

3.2 Natural History of the Regal Fritillary

The large strong flying regal fritillary is a member of the family Nymphalidae, or brush-footed butterflies. Its flight dates are 4 June – 16 September (Sedman and Hess 1985; Wiker 2004).

In the spring, larvae begin feeding on birds-foot violet (*Viola pedata* L.*)*, arrow-leaved violet (*Viola sagittata* Air*)*, and prairie violet (*Viola pedatifida* G. Don*)* (WDNR 2000) and they have been documented to use the annual, Johnny jump-up (*Viola rafinesquii* Greene*)* in central Illinois (LaGesse et.al. 2004). Larvae of Lepidoptera, in general, are very specific in their feeding requirements and, in many cases, require a specific species (Ehrlich and Raven 1964). After feeding and completing six instars, they pupate. In early June adult males emerge and are followed by adult females approximately two weeks later (Scudder 1889; Kopper 2001). Mating begins soon after female emergence with each female copulating once. After two weeks of mating, the male regal fritillaries die (Nagel, et al. 1991; Kopper 2001), and fertilized females enter reproductive diapause for the next two months (Kopper et al. 2001). During this period females nectar on common milkweed (*Asclepias syriaca* L.), butterfly milkweed (*Asclepias tuberosa* L.), dogbane (*Apocynum spp.*), bull thistle (*Cirsium pumilum* (Nutt.) Spreng.), and boneset (*Eupatorium perfoliatum* L.) (Sedman and Hess 1985; LaGesse et al. 2006). The diapause period between mating and oviposition is the most precarious time in the life span of the regal fritillary. If drought, disease, predation, parasitism, or other environmental catastrophes occur, the entire brood for the following year is at risk. By early September females begin oviposition, depositing over 1,000 eggs in clusters on violets (Wagner, et al. 1997; Kopper 2001). The eggs hatch and larva feed on the egg case and enter winter dormancy (Scudder 1889; Mattoon et al. 1971; Kopper 2001; Zercher 2002).

3.3 Adult Regal Fritillary Census Report-(Coming in September)

4.0 Violet Population Survey Methods

All violets populations were documented on the MEC and throughout the northern 300 foot end of the CRP field (15.7 of 62 acres). The perimeter and area of each violet population were determined. Wire flags were used to mark the perimeters of all populations to facilitate violet monitoring and mapping. Area mapping was completed using a Trimble® Pro-XR backpack global positioning system (GPS) with sub-meter accuracy to determine the size of each violet population (LaGesse et al. 2004).

Violet populations were classified based on patch size. Areas that were >1,000/m^2 were classified as “Large”, patches from 100-1000/m^2 were classified as “medium”, and patches <100/m^2 were classified as “small”. Then using a random numbers chart, populations within each size class were selected for intensive transect sampling of violets (described below). Violets were also inspected for leaf damage and flagged for larval investigations if damage was observed.

In selected populations, random one meter-square plots were established for sampling, violets, cactus, woody plants, grasses, other forbs, thatch and/or bare ground. Twenty plots were sampled in large violet populations, 10 plots were sampled in medium-sized populations, and 5 plots were sampled in small populations. A cover class was assigned for each plant group, using a modified Daubenmire method to determine plant percent frequency (%), relative frequency (Rel. Freq.), relative cover (Rel. Cov.) and Importance Values (IV) (Rel. Cov. + Rel. Freq.) for each plant group (Ebinger 1998).

4.1 Results – Violet Population Study

Johnny jump-up plants (*Viola rafinesquii*) dominated areas that have not been disturbed for 7 years or more. A new road was constructed in 2005 on the MEC property, and the disturbance from that project limits the current distribution of Johnny jump-up on the plant property. A series of aerial photographs shows the past disturbance history (Google Earth 2012) (See photos # 1-5). The new road was planted with prairie grasses and flowers. That planting has matured, but lacks any colonization of Johnny jump-up plants. Johnny jump-up plants seem to be associated with a thick grass thatch build up. The author has observed a thatch layer seems to repress other spring plant competition and this is when Johnny jump-up can reach high plant densities.

A total of 104 populations of Johnny jump-up, and only one population of *Viola pratincola* (Greene), common blue violet (found in the timber on the MEC) were located during this investigation. Sixty-five violet populations were documented inside the Meredosia Energy Center and 7 populations outside the Meredosia Energy Center (See maps # 1, 2 & 4) and 33 violet population in the 300 foot northern edge of the CRP prairie field (See maps # 3 & 5).

Fourteen large (>1,000m2) populations were documented on the MEC property. A total of forty-two medium (100-1,000m2) violet populations were documented: 33 on the Meredosia Energy Center property, 5 outside the power plant property and 4 in the CRP field. Forty-nine small violet populations were documented: 18 on the MEC property, 3 outside the MEC property

(3 populations) and 28 in the CRP field. Five- large, 16- medium, and 18 small violet populations were selected for plot sampling.

Among populations on MEC property, there was considerable variation in the density of violets and habitat conditions within violet patches. Violet density and IV of violets were somewhat lower in small patches. Evidence of grazing of violets (by larval regal fritillaries, likely also rabbits, deer, etc.) was higher weakly related to population size but more frequently observed in large populations (27%) compared to medium (16%) or small populations (12.5%). Ranges of vegetation IV's are provided in the tables below.

Table 1. Summary Data of IV's from Plots within Meredosia Energy Center

Population size	Violet Density (per sq meter)	IV Grass	IV Forbs	IV Thatch	IV Violets
Large (n=5)	12.5 - 54.8	37.4 - 97.3	32.6 - 60.2	20.8 - 51.2	14.9 - 44.1
Medium (n=10)	8.6 - 102.1	28.3 - 80.5	33.9 - 80.1	24.4 - 39.1	18.4 - 43.8
Small (n=10)	3.8 - 33.8	35.1 - 84.6	32.9 - 91.7	23.7 - 37.8	13.6 - 30.1

Table 2. Summary Data of IV's from Plots within CRP Field/Pipeline Area

Population size	Violet Density (per sq meter)	IV Grass	IV Forbs	IV Thatch	IV Violets
Medium (n=6)	14.1 - 73.8	21.1 - 106.2	27.5 - 106.5	25.6 - 38.5	27.5 - 43.9
Small (n=8)	5.6 - 70.2	28.5 - 107.2	27.4 - 77.6	22.8 - 63.1	22.4 - 43.0

Outside the MEC and the CRP field, no large violet populations were identified. Habitat conditions from populations outside the Meredosia Energy Center were even more variable than those within. Grazing was not observed in any of the medium populations, but was observed in 20% of small populations in the pipeline area.

The author observed that areas with violet densities of 40 violets per square meter appeared to have enough violet density to facilitate habitat for regal fritillary butterflies, with 33% of all large plots sampled had over 40 violets per meter and 37% of all medium plots sampled (See Table 3).

Table 3. Percent of Plots Sampled that had 40 Violets or more Per Square Meter

	MEC Large	MEC Med	MEC Small	Pipeline Med	Pipeline Small
Plots > 40 violet/m²	33% (N=100)	25% (N=100)	10% (N=50)	57% (N=60)	25% (N=40)

4.2 Larval Habitat on Meredosia Energy Center/Pipeline Properties

Male regal fritillary butteries were observed emerging on 24 & 25 May 2012 and females on 4 & 6 June 2012 on the Meredosia Energy Center and pipeline properties. On the Meredosia Energy Center site male and female regal butterfly emergent flights were observed from violet populations 1.11, 1.27, 1.28 & 1.34. On the pipeline prairie site male and female regal butterfly emergent flights were observed from violet populations 2.4, 2.5, 2.6, 2.13, 2.21, 2.27, 2.25, 2.31 & 2.32 on the same dates.

On 4 June 2012, I was accompanied with Tim Kelley, Natural Heritage Biologist IDNR and we walked through the pipeline prairie and observed female regal butterflies emerging throughout the rest of the pipeline field. Later that same day an investigation throughout the surrounding area was established including other CRP fields and degraded sand prairies north and south of Meredosia. Ten other CRP fields and sand prairies were observed from the road to have emerging regal fritillary butteries (See Map #6). All CRP fields documented were warm season prairie plantings that were seven years old or more in their CRP contracts (Pers. Conv. Eric Golden IDNR 2012). This follows the same pattern of stability and lack of disturbance that I have observed at the sand prairies at the Meredosia Energy Center and the pipeline prairie.

Other fritillary butterflies were observed during this investigation. The variegated fritillary butterfly, *Euptoita claudia,* was the dominate fritillary observed follow by the regal and a few great spangle fritillary's, *Speyeria cybele,* were observed in both areas.

5.0 Johnny Jump-Up Investigation

5.1 Methods

During the late spring, Johnny jump-up plants were collected to document flower production, investigate seed production, and collect violet seeds. Johnny jump-up is an annual violet species. Like all violets, its seeds are expelled from its seed pods once the pods dry. In order to investigate seed production and collect seeds, violet plants were hand-pulled from the MEC site. Plants were later separated into five gallon buckets with cloth covers so that the plants could continue to dry and the seeds could be captured in the buckets. For the Johnny jump-up plant investigation, 36 plants that had all of their stems and intact roots were pressed and dried for later investigation.

5.2 Results – Johnny Jump-Up Investigation

Thirty-three violet specimens were collected for this investigation. Only plant specimens that had all stems and intact roots were used. These specimens were pressed, dried and later measured and counted. Of the violets sampled, they had an average height of 208.03 millimeters, with a range of 170 – 260 millimeters tall. The violets sampled had an average 15.1 flowers per plant and had a range of 4 – 35 flowers per plant. Each flower produced 27 seeds per flower, 9 seeds per ovary. For Johnny jump-up plants, one plant could produce from 108 to 948 seeds in one year, with an average of 407 seeds produced per plant. Approximately 12 ounces of Johnny jump-up seed was collected during this investigation.

6.0 *Astragalus distortus*, Bent-Leave Milk Vetch

Photo #1. Bent-Leave Milk Vetch, Photo by V. LaGesse

During investigation of the violet species on the Meredosia Energy Center, three subpopulations of the Illinois State Endangered plant, *Astragalus distortus*, Bent-Leaved Milk Vetch were documented. This perennial, tap-rooted herb is currently known from only three counties (Mason, Cass & Morgan) in Illinois with only six known populations (IESPB 2004).

The Meredosia Energy Center population is a new documented population. The three subpopulations occur near the front gate and along the east fence line near the front gate. The distribution appears to be scattered along the disturbance of the road construction for the haul road and entrance gate that was constructed in 2005-2006. A total of 95 plants were documented during the week of 23 April through 25 April 2012. All plants were flagged and there locations were mapped using the Trimble Pro-X GPS. Two plants were collected, dried and pressed as vouchers.

There are no state laws to protect state listed plant species in Illinois. Therefore, preservation and protection of these plant species is the responsibility of the landowner. There are only seven known populations of this species currently known to exist in Illinois, including the population on the Meredosia Energy Complex. If possible, avoiding the known population of

Astragulus distortus during project activities at the Meredosia Energy Complex is recommended. If the population will be impacted during construction and operation activities, it is recommended that the project work with IDNR to move the plants prior to construction and/or collect seed for future plantings.

Map # 7 Distribution of Bent-Leave Milk Vetch, Meredosia Energy Center 2012

7.0 Discussions

Regal fritillary habitat did not seem to depend on violet population patch size, but there is a relationship between violet density and the presence of the butterfly. Violet populations with densities of 40 violets per square meter or more were found to be possible regal habitat. Variegated fritillary butterflies were observed utilizing most violet populations and the Great spangled fritillary butterflies were observed from both study sites. Both of these species host on any violet species, and in Morgan County they appear to be utilizing the annual Johnny jump-up violet.

7.1 Recommendations

The FutureGen II project may impact potential regal fritillary habitat. The following recommendations are made to avoid, minimize, and mitigate impacts to the regal fritillary that might result from project activities:

1. When possible, avoid documented regal fritillary habitat destruction during design and layout of the project elements (e.g., laydown yard, access road)
2. If documented areas of potential regal fritillary habitat will be impacted with this project, adjacent areas, with mature grass stands and a developed thatch layer, should be over seeded with Johnny jump-up seed to mitigate project impacts. Based on the findings of this study, a seed rate of 40 seeds per square meter is adequate. Restoration/mitigation ratios will be determined in the Conservation Plan for this project. This will be written with input from Illinois Department of Natural Resources.
3. All contractors and employees working on the project should be trained to recognize the Regal Fritillary; to understand its significance to the project and the public; and be instructed how to respond to an observation or encounter with this species.
4. All sightings of possible or actual regal fritillaries during project activities should be reported to IDNR.
5. In areas where the regal fritillary is present, during the construction phase project, vehicles should reduce speed to minimize the risks of taking butterflies through collision, or find alternate routes posing less risk.

7.2 Acknowledgments

I wish to thanks, Jeff Walk, The Nature Conservancy, for assisting with sampling protocols and statistics reviews and Ted Prescott, Illinois Environmental Protection Agency for assistance with GPS and GIS issues with this study. I would also want to thank, Mitch White and the other staff of Ameren Company for access to the site and for keeping an eye on me.

8.0 Literature Cited

Ehrlich, P.R. and P. H. Raven. 1964. Butterflies and plants: A Case Study in Co evolution. Evolution 18:586-608

Ebinger, J. E. 1998. Possible Survey Methods for Woodland Studies in Illinois. Unpublished Report for IDNR, Eastern Illinois University, Charleston IL.

IDNR. 2005. Illinois Wildlife Action Plan. Illinois Department of Natural Resources. Springfield, IL.

Google Earth. 2012. Timeline aerial photos of Meredosia Energy Center. WWW.Googleearth.com

Herkert, J.R., Editor. 1992. Endangered and Threatened Species of Illinois: Status and Distribution, Vol. 2 – Animals. Illinois Endangered Species Board. Springfield, Il 142pp.

Kopper, B.J., S. Shu, R. E. Charlton, and S.B. Ramaswamy. 2001. Evidence for Reproductive Diapause in the Fritillary *Speyeria idalia* (Lepidoptera: Nymphalidae). Ann. Entomol. Soc. Am. 94(3): 427-432.

LaGesse, V., W.E. McClain, C.A. Falco and J.R. Wiker. 2004. Little Bluestem and Violet Populations at Sand Ridge State Forest, Mason County, Illinois: Implications for Rare Butterfly Survival. Final Report. Illinois Department of Natural Resources, Springfield, IL. Unpublished report.

LaGesse, V., W.E. McClain, C.A. Falco and J.R. Wiker. 2006.Census Route Study of Regal Fritillary (*Speyeria idalia)* at Sand Ridge State Forest, Mason County Illinois. Illinois Department of Natural Resources, Springfield, IL. Unpublished report.

Mattoon, S., R. Davis and O. Spencer. 1971. Rearing techniques for species of Speyeria (Nymphalidae). Journal of the Lepidopterist's Society 25 (4) 247-256.

Nagle, H.G., T. Nightengale and N. Dankert. 1991. Regal Fritillary Population Estimation and Natural History on Rowe Sanctuary, Nebraska. Prairie Naturalist. 23(3); 145-152

NatureServe. 2004. Speyeria idalia – Comprehensive Report. NatureServe Explorer: An online encyclopedia of life [web application]. Version 3.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: June 23, 2004).

Nyboer, R.W. and J.E. Ebinger, Editors 2004. Endangered and Threatened Species of Illinois: Status and Distribution, Volume 3: 2004 Changes to the Illinois List of Endangered and Threatened Plant Species. Illinois Endangered Species Protection Board. Springfield, Illinois. 34 pp.

Schwegman, J.E., G.B. Fell, M. Hutchison, W. M. Shepherd, and J. White. 1973. Comprehensive plan for the Illinois Nature Preserves System. Part 2. The natural divisions of Illinois. Illinois Nature Preserves Commission. Rockford, Illinois. 32 p. + map.

Scudder, S.H. 1889. The Butterflies of the Eastern United States and Canada. Scudder, Cambridge, Mass.

Sedman, Y, and D. Hess. 1985. *The Butterflies of West Central Illinois*. Western Illinois University. Series in the Biological Sciences No. 11. 120 p.

Selby, G. (2007, February 9). Regal Fritillary (*Speyeria idalia* Drury): a technical conservation assessment. [Online] USDA Forest Service, Rocky Mountain Region, Available: http://www.fs.fed.us/r2/projects/scp/assessments/regalfritillary.pdf (28 August 2012)

Wagner, D.L., M. Wallace, J. Boettner, and J. Elkinton. 1971. Status update and life history studies on the regal butterfly (Lepidoptera: Nymphalidae). Pp. 261-275. In the ecology and conservation of grasslands and healthlands in northeast North America. P. D. Vickery, P. Dunwiddie, and C. Griffin (eds.). Massachusetts Audubon, Lincoln MA

WDNR. 2000. Protocol for Incidental Take Authorization Regal Fritillary (Speyeria idalia). Wisconsin Department of Natural Resources. www.dnr.state.wi.us/org/land/er/take/pdfs/regalprot.pdf

Zercher, D. 2002. Ft. Indiantown Gap National Guard Training Center. Final Integrated Natural Resources Management Plan. Fort Indiantown Gap, Annville, PA. The Pennsylvania Department of Military and Veterans Affairs. The Nature Conservancy.

Appendix A – Maps

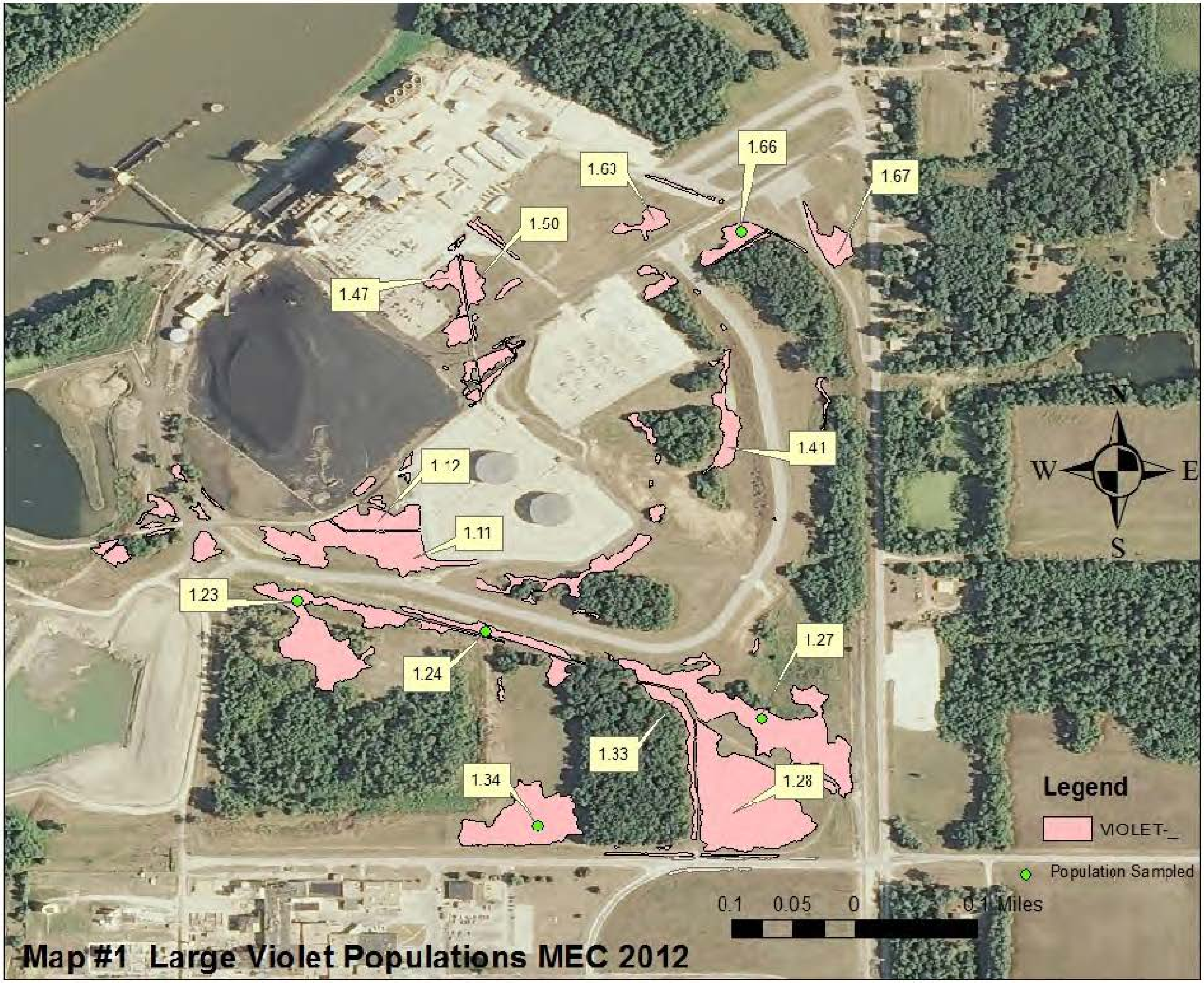
Photo #1 Meredosia Energy Center 2011 Google Earth 2012

Photo #2 Meredosia Energy Center 2009 Google Earth 2012

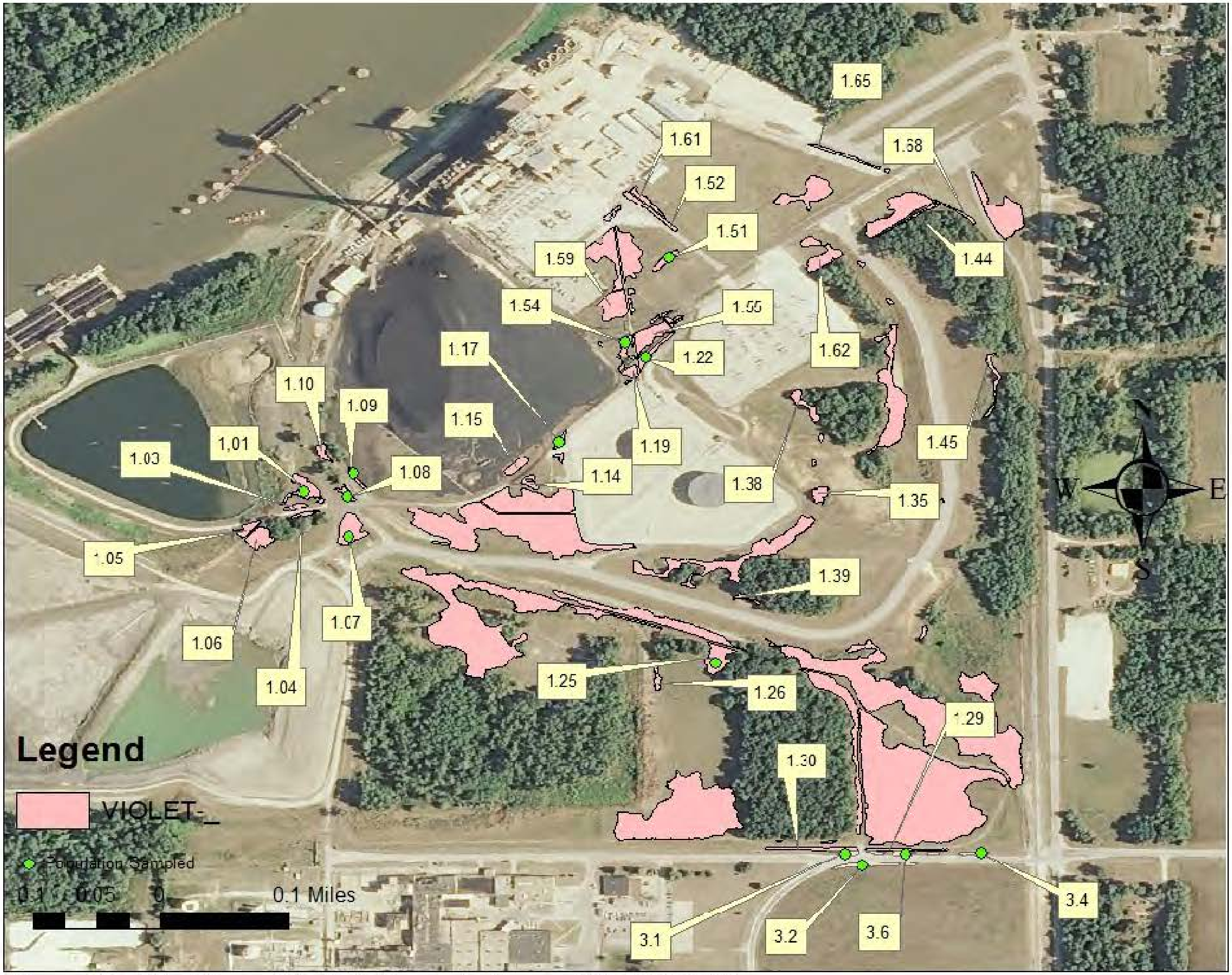
Photo #3 Meredosia Energy Center 2007 Google Earth 2012

Photo #4 Meredosia Energy Center 2006 Google Earth 2012

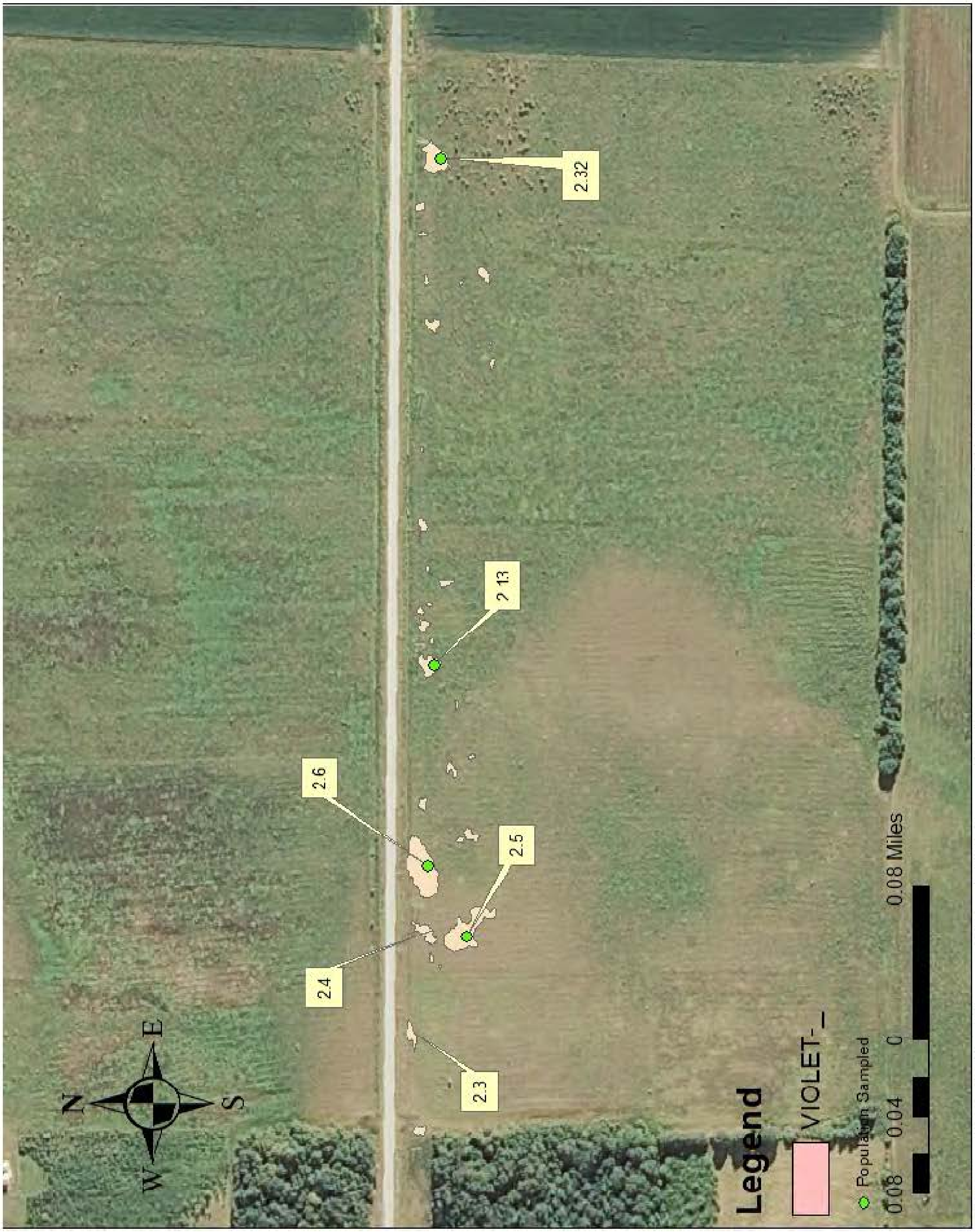
Photo #5 Meredosia Energy Center 2005 Google Earth 2012



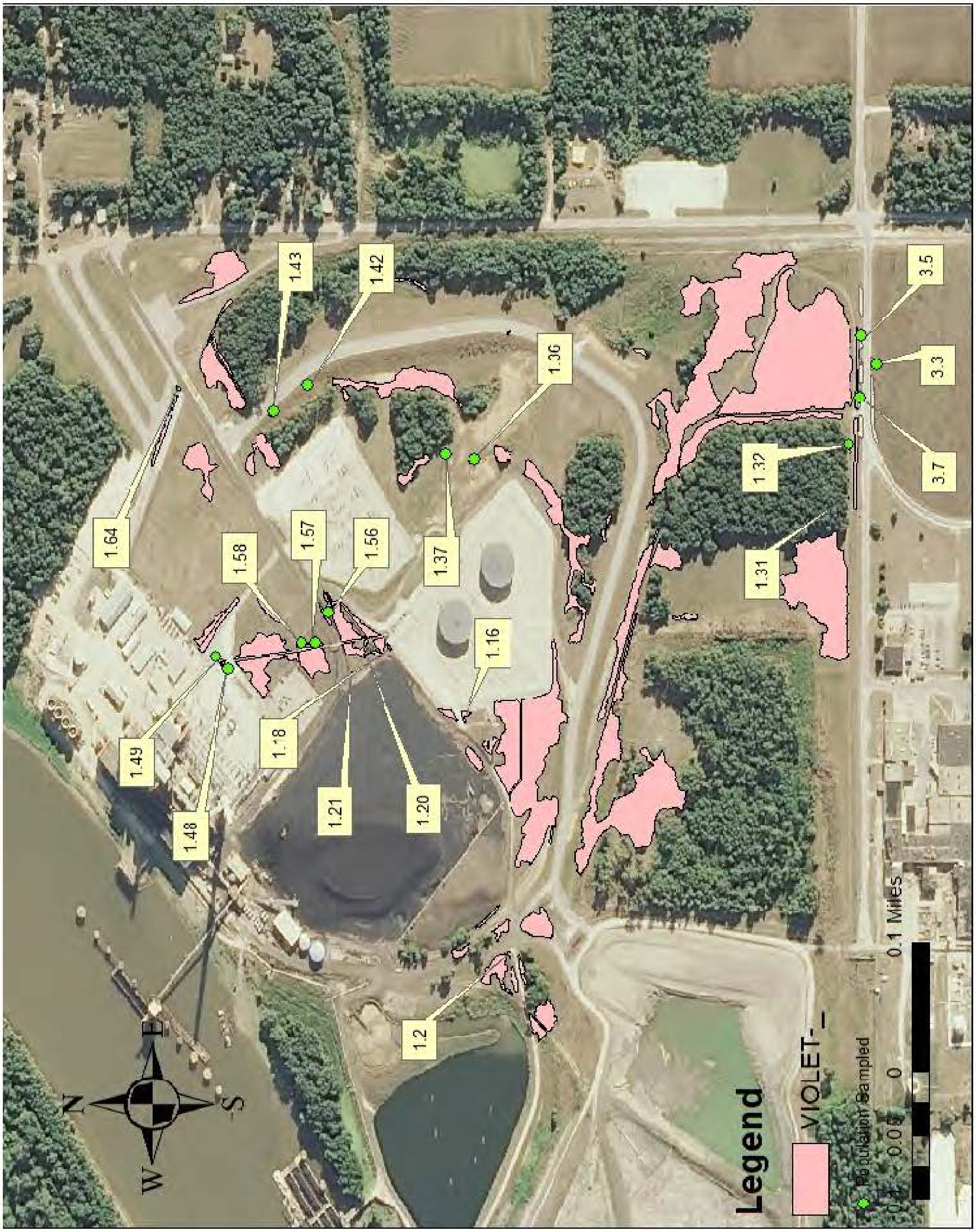
Map #1 Large Violet Populations MEC 2012



Map #2 Medium Violet Populations MEC 2012



Map #3 Medium Violet Populations PIPELINE 2012

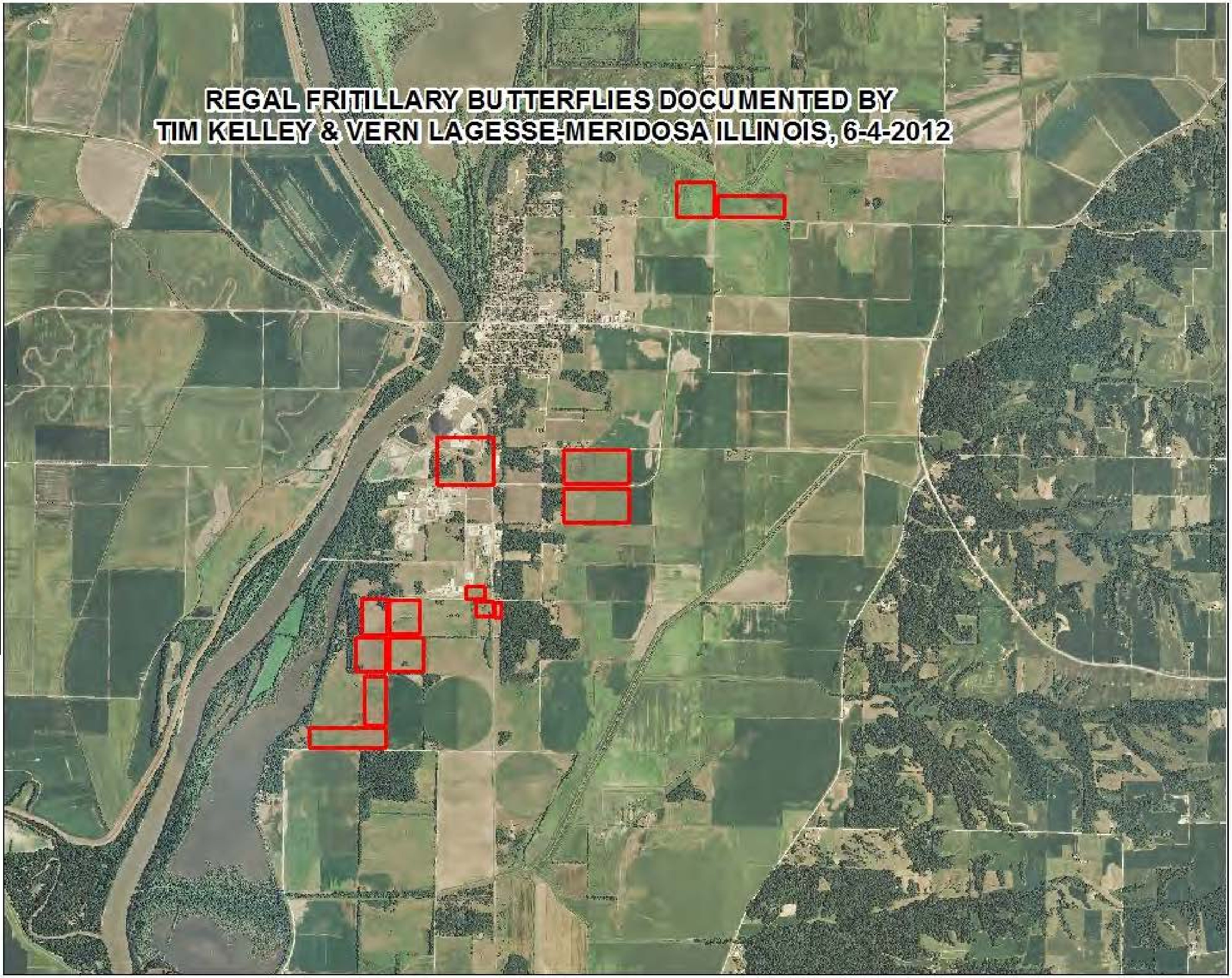


Map #4 Small Violet Populations MEC 2012

Page A-7

Map #5 Small Violet Populations PIPELINE 2012

Map # 6


REGAL FRITILLARY BUTTERFLIES DOCUMENTED BY
TIM KELLEY & VERN LAGESSE-MERIDOSA ILLINOIS, 6-4-2012

Appendix B – Butterflies Observed During Regal Study 2012

Scientific Name	Common Name
Family *Papilionidae*	
Pterourus troilus	Spicebush Swallowtail
Battus philenor	Pipe-Vine Swallowtail
Pterourus glaucus	Tiger Swallowtail
Papilio polyxenes	Black Swallowtail
Family *Pierdae*	
Ponita protodice	Checkered White
Artogeia rapae	Cabbage White
Colias philodice	Clouded Sulfur
Colias eurytheme	Orange Sulfur
Phoebis sennae	Cloudless Sulfur
Pyrisitia lisa	Little Sulfur
Nathalis iole	Dainty Sulphur
Euchloe olympia	Olympia Marble
Family *Lycanidae*	
Strymon melinus	Gray Hairstreak
Everes comyntas	Eastern-Tailed Blue
Celastrina ladon	Spring Azure
Family *Nymphalidae*	
Euptoieta claudia	Variegated Fritillary
Speryeria idalia	Regal Fritillary
Speyeria cybele	Great Spangled Fritillary
Phyciodes tharos	Pearl Crescent
Vanessa cardui	American Painted Lady
Vanessa virginiensis	Painted Lady
Vanessa atalanta	Red Admiral
Junonia coenia	Buckeye
Basilarchia arthemis	Red Spotted Purple
Nymphalis antiopa	Mourning Cloak
Family *Aparturidae*	
Astrocampa celtis	Hackberry
Family *Satyridae*	
Megisto cymela	Little Wood Satyr
Family *Danaidae*	
Danaus plexippus	Monarch
Family Hesperiidae	
Epargyreus clarus	Silver Spotted Skipper
Erynnis juvenalis	Juvenal's Duskywing
Erynnis horatius	Horace's Duskywing
Pyrgus communis	Checkered Skipper
Pholisora catullus	Common Sootywing

Appendix C – Violet Data

C.1 Large Plot – MEC

Table C.1-1. Population 1.24 – Large

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel Cover	IV
VIOLETS	19	20	95.0	19.0	19.8	16.7	35.7
WOODY	1	20	5.0	1.0	0.0	0.0	1.0
CACTUS	5	20	25.0	5.0	0.3	0.2	5.2
FORBS	20	20	100.0	20.0	47.8	40.2	60.2
GRASS	20	20	100.0	20.0	20.7	17.4	37.4
THATCH	20	20	100.0	20.0	28.6	24.1	44.1
BARE GR.	15	20	75.0	15.0	1.6	1.3	16.3
Totals	100		500.0	100.0		100.0	200.0

Table C.1-2. Population 1.23 – Large

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	20	20	100.0	22.5	24.1	18.7	41.1
WOODY	0	20	0.0	0.0	0.0	0.0	0.0
CACTUS	1	20	5.0	1.1	0.0	0.0	1.1
FORB	20	20	100.0	22.5	42.7	33.1	55.6
GRASS	20	20	100.0	22.5	24.8	19.2	41.6
THACTH	20	20	100.0	22.5	37.1	28.7	51.2
BARE GR.	8	20	40.0	9.0	0.5	0.3	9.3
Totals	89		445.0	100.0		100.0	200.0

Table C.1-3. Population 1.27 – Large

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	20	20	100.0	16.9	7.9	7.3	24.2
WOODY	0	20	0.0	0.0	0.0	0.0	0.0
CACTUS	19	20	95.0	16.1	7.4	6.9	23.0
FORB	20	20	100.0	16.9	39.3	36.4	53.4
GRASS	20	20	100.0	16.9	44.4	41.2	58.2
THATCH	20	20	100.0	16.9	4.2	3.9	20.8
BARE GR.	19	20	95.0	16.1	4.7	4.3	20.4
Totals	118		590.0	100.0		100.0	200.0

Table C.1-4. Population 1.34 – Large

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	12	20	60.0	12.6	3.0	2.3	14.9
WOODY	0	20	0.0	0.0	0.0	0.0	0.0
CACTUS	18	20	90.0	18.9	3.2	2.4	21.4
FORB	19	20	95.0	20.0	16.1	12.3	32.3
GRASS	20	20	100.0	21.1	87.0	66.3	87.3
THATCH	20	20	100.0	21.1	21.8	16.6	37.6
BARE GR.	6	20	30.0	6.3	0.3	0.2	6.5
Totals	95		475.0	100.0		100.0	200.0

Table C.1-5. Population 1.66 – Large

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	15	20	75.0	18.5	19.4	14.0	32.6
WOODY	0	20	0.0	0.0	0.0	0.0	0.0
CACTUS	4	20	20.0	4.9	0.4	0.3	5.2
FORB	19	20	95.0	23.5	44.4	32.1	55.5
GRASS	19	20	95.0	23.5	55.2	39.9	63.4
THATCH	19	20	95.0	23.5	13.1	9.4	32.9
BARE GR.	5	20	25.0	6.2	6.0	4.3	10.5
Totals	81		405.0	100.0		100.0	200.0

C.2 Medium Plot – MEC

Table C.2-1. Plot 1.01 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	8	10	80.0	17.8	2.6	2.6	20.3
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	2	10	20.0	4.4	0.6	0.6	5.0
FORB	10	10	100.0	22.2	42.9	42.4	64.6
GRASS	9	10	90.0	20.0	45.5	45.0	65.0
THATCH	10	10	100.0	22.2	8.5	8.4	30.6
BARE GR.	6	10	60.0	13.3	1.1	1.0	14.4
Totals	45		450.0	100.0		100.0	200.0

Table C.2-2. Plot 1.07 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	21.7	25.7	22.0	43.8
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	0	10	0.0	0.0	0.0	0.0	0.0
FORB	10	10	100.0	21.7	59.5	51.1	72.8
GRASS	10	10	100.0	21.7	20.4	17.5	39.2
THATCH	10	10	100.0	21.7	10.2	8.8	30.5
BARE GR	6	10	60.0	13.0	0.8	0.7	13.7
Totals	46		460.0	100.0		100.0	200.0

Table C.2-3. Plot 1.08 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	7	10	70.0	15.6	4.3	3.9	19.5
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	4	10	40.0	8.9	2.2	2.0	10.9
FORB	10	10	100.0	22.2	39.6	36.4	58.7
GRASS	10	10	100.0	22.2	43.4	39.9	62.2
THATCH	10	10	100.0	22.2	18.3	16.9	39.1
BARE GR	4	10	40.0	8.9	1.0	0.9	9.8
Totals	45		450.0	100.0		100.0	200.0

Table C.2-4. Plot 1.09 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	9	10	90.0	17.6	2.7	2.3	20.0
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	8	10	80.0	15.7	7.9	6.9	22.6
FORB	10	10	100.0	19.6	35.9	31.7	51.3
GRASS	10	10	100.0	19.6	52.3	46.2	65.8
THATCH	10	10	100.0	19.6	12.6	11.1	30.7
BARE GR	4	10	40.0	7.8	1.9	1.7	9.5
Totals	51		510.0	100.0		100.0	200.0

Table C.2-5. Plot 1.17 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	21.3	27.8	21.6	42.9
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	2	10	20.0	4.3	1.8	1.4	5.7
FORB	10	10	100.0	21.3	75.8	58.9	80.1
GRASS	10	10	100.0	21.3	9.1	7.0	28.3
THATCH	10	10	100.0	21.3	13.8	10.7	32.0
BARE GR	5	10	50.0	10.6	0.5	0.4	11.0
Totals	47		470.0	100.0		100.0	200.0

Table C.2-6. Plot 1.22 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	9	10	90.0	17.3	1.5	1.1	18.4
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	4	10	40.0	7.7	1.2	0.9	8.6
FORB	10	10	100.0	19.2	71.0	55.8	75.1
GRASS	10	10	100.0	19.2	44.8	35.2	54.4
THATCH	10	10	100.0	19.2	6.6	5.2	24.4
BARE GR	9	10	90.0	17.3	2.2	1.7	19.0
Totals	52		520.0	100.0		100.0	200.0

Table C.2-7. Plot 1.25 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	9	10	90.0	17.3	8.1	6.9	24.3
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	7	10	70.0	13.5	6.5	5.6	19.1
FORB	10	10	100.0	19.2	17.0	14.6	33.9
GRASS	10	10	100.0	19.2	71.0	61.3	80.5
THATCH	10	10	100.0	19.2	11.4	9.8	29.1
BARE GR	6	10	60.0	11.5	2.0	1.7	13.2
Totals	52		520.0	100.0		100.0	200.0

Table C.2-8. Plot 1.59 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	9	10	90.0	17.0	2.2	2.5	19.5
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	9	10	90.0	17.0	3.9	4.5	21.4
FORB	10	10	100.0	18.9	37.8	43.6	62.5
GRASS	10	10	100.0	18.9	33.4	38.6	57.4
THATCH	10	10	100.0	18.9	9.2	10.6	29.4
BARE GR	5	10	50.0	9.4	0.3	0.3	9.7
Totals	53		530.0	100.0		100.0	200.0

Table C.2-9. Plot 1.54 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	19.2	1.5	2.4	21.6
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	2	10	20.0	3.8	0.6	1.0	4.8
FORB	10	10	100.0	19.2	33.0	53.0	72.2
GRASS	10	10	100.0	19.2	7.6	12.1	31.4
THATCH	10	10	100.0	19.2	7.8	12.5	31.8
BARE GR	10	10	100.0	19.2	11.8	19.0	38.2
Totals	52		520.0	100.0		100.0	200.0

Table C.2-10. Plot 1.51 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	19.2	3.9	3.9	23.1
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	10	10	100.0	19.2	1.5	1.5	20.7
FORB	10	10	100.0	19.2	24.0	24.1	43.3
GRASS	10	10	100.0	19.2	57.5	57.7	77.0
THATCH	10	10	100.0	19.2	12.6	12.7	31.9
BARE GR	2	10	20.0	3.8	0.1	0.1	3.9
Totals	52		520.0	100.0		100.0	200.0

C.3 Small Plot – MEC

Table C.3-1. Plot 1.32 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	18.5	0.5	0.4	18.9
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	4	5	80.0	14.8	3.8	2.8	17.6
FORB	5	5	100.0	18.5	19.5	14.4	32.9
GRASS	5	5	100.0	18.5	85.0	62.9	81.4
THATCH	5	5	100.0	18.5	26.1	19.3	37.8
BARE GR	3	5	60.0	11.1	0.3	0.2	11.3
Totals	27		540.0	100.0		100.0	200.0

Table C.3-2. Plot 1.36 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	4	5	80.0	16.7	0.4	0.3	17.0
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	3	5	60.0	12.5	0.3	0.2	12.7
FORB	5	5	100.0	20.8	80.5	61.1	81.9
GRASS	5	5	100.0	20.8	45.0	34.1	55.0
THATCH	5	5	100.0	20.8	5.4	4.1	24.9
BARE GR	2	5	40.0	8.3	0.2	0.2	8.5
Totals	24		480.0	100.0		100.0	200.0

Table C.3-3. Plot 1.37 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	22.7	12.3	7.9	30.6
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	22.7	43.0	27.7	50.4
GRASS	5	5	100.0	22.7	85.0	54.7	77.4
THATCH	5	5	100.0	22.7	15.0	9.6	32.4
BARE GR	2	5	40.0	9.1	0.2	0.1	9.2
Totals	22		440.0	100.0		100.0	200.0

Table C.3-4. Plot 1.42 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	22.7	4.9	4.0	26.7
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	22.7	52.0	42.1	64.8
GRASS	5	5	100.0	22.7	55.7	45.1	67.8
THATCH	5	5	100.0	22.7	10.2	8.3	31.0
BARE GR	2	5	40.0	9.1	0.7	0.6	9.7
Totals	22		440.0	100.0		100.0	200.0

Table C.3-5. Plot 1.43 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	4	5	80.0	16.7	1.4	1.4	18.1
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	20.8	19.5	19.9	40.7
GRASS	5	5	100.0	20.8	62.5	63.8	84.6
THATCH	5	5	100.0	20.8	12.6	12.9	33.7
BARE GR	5	5	100.0	20.8	2.0	2.0	22.9
Totals	24		480.0	100.0		100.0	200.0

Table C.3-6. Plot 1.46 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	4	5	80.0	12.9	0.9	0.7	13.6
WOODY	4	5	80.0	12.9	0.4	0.3	13.2
CACTUS	5	5	100.0	16.1	10.2	7.6	23.7
FORB	5	5	100.0	16.1	28.5	21.3	37.4
GRASS	5	5	100.0	16.1	80.5	60.1	76.2
THATCH	5	5	100.0	16.1	10.2	7.6	23.7
BARE GR	3	5	60.0	9.7	3.2	2.4	12.1
Totals	31		620.0	100.0		100.0	200.0

Table C.3-7. Plot 1.49 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	21.7	9.7	8.4	30.1
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	1	5	20.0	4.3	0.1	0.1	4.4
FORB	5	5	100.0	21.7	52.5	45.4	67.1
GRASS	5	5	100.0	21.7	40.6	35.1	56.8
THATCH	5	5	100.0	21.7	12.1	10.5	32.2
BARE GR	2	5	40.0	8.7	0.7	0.6	9.3
Totals	23		460.0	100.0		100.0	200.0

Table C.3-8. Plot 1.56 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	21.7	2.0	2.3	24.1
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	1	5	20.0	4.3	0.6	0.7	5.0
FORB	2	5	40.0	8.7	28.5	33.2	41.9
GRASS	5	5	100.0	21.7	43.5	50.7	72.4
THATCH	5	5	100.0	21.7	7.8	9.1	30.8
BARE GR	5	5	100.0	21.7	3.4	4.0	25.7
Totals	23		460.0	100.0		100.0	200.0

Table C.3-9. Plot 1.57 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	19.2	3.4	3.6	22.9
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	2	5	40.0	7.7	0.7	0.7	8.4
FORB	5	5	100.0	19.2	48.0	51.2	70.4
GRASS	5	5	100.0	19.2	33.5	35.7	54.9
THATCH	5	5	100.0	19.2	7.8	8.3	27.5
BARE GR	4	5	80.0	15.4	0.4	0.4	15.8
Totals	26		520.0	100.0		100.0	200.0

Table C.3-10. Plot 1.58 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	4	5	80.0	13.8	1.4	1.7	15.5
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	5	5	100.0	17.2	1.5	1.8	19.0
FORB	5	5	100.0	17.2	62.5	74.5	91.7
GRASS	5	5	100.0	17.2	15.0	17.9	35.1
THATCH	5	5	100.0	17.2	3.0	3.6	20.8
BARE GR	5	5	100.0	17.2	0.5	0.6	17.8
Totals	29		580.0	100.0		100.0	200.0

C.4 Medium Plot – Pipeline

Table C.4-1. Pipeline Plot 3.02 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	18.9	27.1	22.8	41.7
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	9	10	90.0	17.0	1.2	1.0	18.0
FORB	10	10	100.0	18.9	75.8	63.9	82.8
GRASS	10	10	100.0	18.9	2.7	2.3	21.1
THATCH	10	10	100.0	18.9	11.4	9.6	28.5
BARE GR.	4	10	40.0	7.5	0.5	0.4	7.9
Totals	53		530.0	100.0		100.0	200.0

Table C.4-2. Pipeline Plot 3.04 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	17.5	17.0	13.3	30.9
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	10	10	100.0	17.5	0.8	0.6	18.1
FORB	10	10	100.0	17.5	85.0	66.9	84.4
GRASS	10	10	100.0	17.5	13.8	10.9	28.4
THATCH	10	10	100.0	17.5	10.2	8.0	25.6
BARE GR.	7	10	70.0	12.3	0.4	0.3	12.6
Totals	57		570.0	100.0		100.0	200.0

Table C.4-3. Pipeline Plot 2.32 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	25.0	36.6	18.9	43.9
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	0	10	0.0	0.0	0.0	0.0	0.0
FORB	10	10	100.0	25.0	60.6	31.3	56.3
GRASS	10	10	100.0	25.0	81.6	42.1	67.1
THATCH	10	10	100.0	25.0	15.0	7.7	32.7
BARE GR.	0	10	0.0	0.0	0.0	0.0	0.0
Totals	40		400.0	100.0		100.0	200.0

Table C.4-4. Pipeline Plot 2.06 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	25.0	3.9	3.2	28.2
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	0	10	0.0	0.0	0.0	0.0	0.0
FORB	10	10	100.0	25.0	3.9	3.2	28.2
GRASS	10	10	100.0	25.0	98.5	81.2	106.2
THATCH	10	10	100.0	25.0	15.0	12.4	37.4
BARE GR.	0	10	0.0	0.0	0.0	0.0	0.0
Totals	40		400.0	100.0		100.0	200.0

Table C.4-5. Pipeline Plot 205 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	9	10	90.0	23.7	4.7	3.8	27.5
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	0	10	0.0	0.0	0.0	0.0	0.0
FORB	9	10	90.0	23.7	4.7	3.8	27.5
GRASS	10	10	100.0	26.3	98.5	80.2	106.5
THATCH	10	10	100.0	26.3	15.0	12.2	38.5
BARE GR.	0	10	0.0	0.0	0.0	0.0	0.0
Totals	38		380.0	100.0		100.0	200.0

Table C.4-6. Pipeline Plot 2.13 – Medium

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	10	10	100.0	25.0	19.4	14.0	39.0
WOODY	0	10	0.0	0.0	0.0	0.0	0.0
CACTUS	0	10	0.0	0.0	0.0	0.0	0.0
FORB	10	10	100.0	25.0	19.4	14.0	39.0
GRASS	10	10	100.0	25.0	85.0	61.3	86.3
THATCH	10	10	100.0	25.0	15.0	10.8	35.8
BARE GR.	0	10	0.0	0.0	0.0	0.0	0.0
Totals	40		400.0	100.0		100.0	200.0

C.5 Small Plot – Pipeline

Table C.5-1. Pipeline Plot 3.06 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	20.0	34.0	23.0	43.0
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	3	5	60.0	12.0	0.8	0.5	12.5
FORB	5	5	100.0	20.0	85.0	57.6	77.6
GRASS	5	5	100.0	20.0	12.6	8.5	28.5
THATCH	5	5	100.0	20.0	15.0	10.2	30.2
BARE GR	2	5	40.0	8.0	0.2	0.1	8.1
Totals	25		500.0	100.0		100.0	200.0

Table C.5-2. Pipeline Plot 2.27 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	25.0	26.1	15.8	40.8
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	25.0	57.5	34.8	59.8
GRASS	5	5	100.0	25.0	66.5	40.3	65.3
THATCH	5	5	100.0	25.0	15.0	9.1	34.1
BARE GR	0	5	0.0	0.0	0.0	0.0	0.0
Totals	20		400.0	100.0		100.0	200.0

Table C.5-3. Pipeline Plot 2.33 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	25.0	2.5	1.3	26.3
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	25.0	33.0	17.6	42.6
GRASS	5	5	100.0	25.0	80.5	42.9	67.9
THATCH	5	5	100.0	25.0	71.5	38.1	63.1
BARE GR	0	5	0.0	0.0	0.0	0.0	0.0
Totals	20		400.0	100.0		100.0	200.0

Table C.5-4. Pipeline Plot 2.01 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	20.0	2.5	2.4	22.4
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	20.0	15.0	14.2	34.2
GRASS	5	5	100.0	20.0	85.0	80.2	100.2
THATCH	5	5	100.0	20.0	3.0	2.8	22.8
BARE GR	5	5	100.0	20.0	0.5	0.5	20.5
Totals	25		500.0	100.0		100.0	200.0

Table C.5-5. Pipeline Plot 2.15 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	20.8	4.4	3.4	24.2
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	20.8	67.0	51.8	72.7
GRASS	5	5	100.0	20.8	42.5	32.9	53.7
THATCH	5	5	100.0	20.8	15.0	11.6	32.4
BARE GR	4	5	80.0	16.7	0.4	0.3	17.0
Totals	24		480.0	100.0		100.0	200.0

Table C.5-6. Pipeline Plot 2.08 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	25.0	4.4	4.1	29.1
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	25.0	7.8	7.2	32.2
GRASS	5	5	100.0	25.0	80.5	74.7	99.7
THATCH	5	5	100.0	25.0	15.0	13.9	38.9
BARE GR	0	5	0.0	0.0	0.0	0.0	0.0
Totals	20		400.0	100.0		100.0	200.0

Table C.5-7. Pipeline Plot 2.10 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	25.0	0.5	0.4	25.4
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	25.0	3.0	2.4	27.4
GRASS	5	5	100.0	25.0	85.0	67.5	92.5
THATCH	5	5	100.0	25.0	37.5	29.8	54.8
BARE GR	0	5	0.0	0.0	0.0	0.0	0.0
Totals	20		400.0	100.0		100.0	200.0

Table C.5-8. Pipeline Plot 2.10 – Small

Species	# Plots	Total Plots	% Freq.	Rel. Freq.	Cover	Rel. Cover	IV
VIOLET	5	5	100.0	25.0	1.5	1.3	26.3
WOODY	0	5	0.0	0.0	0.0	0.0	0.0
CACTUS	0	5	0.0	0.0	0.0	0.0	0.0
FORB	5	5	100.0	25.0	4.9	4.1	29.1
GRASS	5	5	100.0	25.0	98.5	82.2	107.2
THATCH	5	5	100.0	25.0	15.0	12.5	37.5
BARE GR	0	5	0.0	0.0	0.0	0.0	0.0
Totals	20		400.0	100.0		100.0	200.0

Table C.5-9. Violets

Speimen #	Height MM	# Stems	# Flowers
1	250	2	8
2	234	1	5
3	203	1	5
4	195	1	4
5	175	1	9
6	165	2	7
7	195	3	13
8	165	2	9
9	170	2	10
10	200	2	7
11	230	9	30
12	195	3	15
13	200	5	24
14	220	3	18
15	225	1	6
16	170	3	9
17	250	5	28
18	190	4	8
19	230	7	35
20	190	8	30
21	195	1	6
22	195	1	6
23	260	1	15
24	220	5	27
25	235	3	17
26	235	5	20
27	195	4	18
28	220	5	18
29	225	5	20
30	215	5	22
31	190	2	10
32	220	6	24
Average	208	3.4	15.1
Ranges	170 to 260	1 to 9	4 to 35

APPENDIX E3

PROTECTED SPECIES SURVEY FOR PROPOSED FUTUREGEN SOIL-GAS MONITORING AND METEOROLOGICAL TOWER

INTENTIONALLY LEFT BLANK

Specialized Ecological Services

105 East Oak Street, Greenville, Illinois 62246
888-511-7735, 618-741-0426 (cell), bob@specialized-ecological.com

November 28, 2011

Matthew Mangan
Fish and Wildlife Biologist
Ecological Services
Marion Illinois Sub-Office
US Fish & Wildlife Service
8588 Route 148
Marion, Illinois 62959

Re: Protected Species Survey
FutureGen Industrial Alliance, Incorporated
Soil-Gas Monitoring and Meteorological Tower Sites
Morgan County, Illinois

Dear Mr. Mangan,

Enclosed is a copy of our report documenting the results of our survey for state and federal threatened and endangered species at the above referenced project in Morgan County, Illinois, for FutureGen Industrial Alliance of Washington, D.C. As indicated in our report, no threatened and endangered species were identified in the project area and no impacts to threatened and endangered species are anticipated. I am also including the results of our survey for jurisdictional wetlands at the project site. As reported, no jurisdictional wetlands were identified and no impacts to jurisdictional wetlands are anticipated.

Please mail comments to:

FutureGen Alliance, Inc.
1101 Pennsylvania Avenue, NW
Sixth Floor
Washington, D.C. 20004
Contact Person: Mr. Ken Humphreys, CEO
Phone Number: (202) 280-6019

U.S. Department of Energy National Technology Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507
Contact Person: Mr. Cliff Whyte, NEPA Compliance Officer
Phone Number: (304) 285-2098

Please include myself and Amanda Stegen, Research Scientist, Battelle on any correspondence.

Amanda Stegen
Battelle
902 Battelle Blvd
P.O. Box 999
MSIN K3-66
Richland, Washington 99352
amanda.stegen@pnl.gov
509-372-4511

Sincerely,
Specialized Ecological Services

Robert O. Rinella
Consulting Ecologist

Cc: Mr. Chris Burger, Patrick Engineering
Ms. Amanda Stegen, Battelle

INTRODUCTION

This report documents an investigation of state and federal threatened and endangered species in the vicinity of proposed construction of FutureGen Industrial Alliance, Inc. facilities near Jacksonville, Illinois. The current proposed action involves the installation of a meteorological tower and soil-gas collection network in support of the FutureGen 2.0 Morgan County carbon sequestration site. The network will provide samples of soil gas for evaluating baseline CO_2 concentrations and, once site operations begin, a means of assessing possible increases in CO_2 concentration or co-injected tracer compounds. The network includes one meteorological tower and seven soil-gas monitoring chambers.

The Endangered Species Act of 1973 (as amended), 16 USC 1531-1544

The Endangered Species Act (16 USC 1531-1544) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The U.S. Fish and Wildlife Service (USFWS) maintains a list of endangered and threatened species. Species include birds, insects, fish, amphibians, reptiles, mammals, crustaceans, flowers, grasses, and trees. The law prohibits any action, administrative or real, that results in a "taking" of listed species or an adverse impact to their habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

Endangered Species Protection Act of 1972, 520 ILCS 10/11

The Illinois Endangered Species Protection Act (520 ILCS 10/11) is administered by the Illinois Department of Natural Resources, Endangered Species Protection Board. Procedures for coordination and consultation with the Board are described in the Illinois Administrative Code, Consultation Procedures for Assessing Impacts of Agency Actions on Endangered and Threatened Species. Species are protected if they meet at least one of four definitions:

- Federally Endangered Species: Any species that is in danger of extinction throughout all or a significant portion of its range.
- Federally Threatened Species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- State Endangered Species: Any species that is in danger of extinction as a breeding species in Illinois.
- State Threatened Species: Any breeding species that is likely to become a state endangered species within the foreseeable future in Illinois.

This Act requires agencies of state and local governments to evaluate, through a consultation process with IDNR, whether actions authorized, funded, or implemented by them are likely to jeopardize the continued existence of Illinois-listed threatened or endangered species or are likely to result in the destruction or adverse modification of the designated essential habitat of such species. When an agency has so consulted, and its action is determined not to adversely impact any Illinois listed species or critical habitat of such species, the agency shall be deemed to have complied with its obligations under the Act.

STUDY AREA

Meteorological Tower

The meteorological tower will be installed on a small strip of pasture located approximately 230 feet west of the soil-gas monitoring station, SG-1 (Illustration 1). Planned coordinates are 90.060917W and 39.813090N.

Soil disturbance for the meteorological tower includes one concrete footing, approximately 2 feet wide, 2 feet long, and 3 feet deep. Also, a pad of landscape pavers (approximately 4 feet wide by 4 feet long) will be used to minimize vegetative growth around the tower and solar panel.

Soil-Gas Monitoring Network

The soil-gas monitoring network will consist of six spatially distributed monitoring locations (SG-1 through SG-6, Illustration 2), and one additional location at the site of an abandoned oil and gas well (SG-OGW-1, Illustration 2). A second abandoned well, SG-OGW-2, will be accessed for a one-time soil gas measurement but no permanent soil gas collector will be installed.

The soil gas monitoring points SG-1 through SG-6 are located adjacent to county roads on what is thought to be the public right–of-way between the road surface and private property. However, selected locations may actually extend onto private property. All locations are sited on high ground where saturation of the soil is least likely to occur. Monitoring point SG-OGW-1 is located in the middle of a fenced pasture.

The soil disturbance caused by installation of the soil-gas monitoring collector at each site will be approximately 2 feet wide, 2 feet long, and 3 feet deep.

Illustration 1: Proposed meteorological tower location.

Legend

- Characterization Well

Soil Gas Monitoring Points

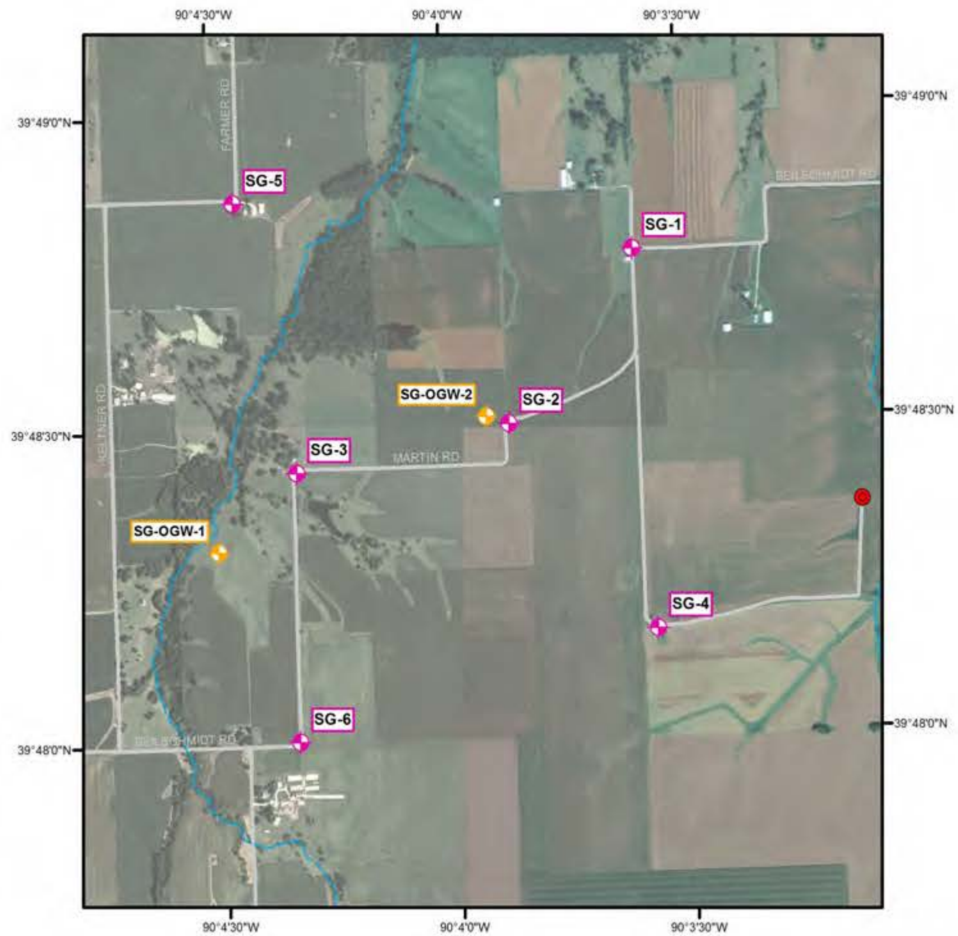
- Primary Soil Gas Monitoring Point
- Soil Gas Monitoring Point, abandonned Oil & Gas Well

Water Features

- Rivers and Streams
- Lakes

Roads Classification

- State Routes
- Local Roads



Coordinates of Soil Gas Monitoring Points

Label	Latitude	Longitude	Current Land Owner
SG-1	39.81286	-90.06011	Hoagland Harold E JR
SG-2	39.80831	-90.06467	M and G Farms Inc.
SG-3	39.80716	-90.07227	Martin Jean R Trustee Jean R Martin 1993 Trust
SG-4	39.80275	-90.05957	Martin Marvin L Trustee Marvin L Martin 1993 Trust
SG-5	39.81437	-90.07428	Keltner W Dale Mardelle Trustees Keltner trust
SG-6	39.80000	-90.07244	Martin Jean R Trustee Jean R Martin 1993 Trust

References of Soil Gas Monitoring Points (Abandoned Oil & Gas Wells)

Label	API	Status	Latitude	Longitude	Total Depth (ft)	Elevation (ft)	Company Name	Current Land Owner	Farm name
SG-OGW-1	121370036301	Junked and Abandoned, Plugged	39.805106	-90.075129	1400	610	Kuehling, Merle	Martin Jean R Trustee Jean R Martin 1993 Trust	MARTIN 1
SG-OGW-2	121370009900	Dry and Abandoned, No Shows	39.808508	-90.065474	1530	630	Horn, J. F. Oil Co.	Hoagland Harold E Jr	Beilschmidt, Wm. 1

FutureGEN 2.0
Date: 10/18/2011

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 0.125 0.25 0.5 Miles

0 0.2 0.4 0.8 Km

Illustration 2: Proposed locations of soil-gas monitoring points.

PURPOSE & PROCEDURE

A survey for protected species and their critical habitat was conducted using best professional practice. Both the US Fish and Wildlife Service and Illinois Department of Natural Resources, Division of Ecosystems and Environment were contacted for a list of potential protected species. Based on this list, the flora and fauna of the proposed impact area were surveyed.

Preliminary Data Collection & Review

Prior to conducting the protected species survey, the Illinois Natural Heritage Database was reviewed using the EcoCAT website (IDNR 2011a) and an inquiry to the IDNR Division of Ecosystems and Environment. The U.S. Fish and Wildlife's "County Distribution of Federally Threatened, Endangered, Proposed and Candidate Species (USFWS 2011)" was also reviewed.

Field Survey

Pedestrian surveys for jurisdictional wetlands and protected species were conducted on the subject property on November 1, 2011. Surveys were performed by Specialized Ecological Services' Consulting Ecologist, Robert Rinella. Vegetation identification was performed by Specialized Ecological Services' Senior Botanist, James Lang. Qualifications are provided in Attachment A.

RESULTS

Preliminary Data Collection & Review

The Illinois Department of Natural Resources website lists 14 state and/or federally protected species as potentially occurring in Morgan County (Table 1) (IDNR 2011b). Consultation with the Ecological Compliance Assessment Tool, “EcoCAT”, found no record of State-listed threatened or endangered species in the vicinity of the project location.

Genus species	Common name	State Status
Agalinis skinneriana	pale false foxglove	threatened
Bartramia longicauda	upland sandpiper	endangered
Boltonia decurrens[1]	decurrent false aster	threatened
Buchnera americana	blue hearts	threatened
Fundulus dispar	starhead topminnow	threatened
Fusconala ebena	ebonyshell	threatened
Hesperia ottoe	ottoe skipper	endangered
Lanius ludovicianus	loggerhead shrike	endangered
Melanthium virginicum	branchflower	threatened
Polygala incarnata	pink milkwort	endangered
Pseudacris illinoensis	Illinois chorus frog	threatened
Schoenoplectus hallii	Hall's bulrush	threatened
Speyeria idalia	regal fritillary	threatened
Tropidoclonion lineatum	lined snake	threatened

Table 1: Threatened and endangered species potentially occurring in Morgan County (as of September 13, 2011).

The U.S. Fish and Wildlife Service's “County Distribution of Federally Threatened, Endangered, Proposed and Candidate Species (USFWS 2011)” lists the Threatened decurrent false aster (*Boltonia decurrens*) with a range that includes Morgan County. USFWS (2011) also lists the Endangered Indiana bat (*Myotis sodalis*) with “potential habitat statewide” but no known occurrence in Morgan County. Finally, USFWS (2011) lists the Threatened eastern prairie fringed orchid (*Platanthaera leucophaea*) with an historic range that includes Morgan County. Lah (2003) notes that the orchid once occurred in 33 counties of northern Illinois but is now only found in 9. There are no known occurrences in Morgan County (IDNR 2011c).

[1]Boltonia decurrens is also Federally threatened.

Of the protected species known to inhabit Morgan County, none are known by state or federal authorities to inhabit the subject area. None of these species were observed during the site visits. Because no impacts are expected, no mitigation is required.

Field Survey

No state or federally protected species were observed during field investigation. The meteorological tower site supports cool-season grasses and common weeds. Various grasses (*Festuca arundinaceae, Phalaris arundinacea, Setaria* spp.) and broadleaf weeds (e.g. *Plantago rugelii*, *Taraxacum officinale,* and *Trifolium* spp.) were the dominant herbaceous species. No woody species were observed.

Soil-Gas monitoring sites, SG-1-SG-6 as well as SG-OGW-1 supported cool-season grasses and common weeds. Various grasses (*Festuca arundinaceae, Setaria* spp.) and broadleaf weeds (e.g. *Plantago rugelii*, *Taraxacum officinale,* and *Trifolium* spp.) were the dominant herbaceous species. No woody species were observed.

At the soil-gas monitoring site, SG-OGW-2, only remnants of agricultural species were observed. In season, it would be planted in agricultural row crops. During field observations, there were no live cultivated species present. Evidence of *Glycine max* and *Zea mays* from previous plantings was observed.

Decurrent False Aster *(Boltonia decurrens)*

The decurrent false aster is a federally threatened species found on moist, sandy floodplains and prairie wetlands along the Illinois River. It relies on periodic flooding to scour away other plants that compete for the same habitat. It requires disturbed alluvial soils.

Field survey revealed no suitable habitat for the decurrent false aster within the proposed project area. Therefore, FutureGen Alliance has determined the project will have no effect on the decurrent false aster.

Indiana Bat (*Myotis sodalis)*

The federally endangered Indiana bat may be found throughout most of the eastern United States. Almost half of all Indiana bats hibernate in caves in southern Indiana. Other states within the current range of the Indiana bat include Alabama, Arkansas, Connecticut, Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia.

Indiana bats weigh approximately one-quarter of an ounce with a wingspan of 9 to 11 inches. Their fur is dark-brown to black. They hibernate during winter in caves or, occasionally, in abandoned mines. During summer they roost under the peeling bark of dead and dying trees. The migratory bat forms nursery colonies under the loose bark and/or in cavities of trees during the summer months (between April 1 and September

30). These nurseries are frequently within stream corridors with well-developed riparian woods.

Field survey revealed no suitable habitat for the Indiana bat within the proposed project area. Therefore, FutureGen Alliance has determined the project will have no effect on the Indiana bat.

Eastern Prairie Fringed Orchid *(Platanthaera leucophaea)*

The federally threatened eastern prairie fringed orchid requires sun and a grassy habitat with little or no woody vegetation. The orchid can be found in mesic to wet prairies. Most populations occur in silt-loam soils derived from loess or glacial till (Bowles 1999). Reproduction from seed is accomplished only with pollination by hawkmoths (Bowles 1999). Seedling establishment is also associated with the development of mycorrhizae with soil-inhabiting fungi (Bowles 1999). The eastern prairie fringed orchid flowers from late June to early July. Flowering may last 7 to 10 days. Seed capsules mature over the growing season and are dispersed by the wind from late August through September.

Originally the species was present in 33 Illinois counties in the northern two thirds of the state. Today, 20 populations may occur in six Illinois counties "concentrated in the Chicago region, and single populations occur in cemetery prairies in eastern and west-central Illinois counties (Bowles 1999 citing Bowles et al 1992). The decline of this species is due to loss of habitat, mainly conversion of natural habitats to cropland and pasture and the drainage and development of wetlands. Other reasons for the current decline include succession to woody vegetation, competition from non-native species and over-collection.

The eastern prairie fringed orchid was not observed during threatened and endangered species field surveys in November 2011 (nor was it observed in previous visits to the site in April of 2011). These surveys revealed no suitable habitat for the eastern prairie fringed orchid within the areas affected by proposed project actions.

The Hoagland pasture, proposed as a site for the meteorological tower, may contain habitat suitable for the eastern prairie fringed orchid. Soils at this site include silt-loam and silty clay loam soils formed in loess. (NRCS 2011). The primary soil type of the area is Tama silt loam, 5 to 10 percent slopes, eroded (NCSS 2011). The native vegetation community of this soil is tall grass prairie (NRCS 2011).

The Hoagland Property has been converted to pasture. Conversion of habitat to agriculture and pasture is one of the main causes of species decline. During field investigation, cool-season grasses were the dominant vegetation type. Regular mowing during the growing season is required to maintain this vegetation community. Interview with the property owner, Butch Hoagland (Hoagland 2011) revealed that the property is mowed twice per year and baled for cattle fodder. Bowles (1999, citing Sheviak 1990) notes that mowing during the growing season may result in "failure to form the next season's flower bud, inducing dormancy or even death the following season."

Although suitable soils for the eastern prairie fringed orchid may occur on the project site, the habitat associated with these soils has been converted to cool-season pasture grasses. Maintenance activities associated with this vegetation community preclude the presence of the eastern prairie fringed orchid. There are no recorded occurrences of this species n the vicinity of the project and recent field surveys indicate it is not present in the project area (IDNR 2011b,c). Therefore, FutureGen Alliance has determined the project will have no effect on the eastern prairie fringed orchid.

LITERATURE CITED

16 USC 1531-1544. 1973. "Endangered Species Act of 1973". *Public Law 93-205.*

520 ILCS 10/11. 1972. "Illinois Endangered Species Protection Act." *Illinois Public Act 77-2186.*

Bowles, M., R. Flakne, and R. Dombeck. 1992. "Status and population fluctuations of the eastern prairie fringed orchid [*Platanthera leucophaea* (Nutt.) Lindl.] in Illinois." Erigenia (Illinois Native Plant Society Bulletin) 12:26-40.

Bowles, M. 1999. "Eastern prairie fringed orchid *Platanthera leucophaea* (Nuttall) Lindley Recovery Plan." U.S. Fish and Wildlife Service, Region 3. 58 pp.

Hoagland, Butch. 2011. Personal communication between Butch Hoagland (property owner) and David Wortman (Patrick Engineering) on May 11, 2011.

Illinois Department of Natural Resources (IDNR). 2011a. "Ecological Compliance Assessment Tool (EcoCAT) Public Website." Accessed 11/15/2011 at http://dnrecocat.state.il.us/ecopublic (last updated November 15, 2011).

Illinois Department of Natural Resources (IDNR). 2011b. "Illinois Endangered Species Protection Board Website." Accessed November 15, 2011 at http://www.dnr.state.il.us/espb/index.htm

Illinois Department of Natural Resources (IDNR). 2011c. "Illinois Natural Heritage Database Spatial Data." Illinois Natural Heritage Database Program. Email from Tara Kieninger (IDNR) to Amanda Stegen (Battelle).

Lah, Kris. 2003. "Recovering a Prairie Orchid". Endangered Species Bulletin, Volume 28, Number 4. pp 14-15.

National Cooperative Soil Service (NCSS). 2011. "*NCSS Web Soil Survey.*" Accessed November 15, 2011 at http://websoilsurvey.nrcs.usda.gov/app/ (last updated April 12, 2011).

Sheviak, C.J. 1990. Biological considerations in the management of temperate terrestrial orchids. In: R.S. Mitchell, C.J. Sheviak, and D.J. Leopold, editors. Ecosystem management: Rare species and significant habitats. Proceedings of the 15th annual Natural Areas Conference. New York State Museum Bulletin No. 471. P 194-196.

United States Department of Agriculture Natural Resource Conservation Service. 2011. "Official Soil Series Descriptions (OSD) with series extent mapping capabilities" website. Accessed November 15, 2011 at http://soils.usda.gov/technical/classification/osd/index.html (last updated August 19, 2011).

United States Fish and Wildlife Service (USFWS). 2011. "County Distribution of Federally Threatened, Endangered, Proposed and Candidate Species" website. Accessed November 15, 2011 at http://www.fws.gov/midwest/endangered/lists/illinois-spp.html (last updated July 18, 2011).

ATTACHMENT A: RESEARCHER QUALIFICATIONS

Bob Rinella, Environmental Professional and Wetland Ecologist, Specialized Ecological Services. Three years with Southern Illinois University Cooperative Wildlife Research Laboratory, fifteen years with Specialized Ecological Services. Eighteen (18) years experience with environmental research including wetlands, plant biology, wildlife biology, and environmental planning. Master of Science in Environmental Studies at Southern Illinois University, Bachelor of Science in Biology at Jacksonville University.

James Lang, PhD., Senior Botanist, Specialized Ecological Services. Twenty five (25) years with Greenville College, thirteen years with Specialized Ecological Services. Over thirty five (35) years experience with plant biology and endangered species research. Doctorate in Botany at Iowa University, Master of Science in Botany and Bachelor of Arts in Science at University of Arkansas.

Eric Ahern, Environmental Technician, Specialized Ecological Services. Two years with Zahniser Institute for Environmental Studies, nine years with Specialized Ecological Services. Eleven (11) years experience in environmental research including lacustrine water quality studies, wetland restoration, and GIS/GPS mapping. Master of Science in Education at University of Phoenix and Bachelor of Arts in Biology at Greenville College.

ATTACHMENT B: DOCUMENTATION & CORRESPONDENCE

EcoCAT
Ecological Compliance Assessment Tool

Applicant:	FutureGen Alliance	*IDNR Project #:*	1205363
Contact:	Ronald Swager	Date:	11/15/2011
Address:	300 W. Edwards Suite 200 Springfield, IL 62704		

Project: FutureGen 2 - Met Tower & Soil-Gas Monitoring
Address: 2907 Beilschmidt Rd, Alexander

Description: Installation of a meteorological tower and several soil-gas monitoring stations.

Natural Resource Review Results

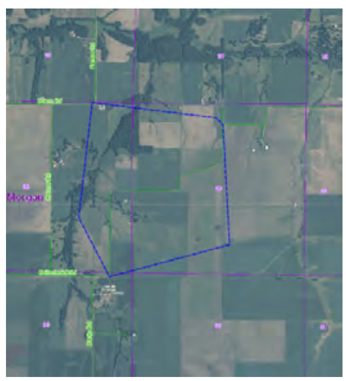
The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Morgan

Township, Range, Section:
16N, 9W, 25
16N, 9W, 26
16N, 9W, 35



IL Department of Natural Resources Contact
Rick Pietruszka
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
Federal Energy Regulatory Commission

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

Terms of Use

By using this website, you acknowledge that you have read and agree to these terms. These terms may be revised by IDNR as necessary. If you continue to use the EcoCAT application after we post changes to these terms, it will mean that you accept such changes. If at any time you do not accept the Terms of Use, you may not continue to use the website.

1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.

2. Unauthorized attempts to upload, download, or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act.

3. IDNR reserves the right to enhance, modify, alter, or suspend the website at any time without notice, or to terminate or restrict access.

Security

EcoCAT operates on a state of Illinois computer system. We may use software to monitor traffic and to identify unauthorized attempts to upload, download, or change information, to cause harm or otherwise to damage this site. Unauthorized attempts to upload, download, or change information on this server is strictly prohibited by law.

Unauthorized use, tampering with or modification of this system, including supporting hardware or software, may subject the violator to criminal and civil penalties. In the event of unauthorized intrusion, all relevant information regarding possible violation of law may be provided to law enforcement officials.

Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

INTENTIONALLY LEFT BLANK

APPENDIX E4

PROTECTED SPECIES SURVEY FOR PROPOSED FUTUREGEN DEVELOPMENT (STRATIGRAPHIC WELL)

INTENTIONALLY LEFT BLANK

Protected Species Survey

Proposed FutureGen Development
Morgan County, Illinois

Date: May 25, 2011

Prepared for FutureGen Alliance

under contract with:

Patrick Engineering
300 West Edwards Street, Suite 200
Springfield, Illinois 62704
(630)795-7200

Prepared by:

Specialized Ecological Services
P.O. Box 136
105 East Oak Street
Greenville, IL 62246

INTRODUCTION

This report documents an investigation of state and federal threatened and endangered species in the vicinity of proposed construction of FutureGen Industrial Alliance, Inc. facilities near Jacksonville, Illinois. Our investigation includes two possible characterization pad areas (the Beilschmidt Property and the Hoagland Property), several truck pull-offs and road modifications on Beilschmidt Road, and widening and extending an existing farm access road.

The Endangered Species Act of 1973 (as amended), 16 USC 1531-1544

The Endangered Species Act (16 USC 1531-1544) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The U.S. Fish and Wildlife Service (USFWS) maintains the list of endangered and threatened species. Species include birds, insects, fish, amphibians, reptiles, mammals, crustaceans, flowers, grasses, and trees. The law prohibits any action, administrative or real, that results in a "taking" of a listed species or an adverse impact to their habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

Endangered Species Protection Act of 1972, 520 ILCS 10/11

The Illinois Endangered Species Protection Act (520 ILCS 10/11) is administered by the Illinois Department of Natural Resources, Endangered Species Protection Board. Procedures for coordination and consultation with the Board are described in the Illinois Administrative Code, Consultation Procedures for Assessing Impacts of Agency Actions on Endangered and Threatened Species. Species are protected if they meet at least one of four definitions:

- Federally Endangered Species: Any species that is in danger of extinction throughout all or a significant portion of its range.
- Federally Threatened Species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- State Endangered Species: Any species that is in danger of extinction as a breeding species in Illinois.
- State Threatened Species: Any breeding species that is likely to become a state endangered species within the foreseeable future in Illinois.

This Act requires agencies of state and local governments to evaluate, through a consultation process with IDNR, whether actions authorized, funded, or implemented by them are likely to jeopardize the continued existence of Illinois-listed threatened or endangered species or are likely to result in the destruction or adverse modification of the designated essential habitat of such species. When an agency has so consulted, and its action is determined not to adversely impact any Illinois listed species or critical habitat of such species, the agency shall be deemed to have complied with its obligations under the Act.

STUDY AREA

Beilschmidt Characterization Pad

The Beilschmidt Characterization Pad is located approximately 6 miles north of Alexander, Illinois. This property occupies a 700 ft X 700 ft portion of the northeastern quarter of the southeastern quarter of Section 25, Township 16 North, Range 9 West, 3rd Prime Meridian, in Morgan County. The area of the site is approximately 11.25 acres. Topography within the site ranged between 540 and 570 feet msl. The property contains agricultural fields.

Hoagland Characterization Pad

The Hoagland Characterization Pad is also located approximately 6 miles north of Alexander, Illinois. This property occupies a 500 ft X 1340 ft portion of the eastern half of the northwestern quarter of Section 25, Township 16 North, Range 9 West, 3rd Prime Meridian, in Morgan County. The area of the site is approximately 15.38 acres. Topography within the site ranged between 540 and 570 feet msl. The property contains agricultural fields and grassed pasture.

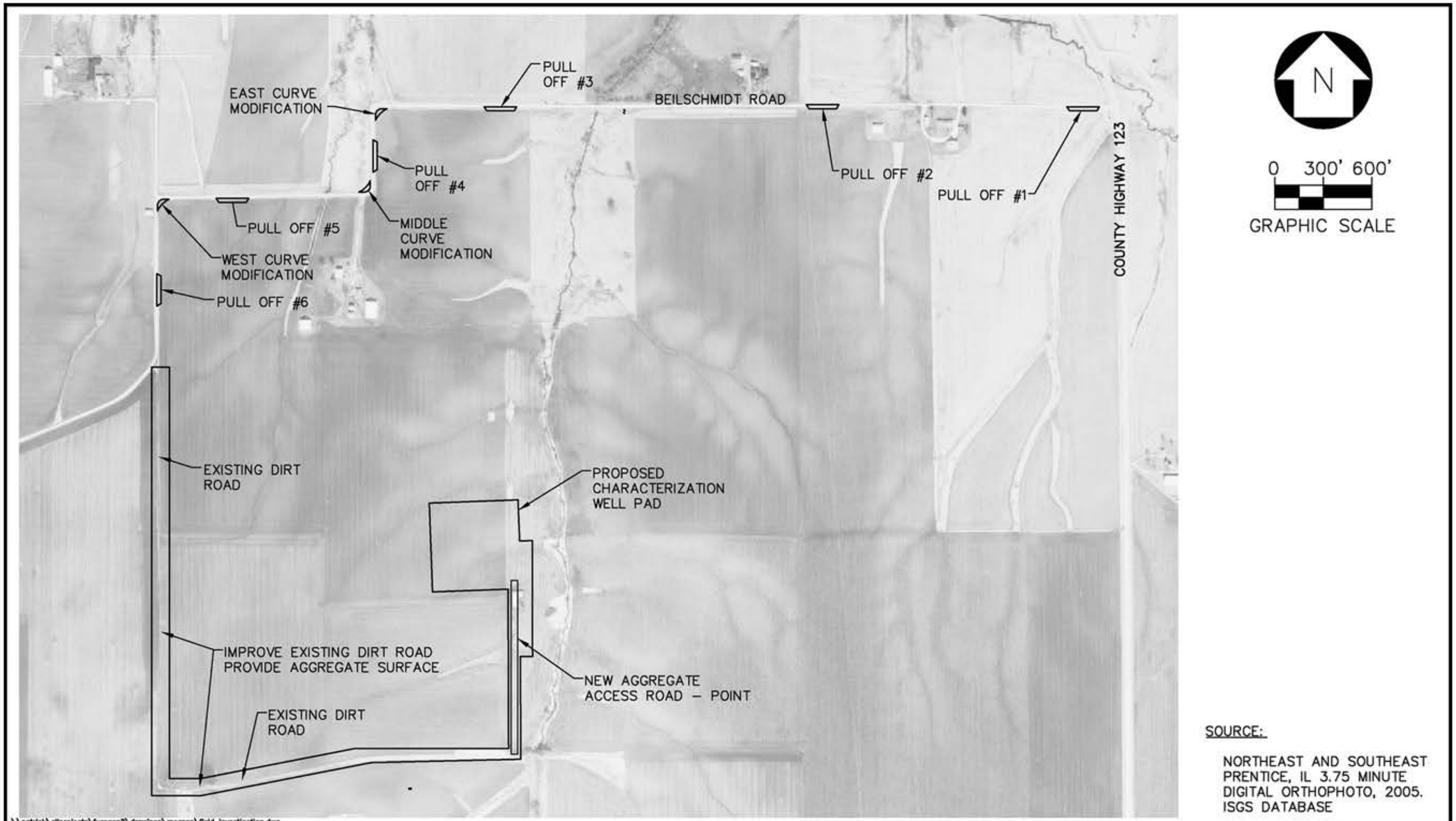
Beilschmidt Road Improvements

Improvements to Beilschmidt Road include 5 truck pull-off areas and modifications to three curves. These improvements are necessary to allow large trucks to safely access Characterization Pads during construction. The first truck pull-off is located at the intersection of County Highway 123 and Beilschmidt Road, on the south side of Beilschmidt Road. Another pull-off is located approximately 1750 feet west of County Highway 123 on the south side of Beilschmidt Road. A third pull-off is located approximately 3540 feet west of County Highway 123 on the south side of Beilschmidt Road. A fourth pull-off is located approximately 1 mile west of County Road 123 on the south side of Beilschmidt Road. The fifth truck pull-off is located adjacent to the Hoagland Characterization Pad on the east side of Beilschmidt Road. Each of these pull-off sites measures approximately 30 ft by 150 ft.

Between County Highway 123 and the existing farm access road (described below), Beilschmidt Road makes three 90^{o} curves. Modifications to the road alignment would affect areas on the inside of these curves. The first corner area of impact includes a triangular area 150 feet wide by 150 feet long south and east of Beilschmidt road approximately 4500 feet west of County Highway 123. Approximately 500 feet south from the first curve, a second area of impact includes a triangular area 150 feet wide by 150 feet long on the north and west sides of Beilschmidt Road. Approximately 1350 feet further west, an area of impact approximately 150 feet wide by 150 feet long is located on the south and east sides of Beilschmidt Road.

Farm Road Improvement and Extension

The existing farm access road begins near the northwest corner of the Beilschmidt farm. This unnamed road extends south from its intersection with Beilschmidt Road for approximately 2580 feet along the wester border of the Beilschmidt farm. The road continues east, bisecting the Martin Property, approximately 2170 feet. An extension of this road northward approximately 870 feet, roughly parallel to the eastern border of the Beilschmidt farm, would allow access to the Beilschmidt Characterization Pad.



PATRICK ENGINEERING INC.
300 W. EDWARDS ST. SUITE 200 TEL. (217) 525-7050
SPRINGFIELD, IL 62704-1907 FAX (217) 525-7053
http://www.patrickengineering.com
PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000409

FUTUREGEN INDUSTRIAL ALLIANCE, INC
MORGAN COUNTY SITE

FIELD INVESTIGATION LOCATIONS

DATE: 5/24/11
PROJ. NO.: 21003.017
APP. BY: JWD

PURPOSE & PROCEDURE

A survey for protected species and their critical habitat was conducted using best professional practice. Both the US Fish and Wildlife Service and Illinois Department of Natural Resources, Division of Ecosystems and Environment were contacted for a list of potential protected species. Based on this list, the flora and fauna of the proposed impact area were surveyed.

Preliminary Data Collection & Review

Prior to conducting the protected species survey, the Illinois Natural Heritage Database was reviewed using the EcoCAT website (IDNR 2011a) and an inquiry to the IDNR Division of Ecosystems and Environment. The U.S. Fish and Wildlife's "County Distribution of Federally Threatened, Endangered, Proposed and Candidate Species (USFWS 2011)" was also reviewed.

Field Survey

Pedestrian surveys for jurisdictional wetlands and protected species were conducted on the subject property on April 27, 2011. Surveys were performed by Specialized Ecological Services' Consulting Ecologist, Robert Rinella. Vegetation identification was performed by Specialized Ecological Services' Senior Botanist, James Lang. Qualifications are provided in Attachment A.

RESULTS

Preliminary Data Collection & Review

The Illinois Department of Natural Resources website lists 14 state and/or federally protected species as potentially occurring in Morgan County (Table 1) (IDNR 2011b). Consultation with the Ecological Compliance Assessment Tool, "EcoCAT", found no record of State-listed threatened or endangered species in the vicinity of the project location.

Genus species	Common name	State Status
Agalinis skinneriana	pale false foxglove	threatened
Bartramia longicauda	upland sandpiper	endangered
Boltonia decurrens[1]	decurrent false aster	threatened
Buchnera americana	blue hearts	threatened
Fundulus dispar	starhead topminnow	threatened
Fusconala ebena	ebonyshell	threatened
Hespeia ottoe	ottoe skipper	endangered
Lanius ludovicianus	loggerhead shrike	endangered
Melanthium virginicum	branchflower	threatened
Polygala incarnata	pink milkwort	endangered
Pseudacris illinoensis	Illinois chorus frog	threatened
Schoenoplectus hallii	Hall's bulrush	threatened
Speyeria idalia	regal fritillary	threatened
Tropidoclonion lineatum	lined snake	threatened

Table 1: Threatened and endangered species potentially occurring in Morgan County (as of April 12, 2011).

The U.S. Fish and Wildlife Service's "County Distribution of Federally Threatened, Endangered, Proposed and Candidate Species (USFWS 2011)" lists the Threatened decurrent false aster (*Boltonia decurrens*) with a range that includes Morgan County. USFWS (2011) also lists the Endangered Indiana bat (*Myotis sodalis*) with "potential habitat statewide" but no known occurrence in Morgan County. Finally, USFWS (2011) lists the Threatened eastern prairie fringed orchid (*Platanthaera leucophaea*) with an historic range that includes Morgan County. Lah (2003) notes that the orchid once occurred in 33 counties of northern Illinois but is now only found in 9. There are no known occurrences in Morgan County (IDNR 2011c).

[1]Boltonia decurrens is also Federally threatened.

Of the protected species known to inhabit Morgan County, none are known by state or federal authorities to inhabit the subject area. None of these species were observed during the site visits. Because no impacts are expected, no mitigation is required.

Field Survey

No state or federally protected species were observed during field investigation. The Beilschmidt Characterization Pad supports a single vegetation community, agricultural row crops. Common species observed include *Barbarea vulgaris, Capsella bursa-pastoris, Conium maculatum, Erigeron canadensis, Lamium amplexicaule, Rananculus abortivus,* and *Stellaria media.* The Hoagland Characterization Pad and project areas associated with improvements to Beilschmidt Road support cool-season grasses and common weeds. Various grasses (*Festuca arundinaceae, Phalaris arundinacea, Setaria* spp.) and broadleaf weeds (*Barbarea vulgaris, Lamium amplexicaule, Rumex chrispus, Taraxacum officinale,* and *Thalaspia arvense*) were the dominant herbaceous species. No woody species were observed. The project areas associated with the improvement and extension of the existing farm access road contain primarily cool-season grasses and common weeds, but also areas of agricultural row crop.

Decurrent False Aster *(Boltonia decurrens)*

The decurrent false aster is a federally threatened species found on moist, sandy floodplains and prairie wetlands along the Illinois River. It relies on periodic flooding to scour away other plants that compete for the same habitat. It requires disturbed alluvial soils.

Field survey revealed no suitable habitat for the decurrent false aster within the proposed project area. Therefore, FutureGen Alliance has determined the project will have no effect on the decurrent false aster.

Indiana Bat (*Myotis sodalis)*

The federally endangered Indiana bat may be found throughout most of the eastern United States. Almost half of all Indiana bats hibernate in caves in southern Indiana. Other states within the current range of the Indiana bat include Alabama, Arkansas, Connecticut, Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia.

Indiana bats weigh approximately one-quarter of an ounce with a wingspan of 9 to 11 inches. Their fur is dark-brown to black. They hibernate during winter in caves or, occasionally, in abandoned mines. During summer they roost under the peeling bark of dead and dying trees. The migratory bat forms nursery colonies under the loose bark and/or in cavities of trees during the summer months (between April 1 and September 30). These nurseries are frequently within stream corridors with well-developed riparian woods.

Field survey revealed no suitable habitat for the Indiana bat within the proposed project area. Therefore, FutureGen Alliance has determined the project will have no effect on the Indiana bat.

Eastern Prairie Fringed Orchid *(Platanthaera leucophaea)*

The federally threatened eastern prairie fringed orchid requires sun and a grassy habitat with little or no woody vegetation. The orchid can be found in mesic to wet prairies. Most populations occur in silt-loam soils derived from loess or glacial till (Bowles 1999). Reproduction from seed is accomplished only with pollination by hawkmoths (Bowles 1999). Seedling establishment is also associated with the development of mycorrhizae with soil-inhabiting fungi (Bowles 1999). The eastern prairie fringed orchid flowers from late June to early July. Flowering may last 7 to 10 days. Seed capsules mature over the growing season and are dispersed by the wind from late August through September.

Originally the species was present in 33 Illinois counties in the northern two thirds of the state. Today, 20 populations may occur in six Illinois counties "concentrated in the Chicago region, and single populations occur in cemetery prairies in eastern and west-central Illinois counties (Bowles 1999 citing Bowles et al 1992). The decline of this species is due to loss of habitat, mainly conversion of natural habitats to cropland and pasture and the drainage and development of wetlands. Other reasons for the current decline include succession to woody vegetation, competition from non-native species and over-collection.

The eastern prairie fringed orchid was not observed during threatened and endangered species field surveys in April 2011. These surveys revealed no suitable habitat for the eastern prairie fringed orchid at the Beilschmidt Characterization Pad, Beilschmidt Road improvement areas, or farm access road improvement/extension areas.

The Hoagland Characterization Pad may contain habitat suitable for the eastern prairie fringed orchid. Soils at this site include silt-loam and silty clay loam soils formed in loess. (NRCS 2011). The primary soil type of the area is Tama silt loam, 5 to 10 percent slopes, eroded (NCSS 2011). The native vegetation community of this soil is tall grass prairie (NRCS 2011).

The Hoagland Property has been converted to pasture. Conversion of habitat to agriculture and pasture is one of the main causes of species decline. During field investigation, cool-season grasses were the dominant vegetation type. Regular mowing during the growing season is required to maintain this vegetation community. Interview with the property owner, Butch Hoagland (Hoagland 2011) revealed that the property is mowed twice per year and baled for cattle fodder. Bowles (1999, citing Sheviak 1990) notes that mowing during the growing season may result in "failure to form the next season's flower bud, inducing dormancy or even death the following season."

Although suitable soils for the eastern prairie fringed orchid may occur on the project site, the habitat associated with these soils has been converted to cool-season pasture grasses. Maintenance activities associated with this vegetation community preclude the presence of the eastern prairie fringed orchid. There are no recorded occurrences of this species n the vicinity of the project and recent field surveys indicate it is not present in the project area (IDNR 2011b,c). Therefore, FutureGen Alliance has determined the project will have no effect on the eastern prairie fringed orchid.

LITERATURE CITED

16 USC 1531-1544. 1973. "Endangered Species Act of 1973". *Public Law 93-205.*

520 ILCS 10/11. 1972. "Illinois Endangered Species Protection Act." *Illinois Public Act 77-2186.*

Bowles, M., R. Flakne, and R. Dombeck. 1992. "Status and population fluctuations of the eastern prairie fringed orchid [*Platanthera leucophaea* (Nutt.) Lindl.] in Illinois." Erigenia (Illinois Native Plant Society Bulletin) 12:26-40.

Bowles, M. 1999. "Eastern prairie fringed orchid *Platanthera leucophaea* (Nuttall) Lindley Recovery Plan." U.S. Fish and Wildlife Service, Region 3. 58 pp.

Hoagland, Butch. 2011. Personal communication between Butch Hoagland (property owner) and David Wortman (Patrick Engineering) on May 11, 2011.

Illinois Department of Natural Resources (IDNR). 2011a. "Ecological Compliance Assessment Tool (EcoCAT) Public Website." Accessed 4/28/2011 at http://dnrecocat.state.il.us/ecopublic (last updated April 28, 2011).

Illinois Department of Natural Resources (IDNR). 2011b. "Illinois Endangered Species Protection Board Website." Accessed May 16, 2011 at http://www.dnr.state.il.us/espb/index.htm

Illinois Department of Natural Resources (IDNR). 2011c. "Illinois Natural Heritage Database Spatial Data." Illinois Natural Heritage Database Program. Email from Tara Kieninger (IDNR) to Amanda Stegen (Battelle).

Lah, Kris. 2003. "Recovering a Prairie Orchid". Endangered Species Bulletin, Volume 28, Number 4. pp 14-15.

National Cooperative Soil Service (NCSS). 2011. "*NCSS Web Soil Survey.*" Accessed May 1, 2011 at http://websoilsurvey.nrcs.usda.gov/app/ (last updated November 11, 2009).

Sheviak, C.J. 1990. Biological considerations in the management of temperate terrestrial orchids. In: R.S. Mitchell, C.J. Sheviak, and D.J. Leopold, editors. Ecosystem management: Rare species and significant habitats. Proceedings of the 15th annual Natural Areas Conference. New York State Museum Bulletin No. 471. P 194-196.

United States Department of Agriculture Natural Resource Conservation Service. 2011. "Official Soil Series Descriptions (OSD) with series extent mapping capabilities" website. Accessed 5/5/2011 at http://soils.usda.gov/technical/classification/osd/index.html (last updated January 24, 2011).

United States Fish and Wildlife Service (USFWS). 2011. "County Distribution of Federally Threatened, Endangered, Proposed and Candidate Species" website. Accessed 5/1/2011 and 5/5/2011 at http://www.fws.gov/midwest/endangered/lists/illinois-spp.html (last updates May 5, 2011).

ATTACHMENT A: RESEARCHER QUALIFICATIONS

Bob Rinella, Environmental Professional and Wetland Ecologist, Specialized Ecological Services. Three years with Southern Illinois University Cooperative Wildlife Research Laboratory, fifteen years with Specialized Ecological Services. Eighteen (18) years experience with environmental research including wetlands, plant biology, wildlife biology, and environmental planning. Master of Science in Environmental Studies at Southern Illinois University, Bachelor of Science in Biology at Jacksonville University.

James Lang, PhD., Senior Botanist, Specialized Ecological Services. Twenty five (25) years with Greenville College, thirteen years with Specialized Ecological Services. Over thirty five (35) years experience with plant biology and endangered species research. Doctorate in Botany at Iowa University, Master of Science in Botany and Bachelor of Arts in Science at University of Arkansas.

Eric Ahern, Environmental Technician, Specialized Ecological Services. Two years with Zahniser Institute for Environmental Studies, nine years with Specialized Ecological Services. Eleven (11) years experience in environmental research including lacustrine water quality studies, wetland restoration, and GIS/GPS mapping. Master of Science in Education at University of Phoenix and Bachelor of Arts in Biology at Greenville College.

ATTACHMENT B: DOCUMENTATION & CORRESPONDENCE

Applicant:	FutureGen Alliance		*IDNR Project #:*	1112068
Contact:	Ronald Swager		Date:	04/28/2011
Address:	300 W. Edwards Suite 200 Springfield, IL 62704			

Project: FutureGen 2
Address: 2907 Beilschmidt Rd, Alexander

Description: Construction of Characterization and Injection wells for the purpose of sequestering CO2

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)
The Illinois Natural Heritage Database contains no record of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois Nature Preserves, or registered Land and Water Reserves in the vicinity of the project location.

Consultation is terminated. This consultation is valid for two years unless new information becomes available that was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the project has not been implemented within two years of the date of this letter, or any of the above listed conditions develop, a new consultation is necessary. Termination does not imply IDNR's authorization or endorsement.

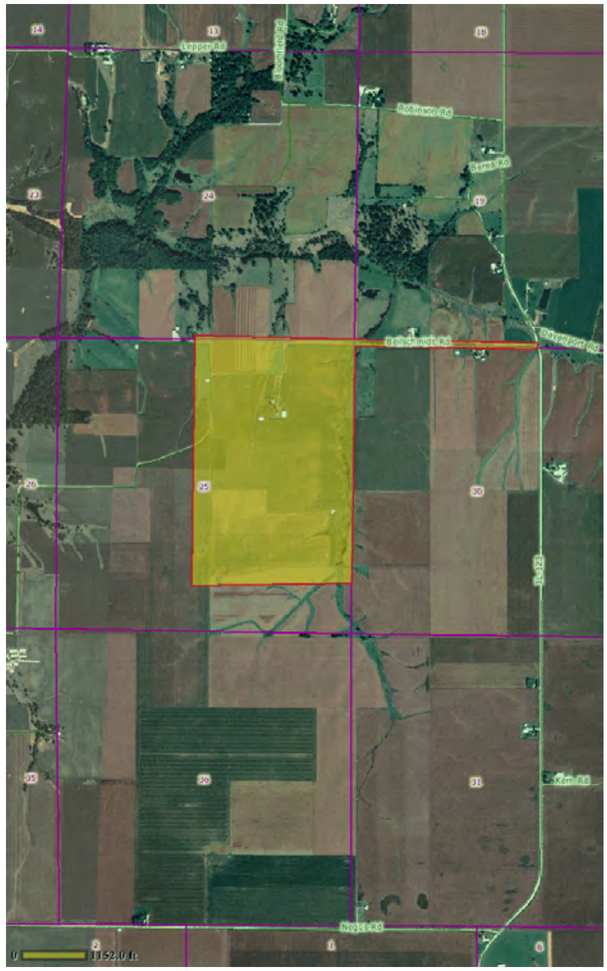
Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Morgan

Township, Range, Section:

16N, 8W, 19
16N, 8W, 30
16N, 9W, 24
16N, 9W, 25



IL Department of Natural Resources Contact

Tracy Evans
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction

IL Army National Guard
Ronald Swager
Patrick Engineering
300 W. Edwards St.
Springfield, Illinois 62704-1907

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

Terms of Use

By using this website, you acknowledge that you have read and agree to these terms. These terms may be revised by IDNR as necessary. If you continue to use the EcoCAT application after we post changes to these terms, it will mean that you accept such changes. If at any time you do not accept the Terms of Use, you may not continue to use the website.

1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.

2. Unauthorized attempts to upload, download, or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act.

3. IDNR reserves the right to enhance, modify, alter, or suspend the website at any time without notice, or to terminate or restrict access.

Security

EcoCAT operates on a state of Illinois computer system. We may use software to monitor traffic and to identify unauthorized attempts to upload, download, or change information, to cause harm or otherwise to damage this site. Unauthorized attempts to upload, download, or change information on this server is strictly prohibited by law.

Unauthorized use, tampering with or modification of this system, including supporting hardware or software, may subject the violator to criminal and civil penalties. In the event of unauthorized intrusion, all relevant information regarding possible violation of law may be provided to law enforcement officials.

Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

INTENTIONALLY LEFT BLANK

APPENDIX F

Cultural Surveys

F1 – Draft Programmatic Agreement

F2 – Phase I – Site Characterization Locale Survey

F3 – Phase I – Meredosia Energy Center Survey

F4 – Phase I – Bluff Area Pipeline Right-of-Way Survey

F5 – Phase I – Soil Gas Monitoring Locations Survey

for the

Draft Environmental Impact Statement
FutureGen 2.0 Project
Meredosia, Illinois (Morgan County)

DOE/EIS-0460D
April 2013

INTENTIONALLY LEFT BLANK

APPENDIX F1

DRAFT PROGRAMMATIC AGREEMENT

INTENTIONALLY LEFT BLANK

PROGRAMMATIC AGREEMENT
AMONG
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION, THE ILLINOIS HISTORIC PRESERVATION AGENCY, THE FUTUREGEN ALLIANCE, AND THE U.S. DEPARTMENT OF ENERGY
REGARDING THE DESIGN, CONSTRUCTION, AND OPERATION OF THE FUTUREGEN 2.0 PROJECT, AN OXY-COMBUSTION POWER GENERATION FACILITY, PIPELINE, AND CO_2 STORAGE RESERVOIR PROJECT
IN MORGAN COUNTY, ILLINOIS

WHEREAS, the FutureGen Alliance (Alliance) proposes to construct and operate the FutureGen 2.0 Project (Project), including the modification of an existing Meredosia Power Generation Station near Meredosia, Illinois; construction of approximately 30 miles of a carbon dioxide (CO_2) transport pipeline; and the development of surface and subsurface facilities for the injection of CO_2 in an underground storage field. The Project will include associated above and below ground facilities such as pump stations, transmission facilities, access roads, and injection and monitoring wells) and ancillary facilities (such as utilities, office and visitor space, temporary workplace areas, and contractor lay down yards); and

WHEREAS, the Alliance has entered into a Cooperative Agreement with the United States Department of Energy (DOE) in order to secure cost-shared funding for the construction of the Project;

WHEREAS, DOE recognizes its role as the "Agency Official" responsible for ensuring that, in the provision of financial assistance for the Project, DOE complies with Section 106 of *the National Historic Preservation Act (NHPA)* (16 U.S.C. 470f, as amended), and its implementing regulations, "*Protection of Historic Properties*," (36 CFR § 800.14(b)); and

WHEREAS, DOE has determined that the activities associated with the construction and operation of the Project may have an adverse effect on properties that are listed in or eligible for the National Register of Historic Places (NRHP), and has consulted with the Illinois State Historic Preservation Officer (SHPO) and Native American Tribes pursuant to 36 CFR § 800; and

WHEREAS, DOE intends to use the provisions of this Programmatic Agreement (PA) to address applicable requirements of Sections 106 of the *National Historic Preservation Act (NHPA)*, as amended (16 U.S.C. 470f and 470h-2(f)); and

WHEREAS, the Alliance acknowledges (as the Project's managing and operating contractors and recipients of Federal funding) their responsibility for preparing the necessary information and analysis for *National Historic Preservation Act* (NHPA) compliance, pursuant to 36 CFR § 800.2(a)(3); and

WHEREAS, the Alliance, which proposes to construct and operate the FutureGen 2.0 Project, has participated in consultations, has been invited by DOE under 36 CFR § 800.2(c)(4) and 800.6(c)(2) to sign this agreement as an invited signatories, and intends to sign said agreement; and

WHEREAS, the definitions listed in 36 CFR § 800 are applicable throughout this Programmatic Agreement; and

NOW, THEREFORE, the signatories to this Programmatic Agreement agree that the Undertaking shall be implemented in accordance with the following stipulations which the signatories agree will ensure all necessary compliance with the relevant provisions of the NHPA.

Stipulations

I. Professional Qualifications Standards

All actions prescribed by this Agreement that involve the identification, evaluation, analysis, recording, treatment, monitoring, or disposition of historic properties, or that involve the reporting or documentation of such actions in the form of reports, forms, or other records, shall be carried out by or under the direct supervision of a person or persons who meets, at a minimum, the qualifications for history, archaeology, or architectural history specified in the Secretary of Interior's "*Professional Qualifications Standards*" (36 CFR § 800.2(a)(1)) and (48 FR 44739-190), as appropriate.

II. Identification and Evaluation of Potential Historic Properties

A. Identification of Historic Properties

1) The Alliance will take all measures necessary to discover, preserve, and avoid significant historic properties listed on or eligible for listing on the National Register of Historic Places (NRHP). Under consultation with the SHPO, the Alliance will describe and define the Area of Potential Effect (hereafter referred to as the APE) in accordance with the definition contained in 36 CFR § 800.16(d). The APE may be modified upon consultation with the SHPO to facilitate avoidance and will be documented through the implementation of historic property surveys and testing, documentary research, recordation, and other investigation data. The APE may be amended without amending the Programmatic Agreement. The APE may be amended by agreement of the signatories and shall be memorialized in writing.
2) The Alliance will ensure that all reconnaissance surveys and subsurface testing are conducted in a manner consistent with the Secretary of the Interior's *Standards and Guidelines for Identification and Evaluation* (48 FR 44720-23) and take into account the National Park Service publication "*The Archaeological Survey: Method and Uses*" (1978) and any extant or most recent version of

appropriate SHPO guidelines for historic properties reconnaissance survey/reports, related guidance, etc.

B. Evaluation of Historic Properties

1) In consultation with the SHPO, the Alliance will evaluate the eligibility of significant historic properties by applying the National Register of Historic Places (NRHP) criteria (36 CFR § 60.4).
2) For those properties that the SHPO agrees are not eligible for inclusion in the NRHP, no further historic properties investigations will be required, and Project activities may proceed in those areas.
3) If the survey results in the identification of properties that the SHPO agrees are eligible for inclusion on the NRHP, the Alliance shall treat such properties in accordance with Part III below.
4) If the Alliance and the SHPO do not agree on NRHP eligibility, or if the ACHP or the National Park Service so request, DOE will request a formal determination of eligibility from the Keeper of the NRHP, National Park Service, whose determination shall be final.
5) Relative to the treatment of historic properties and the identification of traditional cultural properties, DOE and/or the SHPO will provide the appropriate Tribe(s) and the Tribal Historic Preservation Officer(s) (THPO) information related to the treatment measures proposed by the Alliance.

III. Treatment of Historic Properties

Those individual historic properties that DOE and the SHPO agree are eligible for nomination to, or that the Keeper has determined are eligible for inclusion on the NRHP, will be treated in the following manner:

1) If DOE, in consultation with the SHPO, determines that no other actions are feasible to avoid and minimize effect to archaeological properties, then the Alliance will develop a treatment plan, which may include various levels of data recovery, recordation, documentation, and active protection measures. Alliance will implement the treatment plan in consultation with DOE and the SHPO.
2) If data recovery is the agreed-upon treatment, the data recovery plan will address substantive research questions developed in consultation with the SHPO. The treatment plan shall be consistent with the Secretary of the Interior's *Standards and Guidelines for Archaeological Documentation* (48 FR 44734-37) and take into account the ACHP's publication *Treatment of Archaeological Properties* (1980) and pertinent SHPO guidance. It will specify, at a minimum, the following:

    a. The property, properties, or portions of properties where the treatment plan is to be carried out;
    b. The research questions to be addressed, with an explanation of research relevance and importance;

   c. The methods to be used, with an explanation of methodological relevance to the research questions;
   d. Proposed methods of dissemination results of the work to the interested public; and
   e. Proposed schedule for the submission of the results to the SHPO.

3) The Alliance will submit the treatment plan to DOE and/or the SHPO for 30 days' review and comment. The Alliance will take into account DOE and/or SHPO comment(s) and will ensure that the data recovery plan is implemented.
4) The Alliance will ensure that the treatment plan is carried out by or under the direct supervision of an archaeologist(s), architectural historian(s), and/or other appropriate cultural resource specialist that meets, at a minimum, the Secretary of the Interior's *Professional Qualifications Standards* (48 FR 44738-9).
5) The Alliance will ensure that adequate provisions, including personnel, equipment, and laboratory space is available for the analysis and temporary curation of materials, artifacts, and biological specimens recovered from historic properties.
6) The Alliance will develop and implement an adequate program in consultation with the SHPO to secure and protect historic properties from vandalism during the process of data recovery.

IV. Treatment of Human Remains, Funerary Objects, Sacred Objects, or Objects of Cultural Patrimony

A. When human remains, funerary objects, sacred objects, or objects of cultural patrimony are encountered or collected, the Alliance will comply with all provisions outlined in applicable Federal or state law, regulations, guidance, provisions, etc., and any decisions regarding the treatment of human remains will be made recognizing the rights of lineal descendants, Tribes and other recognized Native American groups in consultation with the SHPO, THPO, and /or other appropriate legal authority regarding the evaluation, assessment, documentation, and disposition of remains or objects.

B. If burials are discovered during the investigations covered by this PA, the Alliance shall ensure that required notifications of the discovery will be made to the county coroner and the SHPO as stipulated in *the Human Skeletal Remains Protection Act* (20 ILCS 3440, 17 IAC 4170). Then, following authorization under *the Human Skeletal Remains Protection Act* (20 ILCS 3440, 17 IAC 4170) and its rules, human burials, human remains, and any associated burial artifacts will be removed following procedures for recordation and reporting that are similar to those established under the *Human Skeletal Remains Protection Act* (20 ILCS 3440, 17 IAC 4170). No excavation of human remains will be performed except under the direction of a "Certified Skeletal Analyst" (17 IAC 4170.300(f)).

V. Unexpected Discoveries

The Alliance will notify DOE and the SHPO as soon as practicable if it appears that the Project will affect a previously unidentified property that may be eligible for the NRHP or affect a known historic property in an unanticipated manner.

1) The Alliance will stop construction activities in the vicinity of the discovery and will take all reasonable measures to avoid or minimize harm to the property until consultation with the SHPO. (In the case of human remains, The Alliance will notify the appropriate agencies as detailed in Part IV, subpart B of this PA.)
2) DOE will notify the SHPO at the earliest possible time and consult with the SHPO to develop actions that will take into account the effects of the Project. DOE will notify the SHPO of any time constraints, and DOE and the SHPO will mutually agree upon time frames for this consultation.
3) The Alliance may participate in this consultation.
4) DOE will provide the SHPO with written recommendations that take the effect of the Project into account.
5) If the SHPO does not object to DOE's recommendations within the agreed upon time frame, DOE will require the Alliance to modify the activities as necessary to implement the recommendations.

VI. Dispute Resolution

A. Should the SHPO, the ACHP, the Alliance or any other consulting party object within time frames provided by this PA to any plans, specifications, or actions provided for review pursuant to this Agreement, DOE will consult further with the objecting party to seek resolution.

B. Should DOE object within time frames provided by this PA to any plans, specifications, or actions provided for review pursuant to this Agreement, DOE will consult further with the other parties to seek resolution. If DOE determines within 14 days of receipt that the SHPO, the ACHP, or the Alliance objection cannot be resolved, DOE will forward to the ACHP all documentation relevant to the dispute including DOE's proposed resolution to the objection.

C. Any recommendation or comment provided by the ACHP will pertain only to the subject of the dispute. The responsibility of the signatories to carry out all actions under this PA that are not subject to the dispute will remain unchanged. The signatories will continue to implement other terms of the PA that are not subject to dispute.

VII. Duration, Amendments, and Termination

A. Unless terminated pursuant to Subpart C below, this PA shall remain in effect from the date of execution until DOE, in consultation with all other signatories, determines that the terms of this PA have been fulfilled in a satisfactory manner. Upon a determination by DOE that the terms of this PA have been satisfactorily fulfilled, this PA will terminate and have no further force or effect. DOE will provide all other signatories with written notice of its determination and of termination of this PA. Unless amended otherwise, this will expire on December 31, 2020.

B. If any signatory to the PA determines that the stipulations of the PA cannot be fulfilled, the signatories may consult to seek amendment of the PA. Amendments to this PA will be specific to the applicable and legitimate circumstances unless otherwise agreed to by the signatories.

C. DOE, the SHPO, the ACHP, or the Alliance may terminate this PA by providing 30 days written notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Termination of this PA will require compliance with 36 CFR § 800. This PA may be terminated without further consultation by the execution of a subsequent PA that explicitly terminates or supersedes its terms, or by DOE's implementation of Program Alternatives, pursuant to 36 CFR §800.14.

VIII. Execution of this Programmatic Agreement

This PA may be executed in counterparts, with a separate page for each signatory, and DOE will ensure that each party is provided with a fully executed copy. This PA will become effective on the date of the last signature to this PA.

The execution and implementation of this Programmatic Agreement evidences that DOE has afforded the SHPO and the ACHP reasonable opportunity to comment on its administration of all aforementioned activities associated with the FutureGen 2.0 Project and, in addition, further evidences that DOE has satisfied its responsibilities with regard to complying with Section 106 of the *National Historic Preservation Act* (NHPA) (16 U.S.C. 470f, as amended), its implementing regulations, "*Protection of Historic Properties*," (36 CFR § 800.14(b)) and the *American Indian Religious Freedom Act (AIRFA)* (42 U.S.C. 1996 and 1996a) for all undertakings associated with the FutureGen Project.

APPENDIX F2

PHASE I – SITE CHARACTERIZATION LOCALE SURVEY

INTENTIONALLY LEFT BLANK

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER Date: Accepted Rejected IHPA USE ONLY (Form ASSR0886)

PHASE I CULTURAL RESOURCE SURVEY

FUTUREGEN INDUSTRIAL ALLIANCE, INC.
SITE CHARACTERIZATION LOCALE
MORGAN COUNTY, ILLINOIS

Prepared For

FutureGen Industrial Alliance, Inc.
1101 Pennsylvania Avenue, NW
Sixth Floor
Washington, D.C. 20004

April 2011

Prairie Archaeology & Research

P.O. Box 5603 ● Springfield, Illinois 62705-5603 ● Phone 217.544.4881 / Fax 217.544.4988

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER	
Date:	
Accepted	Rejected
IHPA USE ONLY (Form ASSR0886)	

IHPA Log #: UNASSIGNED

LOCATIONAL INFORMATION AND SURVEY CONDITIONS

County: Morgan **Quadrangle:** Prentice, IL 7.5 minute USGS

Project Type/Title: FutureGen Industrial Alliance--Site Characterization Locale, Morgan County, IL

Funding and/or Permitting Federal/State Agencies: U.S. Department of Energy

Township: 16 North **Range:** 8 West **Section(s):** 30

Township: 16 North **Range:** 9 West **Section(s):** 25

Project Description: A phase I cultural resource investigation of the location for drilling and access routes for characterization activities related to the FutureGen project in Morgan County, Illinois

Topography: Uplands

Soils: Specific soils in the project area include: 36B - Tama silt loam, 2 to 5 percent slopes; 36C2 - Tama silt loam, 5 to 10 percent slopes, eroded; 43A - Ipava silt loam, 0 to 2 percent slopes; 68 – Sable silty clay loam; 259D2 - Assumption silt loam, 10 to 15 percent slopes, eroded; and 567C2 - Elkhart silt loam, 5 to 10 percent slopes, eroded (Figure 2).

Drainage: Indian Creek

Land Use/Ground Cover (Include % Visibility): The Area of Potential Effect (APE) consisted of approximately 15.3 acres of agricultural fields with 80 to 95 percent of the ground surface visible to surveyors.

Survey Limitations: Survey limitations were minimal.

ARCHAEOLOGICAL AND HISTORICAL INFORMATION

Historical Plats/Atlases/Sources: The following historical sources were examined: 1823 *United States General Land Office Plat* (T16N, R8-9W), 1872 *Atlas Map of Morgan County, Illinois* (Andreas, Lyter & Co.), 1894 *Plat Book of Morgan County, Illinois* (American Atlas Co.), and the 1983 *Prentice, IL 7.5' Topographic Map* (United States Geological Survey).

The 1823 General Land Office (GLO) plat shows no improvements or that the property was "applied for". When a parcel is indicated as "Applied for," the property was either occupied or intended to be occupied at the time of the survey. Typically, the occupant or "squatter" expressed, to the GLO surveyor, his interest in purchasing the property once it became available from the federal government. Usually it is unknown if the property was actually improved with a permanent building (such as a house or cabin) at the time the survey was conducted. The GLO plats that include the APE do not indicate any cultural landmarks (such as trails, fords, or roads), structures or farm fields within the project boundaries. This source does indicate that the majority of the parcel was situated within prairie (Figure 3).

The Illinois Public Domain Land Tract Database indicates the land parcels associated with the project areas were purchased by five individuals (William O'Rear, Isaac Robinson, Peter Robinson, Thomas F. Stout, and Jacob Yaple) between 1827 and 1833. All land was purchased from the federal government at the rate of $1.25 per acre (Figure 4).

The 1872 historical atlas indicates the parcels associated with the project areas as owned by William O'Rear, Joel Corrington, and Lucretia Green (Figure 5). This source does not indicate any structures within the APE.

The 1894 historical atlas indicates the parcels associated with the project areas as owned by L. M. Thomas, Henry W. Beilschmidt, and Lucretia Green (Figure 6). While this source indicates a structure intersecting the project area on the Beilschmidt property, this is most likely due to mapping inconsistencies. No evidence of a structure or associated materials was recovered during this investigation.

Previous Surveys/ Reported Sites: A review of IHPA records indicates that no previous surveys or sites have been reported within the APE.

Regional Archaeologists Contacted: Databases maintained by the Illinois State Museum, the Illinois Department of Natural Resources, and the Illinois Historic Preservation Agency were reviewed.

Investigation Techniques: Pedestrian reconnaissance at 5-meter intervals was conducted within the project area.

Field Time Expended: 10 man hours

Sites/Find Spots Located: NONE

Cultural Material: NONE

(Curated at): N/A

Collection Techniques: N/A

Area Surveyed (Acres & Square Meters): Approximately 15.3-acres (61935.36 m^2).

<u>RESULTS OF INVESTIAGATIONS AND RECOMMENDATIONS (CHECK ONE)</u>

■ **Phase I Archaeological Reconnaissance Has Located No Archaeological Material; Project Clearance is Recommended.**

❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials: Site(s) Does (Do) Not Meet requirements for the National Register Eligibility; Project Clearance is Recommended.**

❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials; Site(s) May Meet Requirements for National Register Eligibility; Phase II Testing is Recommended.**

❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Does (Do) Not Meet Requirements for National Register Eligibility; Project Clearance is Recommended.**

❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Meet Requirements for National**

Register Eligibility; Formal Report is Pending and a Determination of Eligibility is Recommended.

Comments: An intensive cultural resource survey of the area proposed to be impacted by site characterization activities associated the FutureGen project in Morgan County, Illinois was conducted on April 25, 2011. The project area is composed of approximately 15.3-acres in agricultural use where 80-95 percent of the ground surface was visible to field investigators.

The current investigation included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, a review of the National Register of Historic Places (NRHP), and a review of the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency. Examination of archival and historical sources and resource databases did not identify that known prehistoric or historic sites, areas, or artifacts may be present within the boundaries of the APE or within the immediate vicinity of the APE.

Archaeological and cultural resource field examination of the APE included the use of pedestrian reconnaissance at 5-meter intervals to located evidence of unknown or unreported archaeological, historical or cultural sites, area, and artifacts. Under excellent field conditions and ground surface exposure, field surveyors failed to find evidence of archaeological or historical resources, sites, or structures within the boundaries where characterization activities will be conducted. Due to the APE's location within the interior uplands of Morgan County, it is unlikely that alluvial or colluvial depositional conditions have resulted in the deep burial of cultural deposits or remains. As a result, geomorphological investigative techniques to locate and assess deeply buried archaeological and historical resources or artifacts were deemed unnecessary.

Management Summary and Conclusions

A cultural resource inventory of the area proposed for characterization activities related to the FutureGen Industrial Alliance facility in Morgan County, Illinois included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, and a review of the National Register of Historic Places (NRHP), a review of the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency, and field investigations utilizing a pedestrian reconnaissance at 5-meter intervals.

Based on the results of field investigations and on information collected during archival and background research, the APE does not contain evidence for the presence of archaeological, historical, or cultural resources, sites, areas, or artifacts. As presently conceptualized, activities related to the characterization of the Morgan County, IL FutureGen facility will not impact cultural resources. Further, additional cultural resource investigations are neither warranted nor recommend. State Historic Preservation Officer concurrence and approval is requested.

Archaeological Contractor Information

Archaeological Contractor: Prairie Archaeology & Research.
Address/Phone: P.O. Box 5603, Springfield, IL 62705-5603 (217) 544-4881
Surveyors(s): Joseph Craig and Jason Rein
Survey Date(s): April 25, 2011
Report Completed By: Jason Rein and Joseph Craig
Date: April 26, 2011
Submitted By (Signature and Title): ______________________

*Attachment Check List: (#1 through #4 are **MANDATORY**)*

- ■ 1. Relevant Portion of USGS 7.5' Topographic Quadrangle Map(s) showing Project Location and Recorded Sites;
- ■ 2. Project Map(s) depicting Survey Limits and, when Applicable, Approximate Survey Limits, and Concentrations of Cultural Materials;
- ■ 3. Site Form(s); Two Copies of Each Form;
- ■ 4. All Relevant Project Correspondence;
- ☐ 5. Additional Information Sheets As Necessary

Address of Owner/Agent/Agency To Whom SHPO Comment Should Be Mailed

FutureGen Industrial Alliance, Inc.
1101 Pennsylvania Avenue, NW
Sixth Floor
Washington, D.C. 20004

Contact Person: Mr. Ken Humphreys, CEO
Phone Number: (202) 280-6019
Fax Number: n/a

U. S. Department of Energy
National Technology Laboratory
3610 Collins Ferry Road
P. O. Box 880
Morgantown, WV 26507-0880

Contact Person: Mr. Cliff Whyte, NEPA Compliance Officer
Phone Number: (304) 285-2098
Fax Number: n/a

Review Comments:

4

REFERENCES

Andreas, Lyter & Co.
1872 Atlas Map of Morgan County, Illinois. Davenport.

American Atlas Co.
1894 Plat Book of Morgan County, Illinois. Chicago.

United States Department of Agriculture
2011 http://websoilsurvey.nrcs.usda.gov

United States General Land Office
1823 General Land Survey Plats, T16N, R8-9W. Plats on file at the Illinois State Library, Springfield, Illinois.

United States Geological Survey
1983 Prentice, IL 7.5 Minute Topographic Map

FIGURES

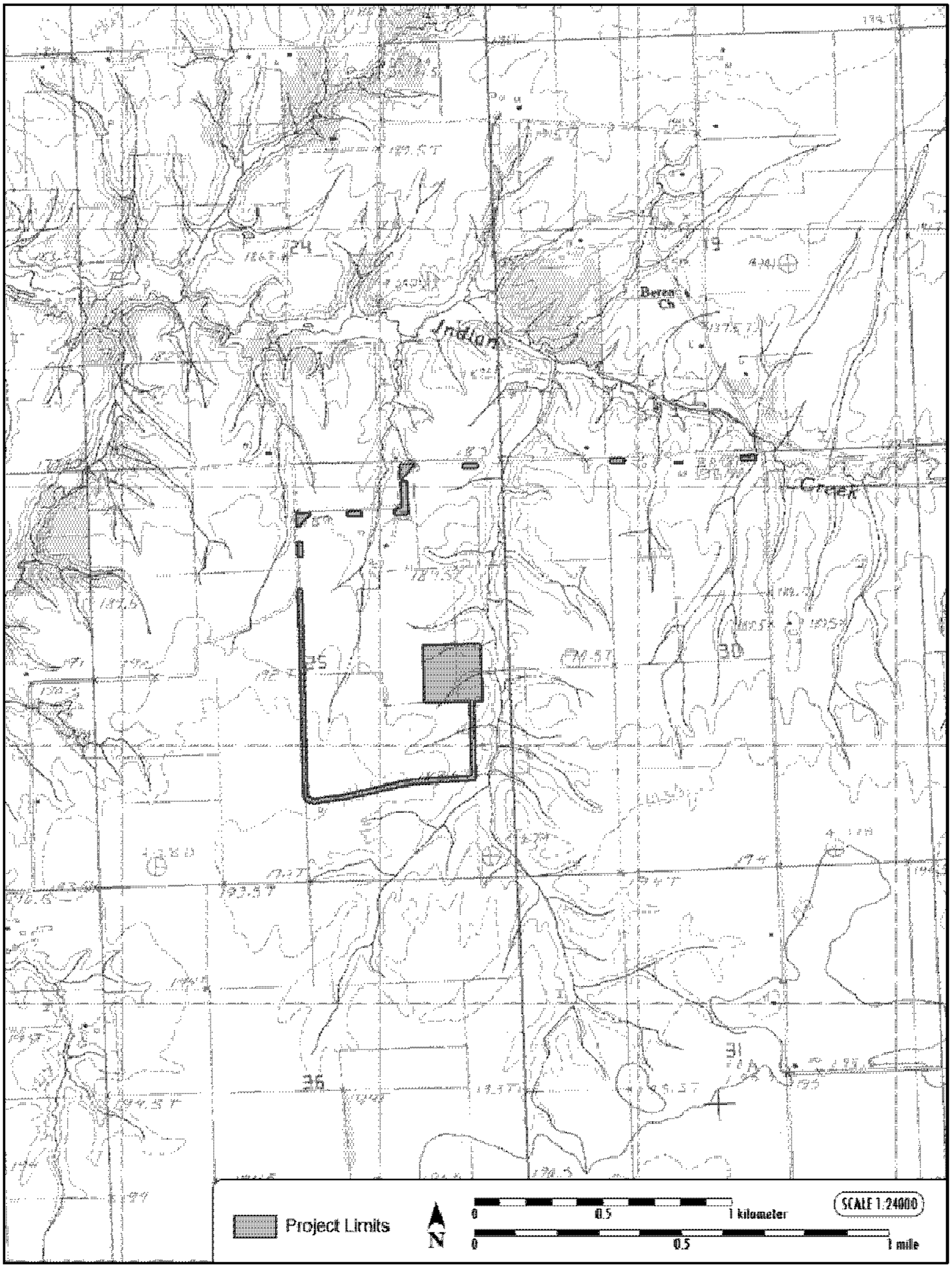


Figure 1. Location of the project area, Morgan County, Illinois (1983 Prentice, IL 7.5' USGS Topographic Map).

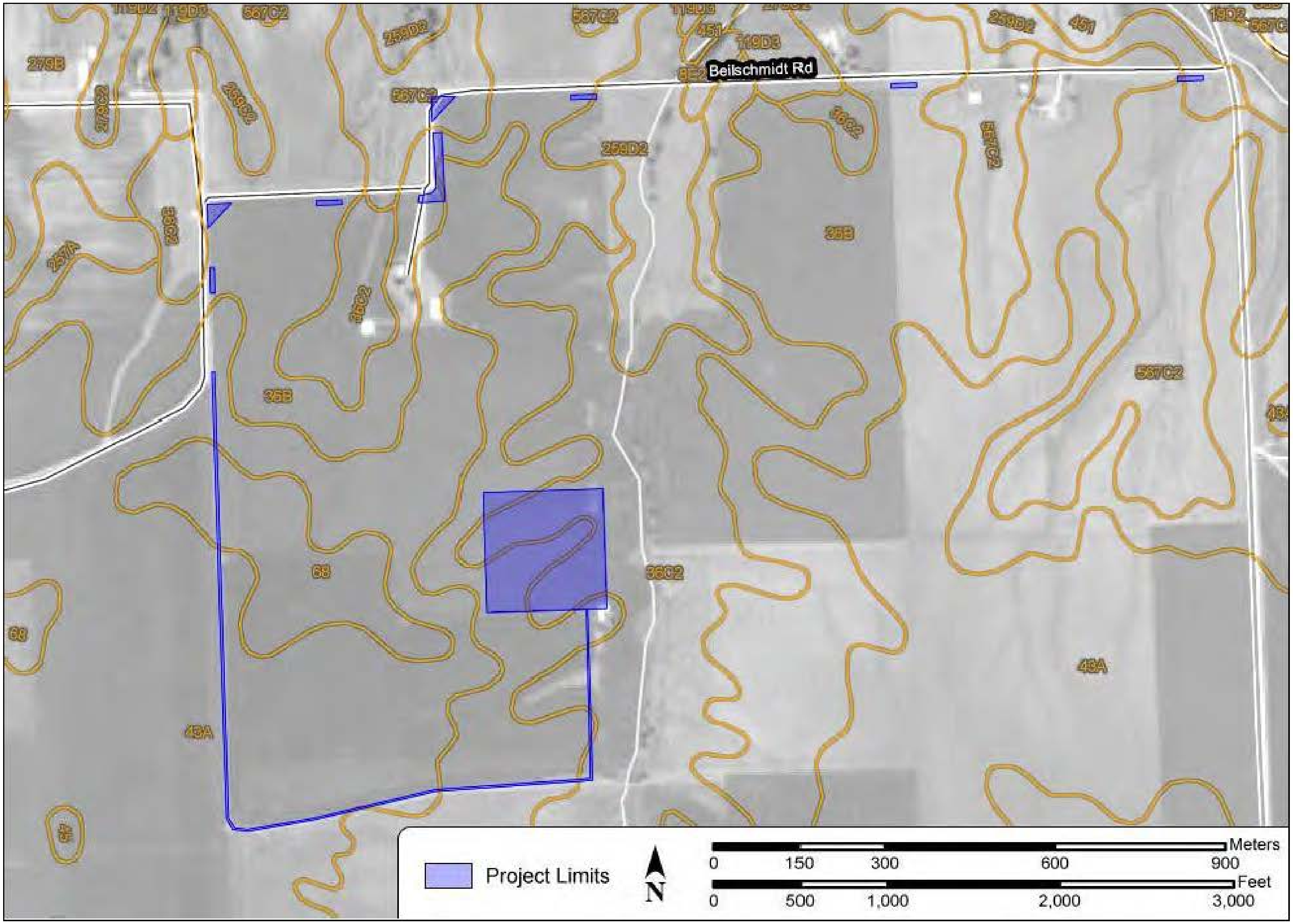


Figure 2. Location of the project area, Morgan County, Illinois (http://websoilsurvey.nrcs.usda.gov).

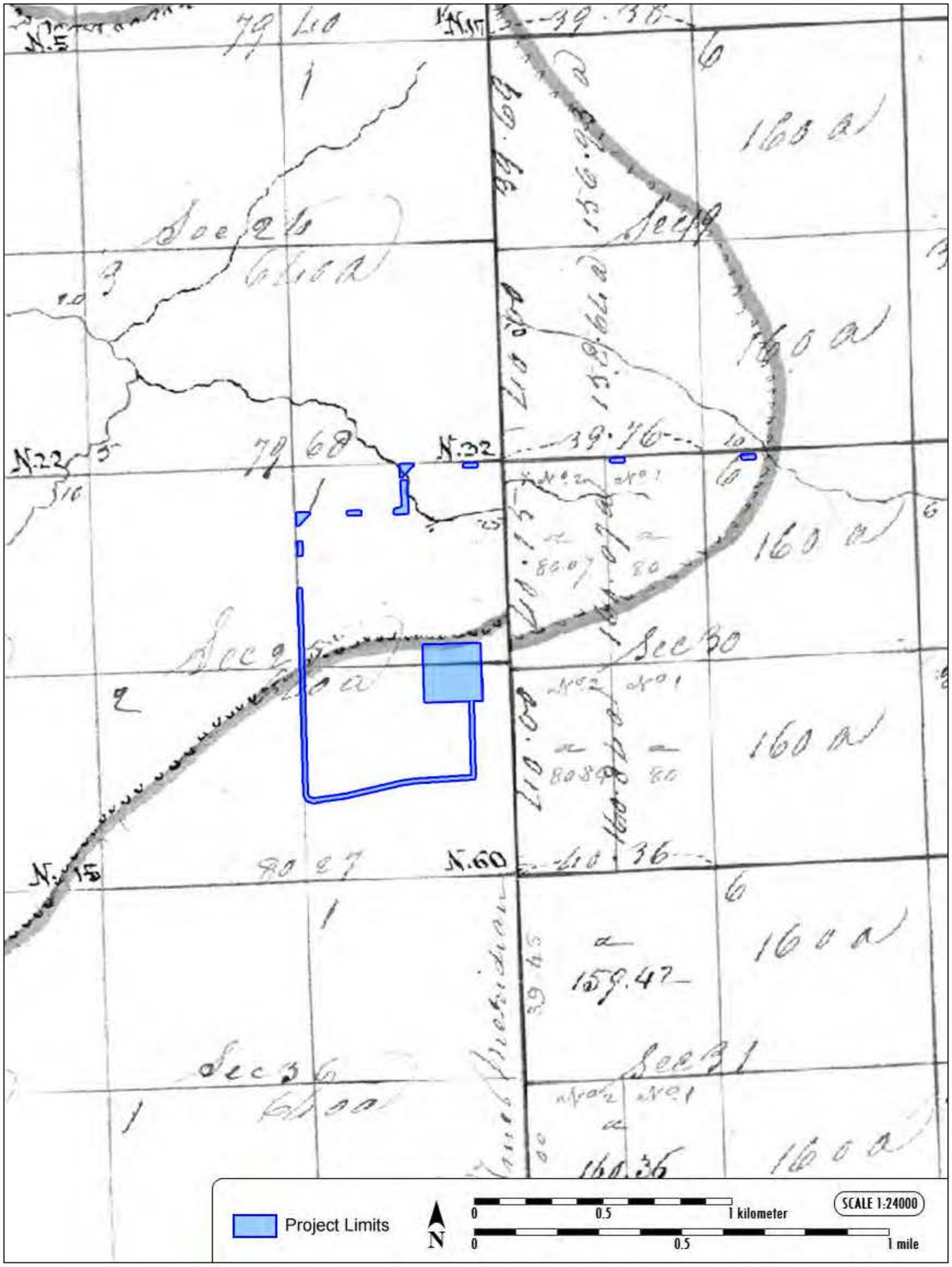


Figure 3. Location of the project area, Township 16 North, Ranges 8-9 West (1823 United States General Land Office Survey)

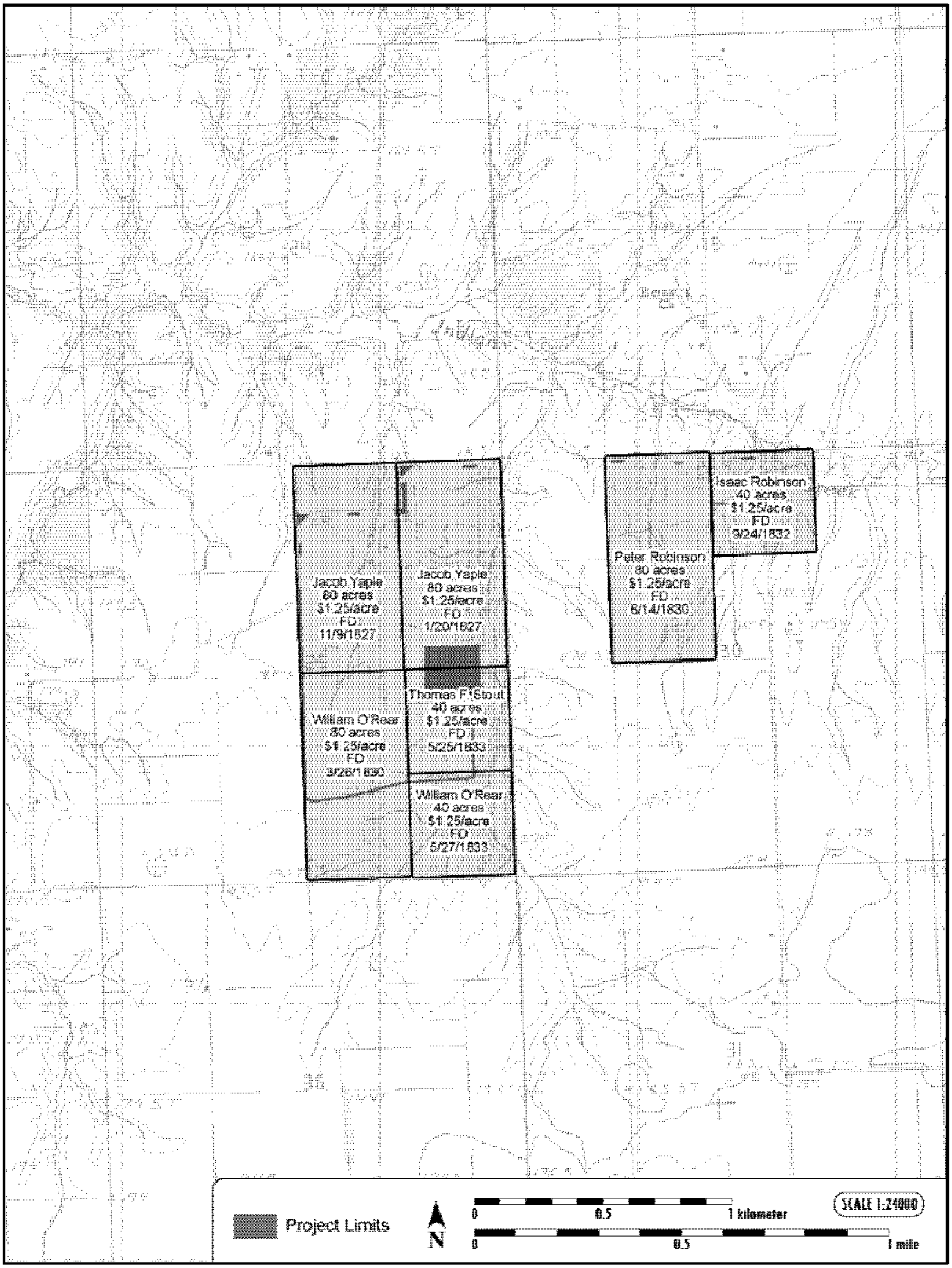


Figure 4. Initial land purchases within the project area.

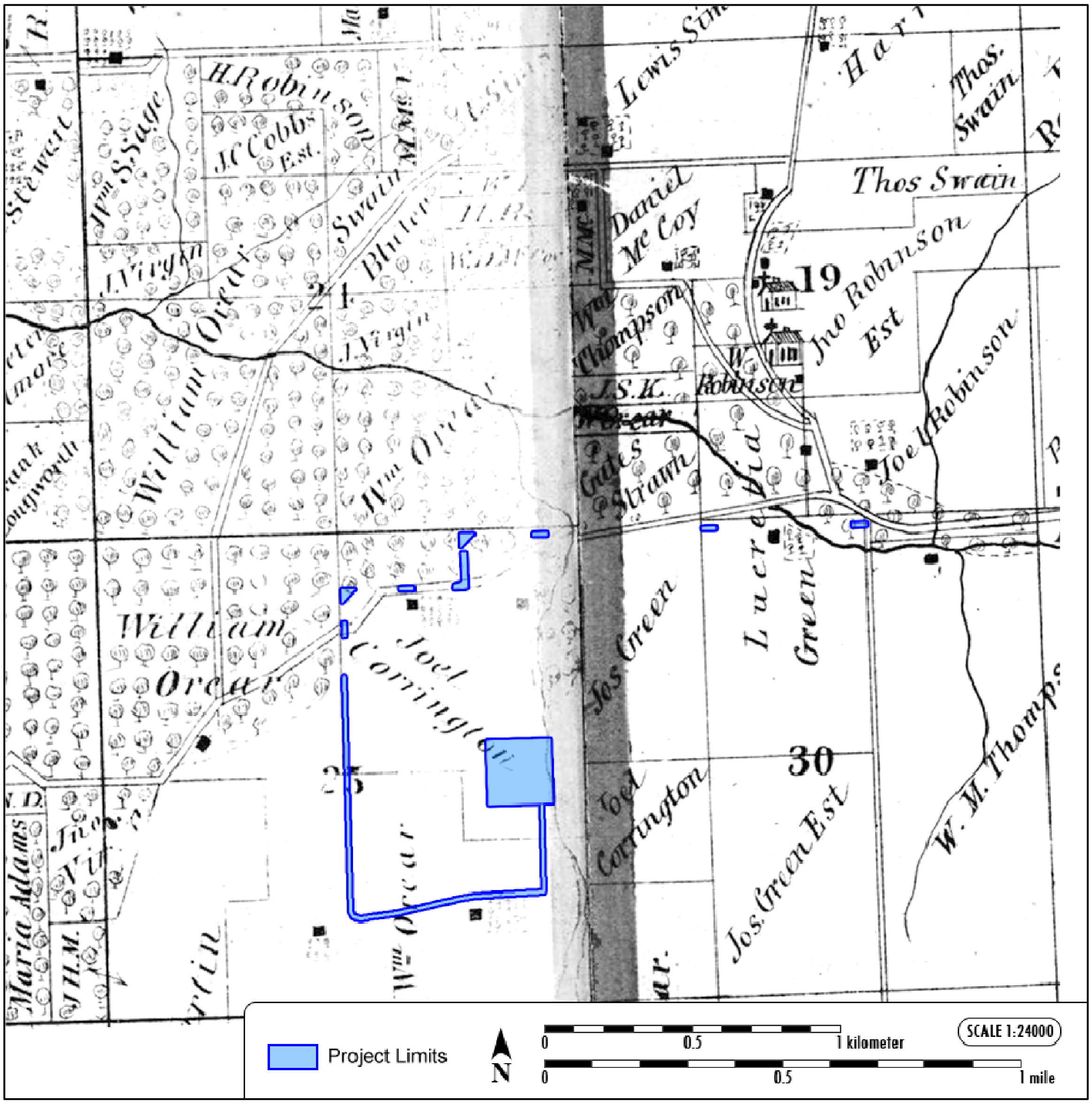


Figure 5. Location of the project area, Morgan County, Illinois (1872 Atlas Map of Morgan County, Illinois).

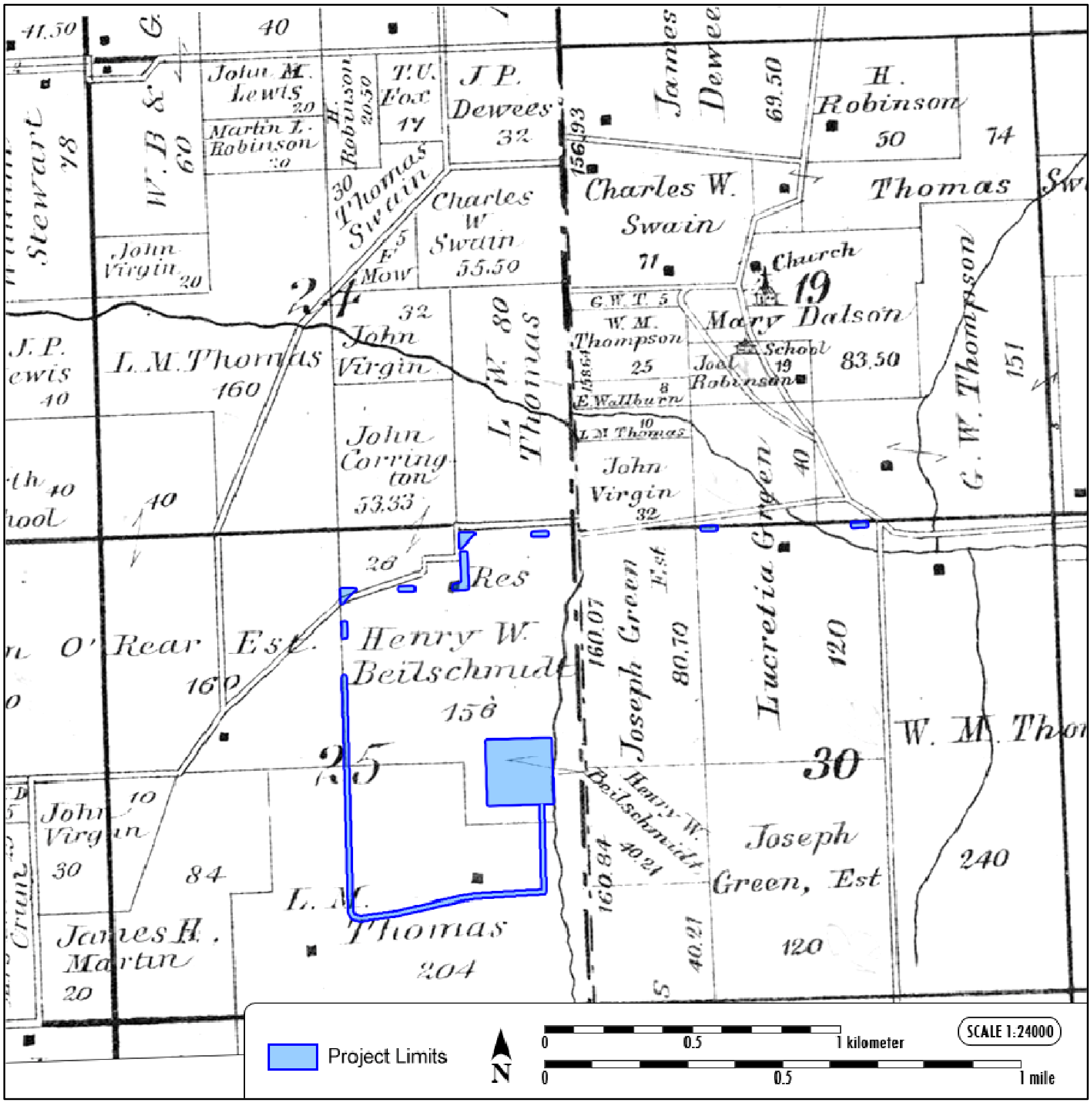


Figure 6. Location of the project area, Morgan County, Illinois (1894 Plat Book of Morgan County, Illinois).

INTENTIONALLY LEFT BLANK

APPENDIX F3

PHASE I – MEREDOSIA ENERGY CENTER SURVEY

INTENTIONALLY LEFT BLANK

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER Date: Accepted Rejected IHPA USE ONLY (Form ASSR0886)

PHASE I CULTURAL RESOURCE SURVEY

147-ACRE FUTUREGEN 2 POWER PLANT SITE NEAR THE VILLAGE OF MEREDOSIA MORGAN COUNTY, ILLINOIS

DRAFT

Prepared For

Potomac-Hudson Engineering, Inc.
One Washingtonian Center
9801 Washingtonian Boulevard, Suite 350
Gaithersburg, Maryland 20878

April 2012

Prairie Archaeology & Research

P.O. Box 5603 ● Springfield, Illinois 62705-5603 ● Phone 217.544.4881
www.prairiearchaeology.com

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER	
Date:	
Accepted	Rejected
IHPA USE ONLY (Form ASSR0886)	

IHPA Log #: ***unassigned***

LOCATIONAL INFORMATION AND SURVEY CONDITIONS

County: Morgan **Quadrangle:** Meredosia, IL 7.5 minute USGS

Project Type/Title: FutureGen 2 Power Plant Site, Morgan County, Illinois (Figure 1).

Funding and/or Permitting Federal/State Agencies: U.S. Department of Energy

Township: 16 North **Range:** 13 West **Section(s):** 21, 22, 27 and 28

Project Description: A phase I cultural resource investigation of the existing Meredosia Energy Center and surrounding areas related to the FutureGen 2 Power Plant Site project in Morgan County, Illinois.

Topography: Floodplain

Soils: Specific soils in the project area include: 54B - Plainfield loamy sand, 2 to 7 percent slopes; 54D - Plainfield loamy sand, 7 to 15 percent slopes; and 533 - Urban land.

Drainage: Illinois River

Land Use/Ground Cover (Include % Visibility): The project area consisted of 100 acres of previously developed and disturbed areas, 18 acres of woods with 0-percent ground surface visibility, 24 acres of agricultural fields with 100-percent ground surface visibility, and 5 acres of grassy/fallow areas with 40-percent ground surface visibility.

Survey Limitations: Survey limitations were minimal.

ARCHAEOLOGICAL AND HISTORICAL INFORMATION

Historical Plats/Atlases/Sources: The following historical sources were examined: 1862 *United States General Land Office Plat* (T16N, R13W), 1872 *Atlas Map of Morgan County, Illinois* (Andreas, Lyter & Co.), 1894 *Plat Book of Morgan County, Illinois* (American Atlas Co.), and the 1980 *Meredosia, IL 7.5' Topographic Map* (United States Geological Survey).

The 1833 GLO shows the project vicinity to be situated within barrens, prairie, and wet, swampy areas. This source does not indicate any cultural landmarks (such as trails, fords, or roads) within the project boundaries (Figure 2). The Illinois Public Domain Land Tract Database indicates the land parcels associated with the project area were purchased by several individuals from the federal government between 1831 and 1835 (Appendix A: Historical Research).

The 1872 historical atlas indicates the parcels associated with the project area as owned by R. S. Lord, Lusk & Brady, and Daniel Waldo (Figure 3). The following 1894 atlas indicates the parcels associated with the project area as owned by E. E. Potter, J. W. Thompson, the Wabash R.R. Company, B. Dunn, and J. S. Knowles (Figure 4). The 1872 atlas indicates a structure within the project area on the R. S. Lord property.

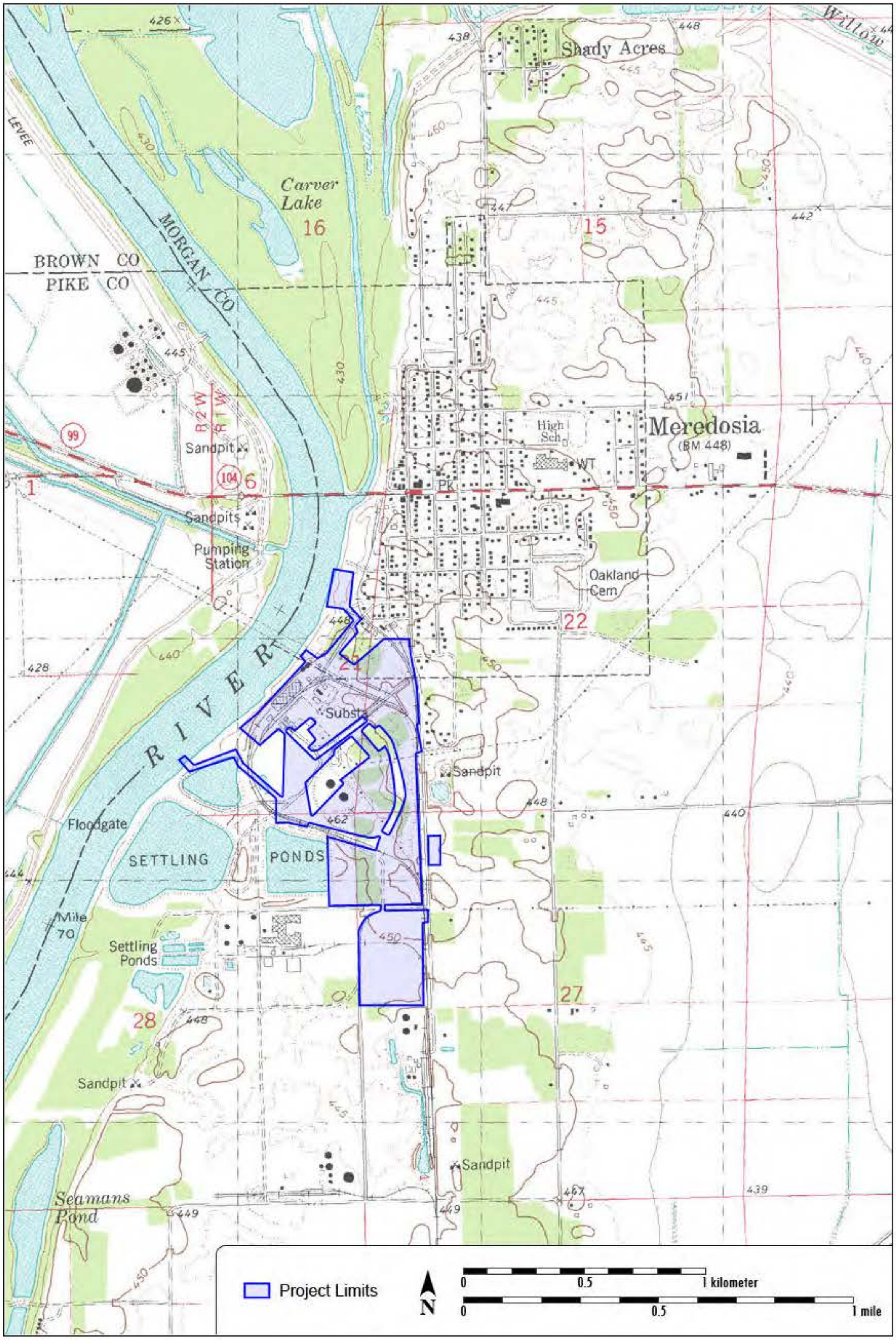


Figure 1. Location of the project area, Morgan County, Illinois (1980 Meredosia, IL 7.5' USGS Topographic Map).

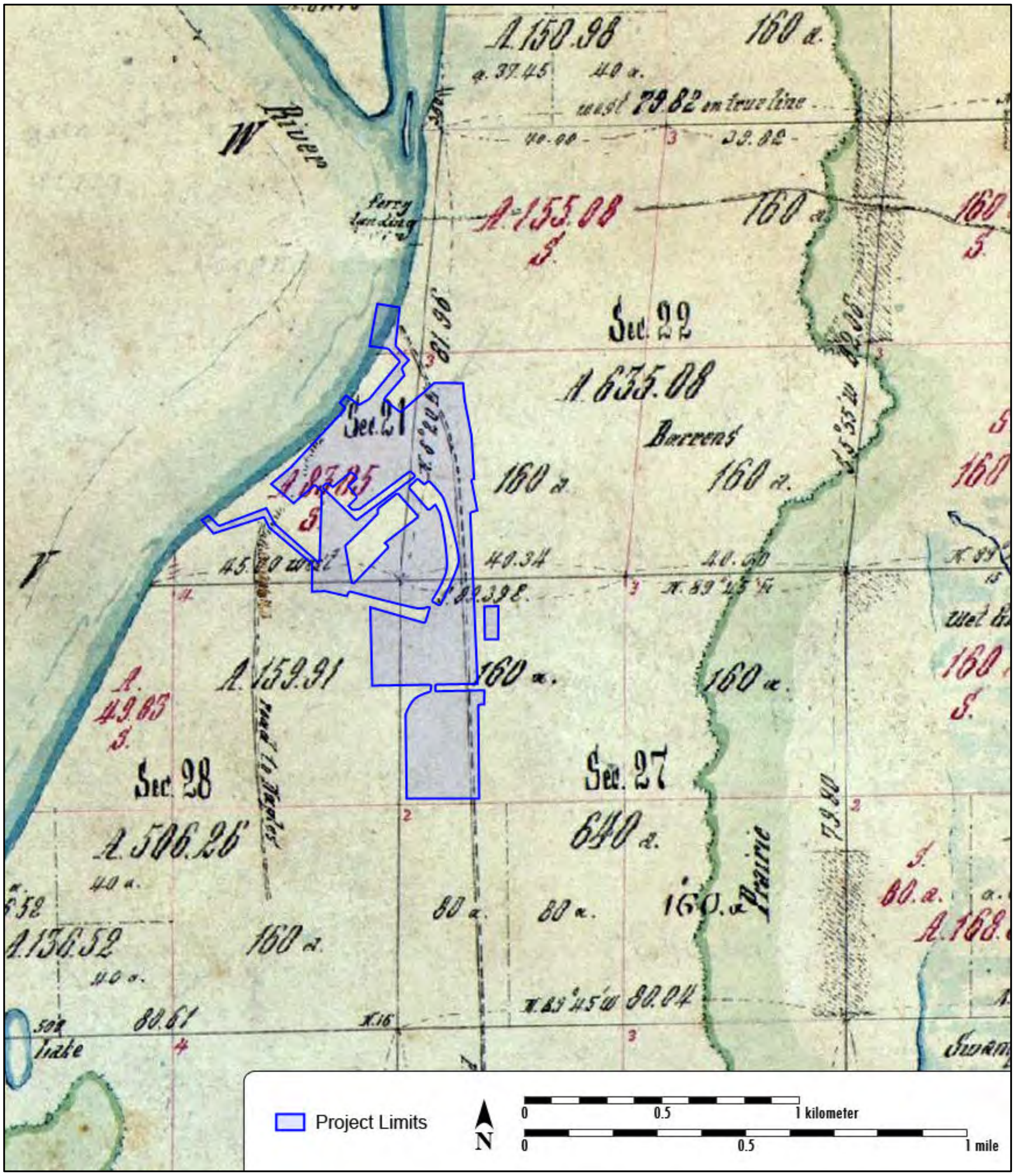


Figure 2. Location of the project area, Township 16 North, Range 13 West (1862 United States General Land Office Survey)

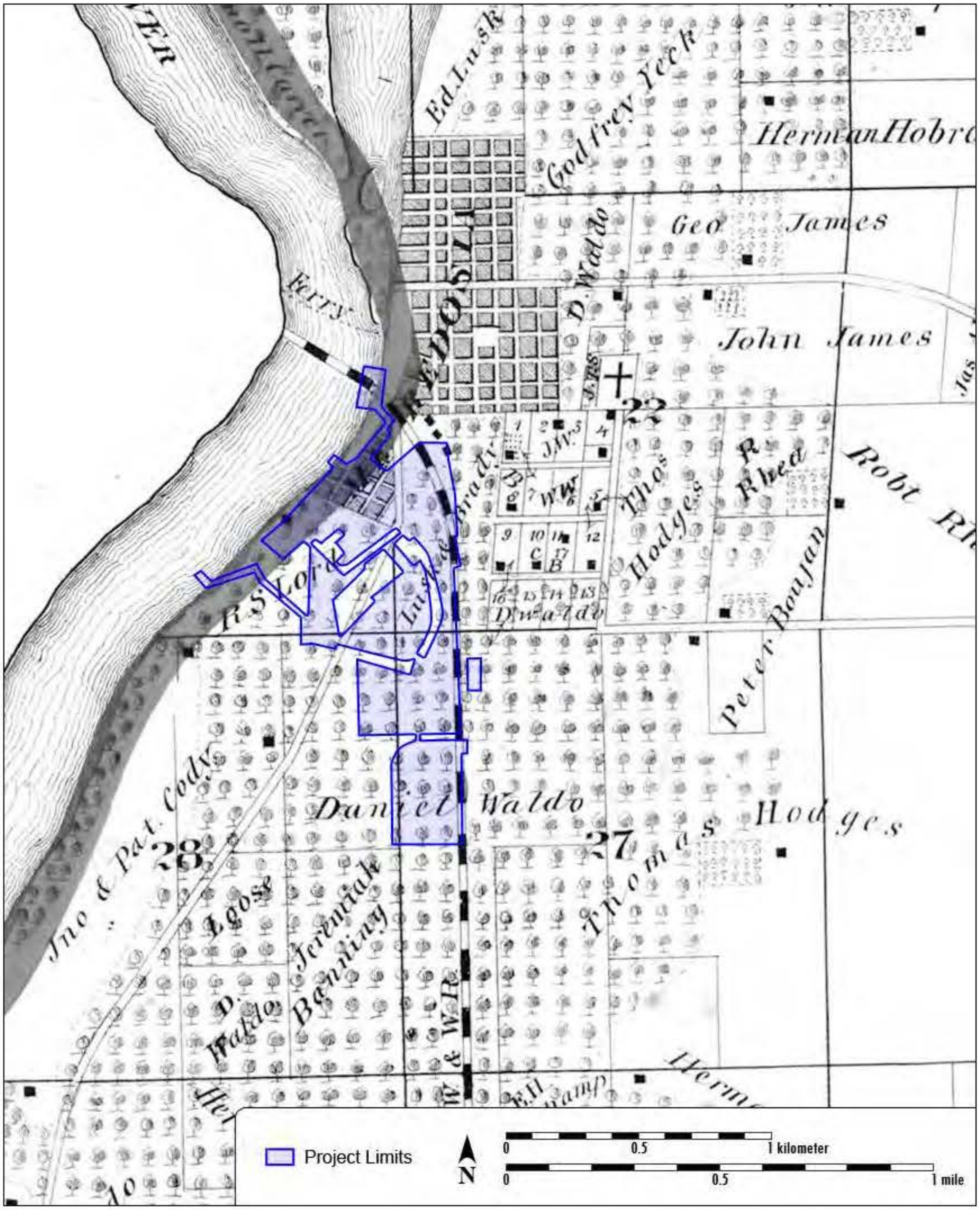


Figure 3. Location of the project area, Morgan County, Illinois (1872 Atlas Map of Morgan County, Illinois).

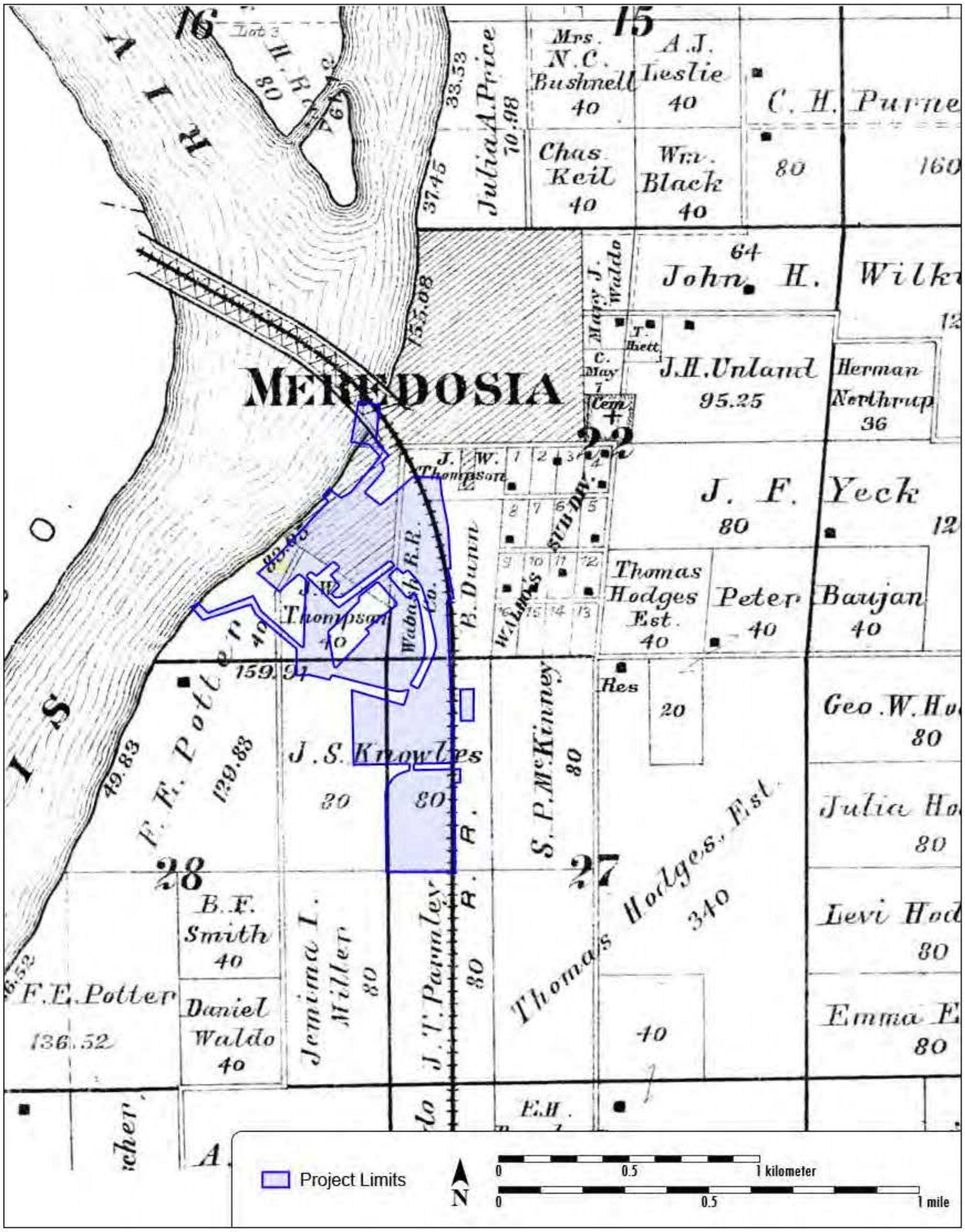


Figure 4. Location of the project area, Morgan County, Illinois (1894 Plat Book of Morgan County, Illinois).

Previous Surveys/ Reported Sites: A review of IHPA records indicates that a portion of the project area was surveyed by the Center for American Archaeology in 1991 (Appendix B). This source also indicates an unknown survey was conducted in the southern portions of the project area. One site, 11Mg473, was reported within northeast portions of the project area. In addition, site 11Mg22 was reported by A. Berkson in 1976. This Early Woodland site is situated adjacent to the project limits along the riverbank. According to IHPA records, a small portion of this site intersects the project limits within an area that has been heavily modified and disturbed by construction activities at the Meredosia Energy Center.

Regional Archaeologists Contacted: Databases maintained by the Illinois State Museum, the Illinois Department of Natural Resources, and the Illinois Historic Preservation Agency were reviewed.

Investigation Techniques: Pedestrian reconnaissance at 5-meter intervals was conducted within grassy areas with 40-percent ground surface visibility. Shovel-probe reconnaissance at 15-meter intervals was conducted within grassy and wooded areas (Figure 5).

Field Time Expended: 57 man hours

Sites/Find Spots Located: none

Cultural Material: none

(Curated at): n/a

Collection Techniques: n/a

Area Surveyed (Acres & Square Meters): Approximately 147-acres (594,890 m^2).

<u>RESULTS OF INVESTIAGATIONS AND RECOMMENDATIONS (CHECK ONE)</u>

- ■ **Phase I Archaeological Reconnaissance Has Located No Archaeological Material; Project Clearance is Recommended.**

- ❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials: Site(s) Does (Do) Not Meet requirements for the National Register Eligibility; Project Clearance is Recommended.**

- ❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials; Site(s) May Meet Requirements for National Register Eligibility; Phase II Testing is Recommended.**

- ❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Does (Do) Not Meet Requirements for National Register Eligibility; Project Clearance is Recommended.**

- ❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Meet Requirements for National Register Eligibility; Formal Report is Pending and a Determination of Eligibility is Recommended.**

Comments: An intensive cultural resource survey of the proposed area to be impacted by construction activities associated with the FutureGen 2 Power Plant Site project in Meredosia, Morgan County, Illinois was conducted on March 5-8, 2012. The project's Area of Potential Effect (APE) is comprised of approximately 100 acres of previously disturbed and developed areas, 18 acres of woods, 24 acres of agricultural areas, and 5 acres of grassy/fallow areas (Figure 5). Shovel-probe reconnaissance at 15-meter intervals was conducted within the wooded areas. Pedestrian reconnaissance at 5-meter intervals was conducted within the agricultural fields and grassy/fallow areas.

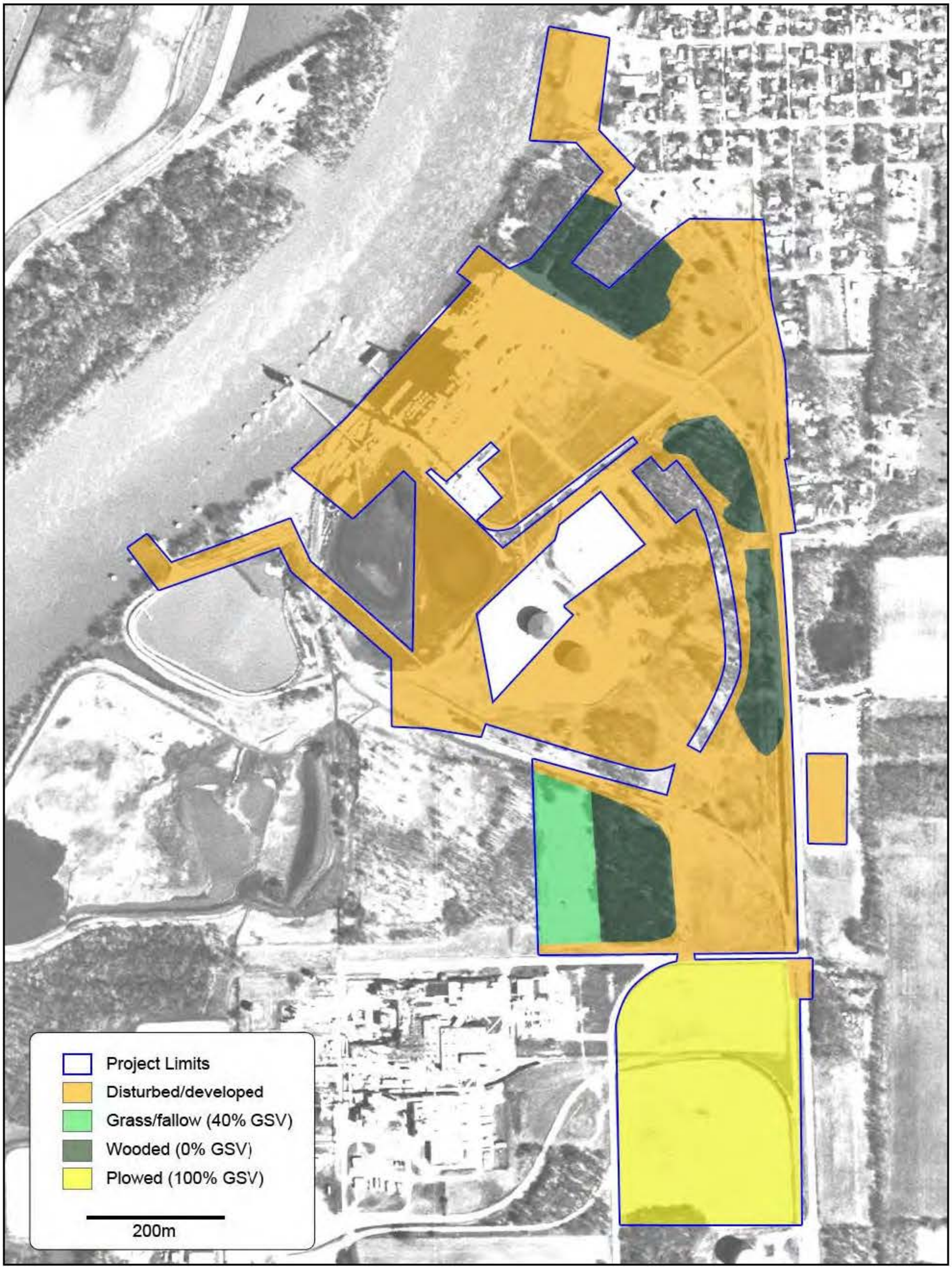


Figure 5. Ground surface visibility within the project area, Morgan County, Illinois.

The current investigation included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, a review of the National Register of Historic Places (NRHP), and a review of the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency. Examination of archival and historical sources and resource databases did not identify that known prehistoric or historic sites, areas, or artifacts may be present within the boundaries of the APE or within the immediate vicinity of the APE.

Assessment of Buried Resources

The Meredosia Energy Center and surrounding project area is mapped as a terrace associated with catastrophic flood landscape (Hajic 2000). The erosional surface of the terrace is as old as 15,500-16,000 BP and no younger than 12,000 BP (Hajic 2000). The surface of the terraces has a low potential for buried archaeological deposits beneath eolian sand. The bulk of the sandy dune deposits are estimated by Hajic (2000) to be no younger than 10,550 BP with localized reactivation during the Holocene. The terrace is mapped as part Bluffs Terrace and part Bath Terrace. Interestingly, the dune morphology appears to be confined to the older Bath Terrace (late Wisconsinan). Soils mapped in the vicinity of the project area are the sandy Plainfield and Sparta series (USDA Web Soil Survey nd). These soils are formed in outwash and wind-reworked outwash. The Plainfield series is an excessively drained entisol with a thick Bw subsoil horizon. The Sparta series is an excessively drained mollisol with a Bw horizon over a lamellar E/Bt horizon in the subsoil. The erosional event that created the catastrophic flood terrace occurred prior to human occupation in the area (16,000 BP - ± 12,000 BP). A dune cap ranging from 0.7 to 1.3 m thick covers the remainder of the terrace in the project area. The age of the dunes is not known with certainty. Hajic (2000) estimates dunes on the terrace tops are no younger than 10,500 BP. Soils are relatively well developed which is consistent with this late Wisconsinan age. Certainly some or all of the dunes date to this time interval. There is also the possibility (albeit low) for localized reactivation during drier periods of the Holocene.

NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY ASSESSMENT

In addition to the inventorying of resources within the proposed development area, Prairie Archaeology & Research offers the following recommendations regarding the eligibility potential for inclusion on the National Register of Historic Places (NRHP). The Advisory Council on Historic Preservation has established inclusion eligibility criteria. According to the Advisory Council on Historic Preservation, a resource is considered eligible for inclusion if it meets at least one of the following conditions:

A. It is associated with events that have made a significant contribution to the broad patterns of history; or
B. It is associated with the lives of persons significant in the past; or
C. It embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master or possesses high artistic value or represents a significant and distinguishable entity whose components may lack individual distinction; or
D. It has yielded, or may be likely to yield, information important in prehistory or history.

To be listed on or determined eligible for listing on the NRHP, a property must meet at least one of the above criteria and must possess integrity. Integrity is defined as the authenticity of a property's historic identity as evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric occupation or use. Physical characteristics may include: integrity of location, design, setting, materials, workmanship, feeling, and association. If a property retains the physical characteristics it possessed in the past, it has the capacity to convey information about a culture or people, historical patterns, or architectural or engineering design and technology.

HISTORICAL CONTEXT

History of the Meredosia Energy Center and the Central Illinois Public Service Company

The Meredosia Energy Center was constructed in the 1940s and operated by the Central Illinois Public Service Company (CIPSCO). The facility is located south of the Town of Meredosia adjacent to the Illinois River.

As a private business enterprise, CIPSCO began in 1902 as the Mattoon City Railway Company which was organized to provide streetcar service in Mattoon, Illinois. Between 1903 and 1904, Mattoon City Railway quickly diversified its services and assets to include an electric generating plant and distribution system supplying both Mattoon and the surrounding region. Additional acquisitions and diversification followed during the first decade of the 20th century. In 1912, the company's name was changed to Central Illinois Public Service Company in a move that more accurately reflected the company's activities and plans to provide light and power to Mattoon and Charleston, Illinois, a heating service in Mattoon, separate electric street railway systems in Mattoon and Charleston, and an electric interurban railway system joining the two cities (CIPSCO 1989).

By 1914 CIPSCO was operating eight generating stations and serving 232 communities, including over 100,000 electric customers. In addition to its electric, gas, and heat utility businesses, the company’s service included supplying water, selling ice wholesale to some communities, and operating a retail ice businesses in select cities. CIPSCO retained its transportation division and the company's transportation system included a network of five railway systems and interurban lines serving nine Central Illinois communities.

Business continued expanding rapidly in the 1920s, with corporate growth following suit. In 1921 CIPS moved its general offices from Mattoon to Springfield. By 1924, construction was completed on the company's Grand Tower Power Station in Jackson County, Illinois. The following year CIPSCO completed the acquisition of electric, gas, and heat companies serving the City of Quincy, Illinois and became the largest community in CIPSCO service territory. Also in 1925, CIPS began furnishing street railway service in Joliet, Illinois which linked interurban railroad service from Joliet to Chicago. During the late 1920s and in spite of the impending national Great Depression, CIPSCO continued acquiring minor electric and ice properties and extending both electric and gas service to previously un-served communities and rural areas.

However by 1931, the impact of the economic decline brought on by the Depression resulted in significant reductions in profit and CIPSCO reduced most classes of service to its customers. Financial conditions worsened in 1932 and the company was in the throes of rapidly declining sales. In order to reduce its expenditures, CIPSCO abandoned all railway and bus operations, sold off water supply divisions, and retired ice properties. As economic conditions improved by 1937, CIPSCO resumed its program of extending utility service into un-served portions of its service territory where business expansion would likely follow (CIPSCO 1989). CIPSCO entered the 1940s continuing a policy of withdrawing from activities not directly related to the electric and gas utility business.

In 1941 preliminary construction began on a steam electric generating plant on the Illinois River south of the Town of Meredosia in Morgan County, Illinois. However, due to the United States entering into World War II, construction of the Meredosia Energy Center was brought to a quick halt in 1942 by a directive of the War Production Board. As a matter of national safety, the War Production Board effectively suspended all construction at facilities not vital to the war effort including the Meredosia facility. Construction materials originally intended for the Meredosia Energy Center were redirected to support America's military needs. Specifically, the turbo-generator and related equipment initially destined for the plant were shipped by the War Production Board to assist the US's World War II ally Russia.

Construction resumed at Meredosia following the war, and the station's first generating unit was completed in 1946 and went into service in 1948. As a result of postwar increases in power demand, during the late 1940s CIPS added generating units at Grand Tower, Meredosia, and Hutsonville. CIPS's continued construction program during the 1950s was largely limited to the addition of generating units at Hutsonville and Grand Tower and completion of an interconnection program linking its Meredosia, Hutsonville, and Grand Tower power stations. CIPSCO continued operating and expanding the Meredosia facility through the 1960s, 70s, and 80s. In 1995, shareholders of CIPSCO and the Union Electric Company approved the merger of the two companies, which were combined as Ameren Corporation. Ameren continued power generation at Meredosia until 2011 when the corporation decided to close and shutter the Meredosia Energy Center.

Physical Layout of the Energy Center

The Meredosia Energy Center has four generating units including an oil-fired steam generator and encompasses a campus totaling 263-acres. As initially planned, the Meredosia Energy Center included a single generating unit (Unit 1) intended to supply 60 megawatts of power. However, to accommodate the growing, post-war demand for electricity, Unit 2 was constructed and placed in operation on Jan. 1, 1949, which doubled the plant's generating power output to 100 megawatts. Unit 3 was constructed and placed in operation in 1960 and produced 229 megawatts of electricity. The plant expanded in 1975 with the construction of the oil-fired Unit 4. Fuel oil for Unit 4 is delivered to the plant by barge and the generating capacity Unit 4 is 200 megawatts. At maximum capacity, the station can generate a total of 549 gross megawatts of energy. The plant has three emissions stacks. The tallest, built in 1979, served Units 1 and 2 and is 526 feet tall. The other two emissions stacks are 301 feet (Unit 3) and 186 feet (Unit 4) tall.

The Meredosia Energy Center operations were similar to many coal-powered generating facilities. Fuel for the plant has historically been coal derived from a wide variety of Illinois and Wyoming coal source types. Coal was delivered via truck and barge and the station drew water needed for power generation from the Illinois River. When in operation, the plant typically burned between 600,000 to 800,000 tons of coal annually, peaking at 1.15 million tons of coal in 2007. After delivery to the plant, coal is pulverized into a powder the consistency of talcum powder and is blown into the boiler furnace. In simple terms, electricity is produced when the boiler heats water creating steam. The steam then flows into a turbine and turns a shaft. On the end of the shaft is a magnet that revolves inside a coil creating electricity. At full capacity, when all units were in service, the plant's boilers burned more than 160 tons of coal per hour and 200 gallons of fuel oil per minute to produce about 4.2 million pounds of steam per hour.

The power plant consists of several sections that correspond to its interior functional divisions and phases of construction. The long brick façade along the river-side of the plant, built as part of the first construction project, visually unifies the portions of the plant built in the late1940s. All of the sections of the steel-framed building built prior to the 1960s are enclosed with red brick curtain walls. The southwest wing of the plant built in the 1960s is enclosed with ribbed sheet metal and has a fenestration pattern different from that of the earlier portions of the plant**.** The power plant floors are concrete; steel trusses support its roof. In 1960, Unit 3 was also built with red brick to match the 1940s section of the plant. The Unit 3 boiler room is about 60 feet higher and the turbine room was extended nearly identically to house

Unit 3. Sheet metal sided sections of the turbine building were built in the 1970s and are associated with Unit 4.

The bays are filled with tall windows that span several floor levels of the turbine and boiler rooms of the 1947 section. The majority of these tall multi-section windows that angle out are in the Unit 3 boiler room, with a few on the West side of the turbine room. Windows in the office and substation portions of the plant and in the 1940s portion of the boiler room do not span several floor levels. Original industrial steel sash with operable awning units remains in place in some of the windows. Openings in the areas used as offices, machine shop, and some of the boiler room windows have replacement aluminum-framed sash. A stone band course sets off the windows and the edge the plant's flat roofs**.** Roof monitors with wire-glass side walls light some of the interior spaces.

The coal that fueled the boilers in the plant was brought into the facility in rail cars that were emptied outdoors into the west section of the reclaim hopper to the east of the fuel-handling breaker house, which is identified as the brick building south of the plant to where the conveyors route. The reclaim hopper is situated in the northwest corner of the coal yard. Several spurs were originally planned to make room for more cars. The spur over the reclaim hopper extended along the east side of the main plant. The last coal received by rail was in 1978. The 1960 portion of the boiler room has a taller section adjacent to the 1940s boiler room**.** The 1940s chimney positioned adjacent to the boiler room has been removed and is surrounded by the steel framework that supports the precipitators that served the units in that section of the plant. The turbine room is located west of the boiler rooms and runs along the river. This portion of the plant, though not expressed clearly on the exterior of the plant, is a distinctive interior space**.** The narrow, rectangular space was extended with no dividing walls as the plant was enlarged in the 1960s and 1970s. The turbine room is approximately 400 feet in length and houses four generators.

Much of the original circa 1940s and early 1960s portions of the plant are obscured by subsequent remodeling and updating, the addition of generating units, and installation of emission control equipment. Considered as a single structure, the generating plant exhibits little evidence of its original structure, use, and purpose. Modernization of the Meredosia Energy Center over the course of the last 60 years since the plant was build retains little of its original structural integrity and is not eligible for nomination to the NRHP under criteria A or C.

In addition to the power generating units and emission stacks, the campus includes a range of offices, maintenance buildings, storage yards, garages, and a number of temporary storage buildings. None of the buildings are considered architecturally or historically significant and are not eligible for nomination to the NRHP.

Photographs of standing structures are shown presented in Appendix C.

MANAGEMENT SUMMARY AND CONCLUSIONS

A cultural resource inventory of the proposed development included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, and a review of the National Register of Historic Places (NRHP) and the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency. In addition to archival records and database examination, the subject property was examined by archaeologists utilizing shovel-probe reconnaissance at 15-meter intervals and pedestrian reconnaissance at 5-meter intervals. Due to the presence of a number of waste water lagoons, bulk coal storage fields, ash and by-product storage, and electrical transmission facilities, barge loading facilities, roads, and railway lines, the entire campus has experienced dramatic ground disturbance due to it construction and continued operation and expansion over the last 60 years. Investigations failed to identify the presence of archaeological resources. In addition, examination of the standing structures occupying the facility did not document any existing structures greater than 50 years in age that are of architectural or historical merit.

Based on the results of field investigations and information derived during archival and background research conducted by Prairie Archaeology & Research for the proposed FutureGen 2 Power Plant Site activities located in Meredosia, Morgan County, Illinois, additional cultural resource investigations are neither warranted nor recommend. It is our recommendation to State Historic Preservation Officer that concurrence and approval be provided.

Archaeological Contractor Information
Archaeological Contractor: Prairie Archaeology & Research.
Address/Phone: P.O. Box 5603, Springfield, IL 62705-5603 (217) 544-4881
Surveyors(s): Joseph Craig and Jason Rein
Survey Date(s): March 5-8, 2012
Report Completed By: Joseph Craig
Date: April 9, 2012
Submitted By (Signature and Title): ______________________________________

*Attachment Check List: (#1 through #4 are **MANDATORY**)*

- ■ 1. Relevant Portion of USGS 7.5' Topographic Quadrangle Map(s) showing Project Location and Recorded Sites;
- ■ 2. Project Map(s) depicting Survey Limits and, when Applicable, Approximate Survey Limits, and Concentrations of Cultural Materials;
- ■ 3. Site Form(s); Two Copies of Each Form;
- ■ 4. All Relevant Project Correspondence;
- ☐ 5. Additional Information Sheets As Necessary

Address of Owner/Agent/Agency To Whom SHPO Comment Should Be Mailed

Potomac-Hudson Engineering, Inc.
One Washingtonian Center
9801 Washingtonian Boulevard, Suite 350
Gaithersburg, Maryland 20878

Contact Person: Ms. Robin Griffin
Phone Number: (301) 907-9078, x3010
Fax Number: n/a

Review Comments:

REFERENCES

Andreas, Lyter & Co.
1872 Atlas Map of Morgan County, Illinois. Davenport.

American Atlas Co.
1894 Plat Book of Morgan County, Illinois. Chicago.

Central Illinois Public Service Company
1989 It Started with a Streetcar: Central Illinois Public Service Company, 1902-1989. Springfield, Illinois.

Hajic, Edwin R.
2000 Landform Sediment Assemblage (LSA) Units in the Illinois River Valley. Illinois State Museum Quaternary Studies Program Technical Report No. 95-1255-16.

United States Department of Agriculture
2012 http://websoilsurvey.nrcs.usda.gov

United States General Land Office
1862 General Land Survey Plats, T16N, R13W. Plats on file at the Illinois State Library, Springfield, Illinois.

United States Geological Survey
1980 Meredosia, IL 7.5 Minute Topographic Map

FIGURES

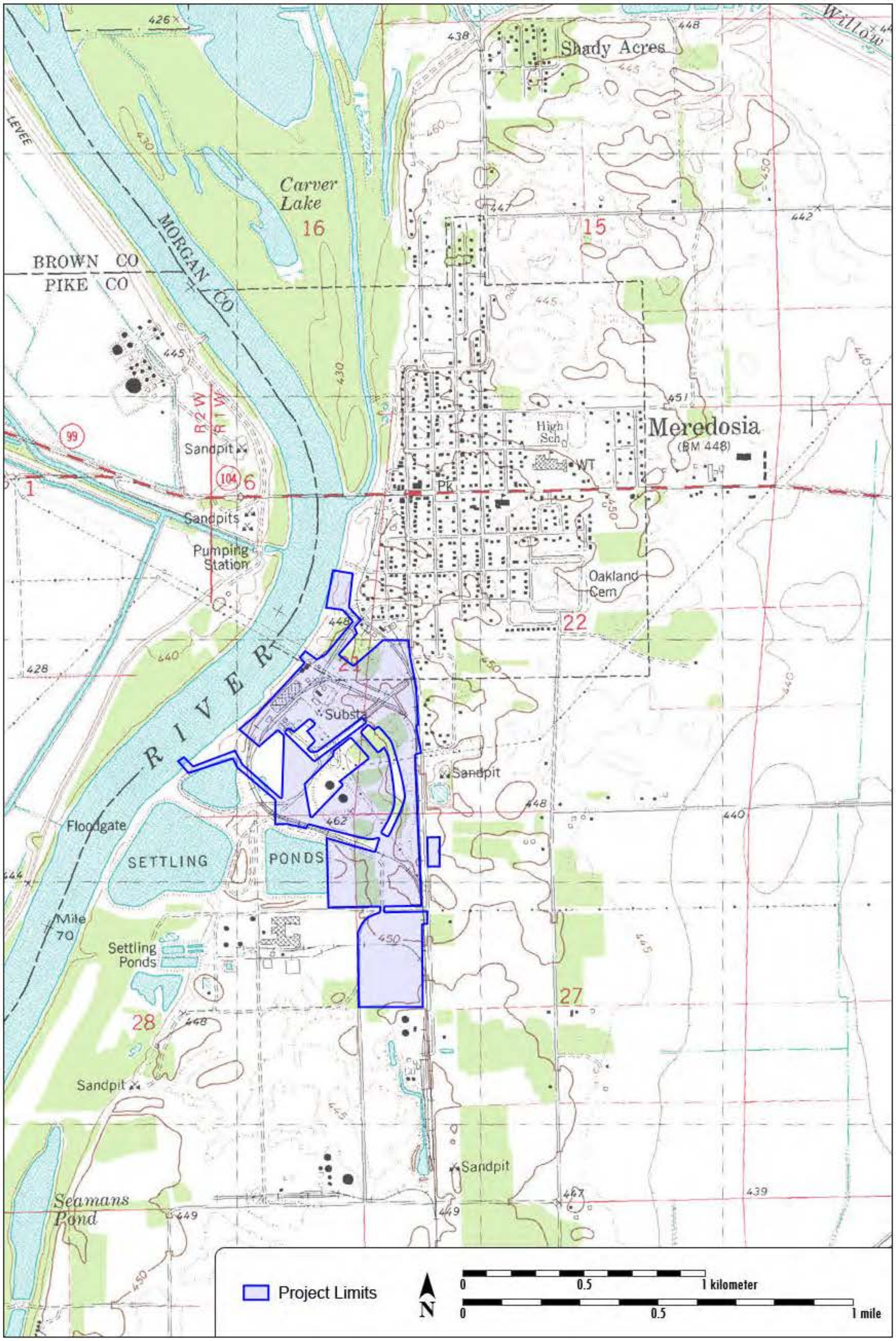


Figure 1. Location of the project area, Morgan County, Illinois (1980 Meredosia, IL 7.5' USGS Topographic Map).

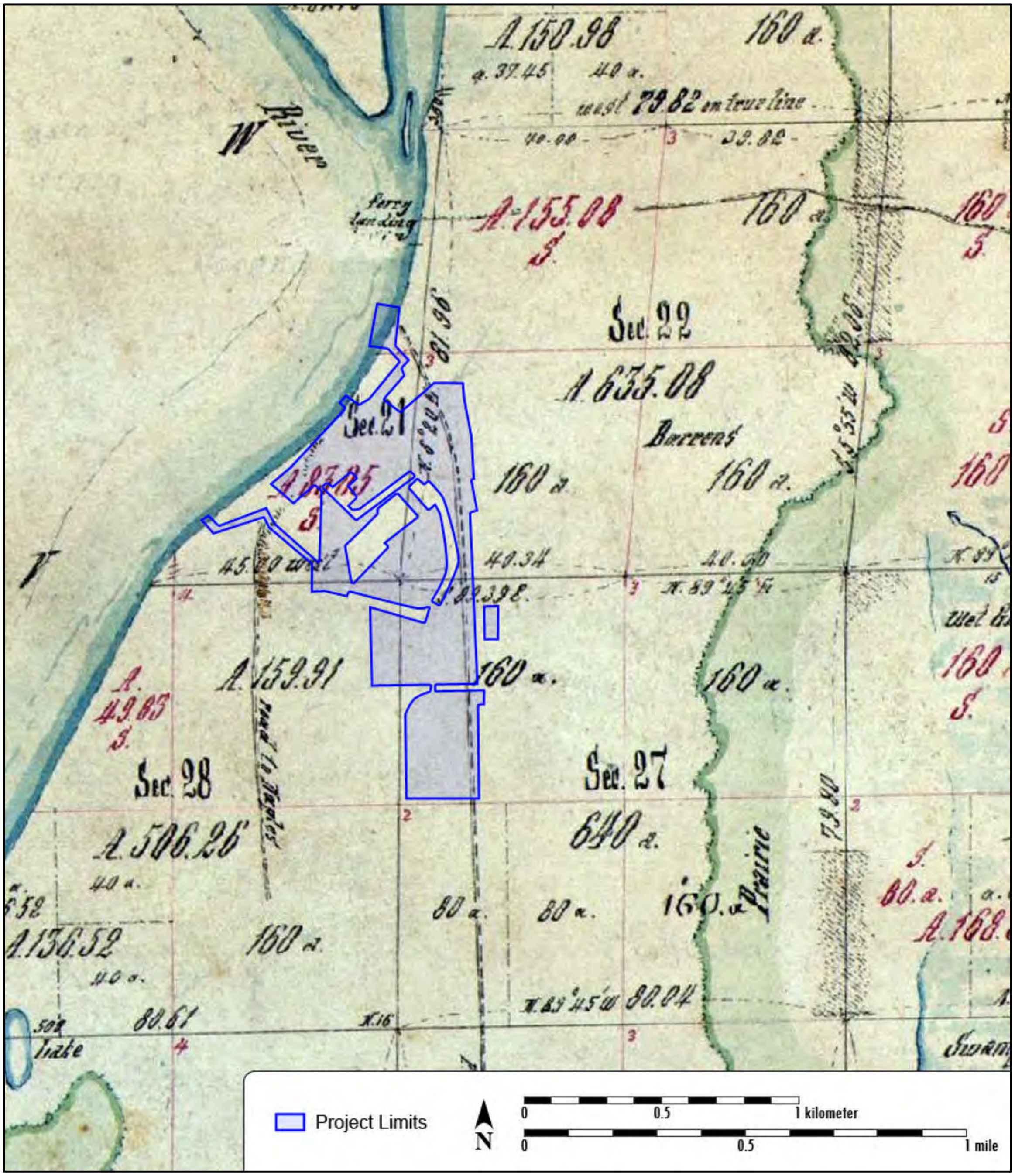


Figure 2. Location of the project corridor, Township 16 North, Range 13 West (1862 United States General Land Office Survey)

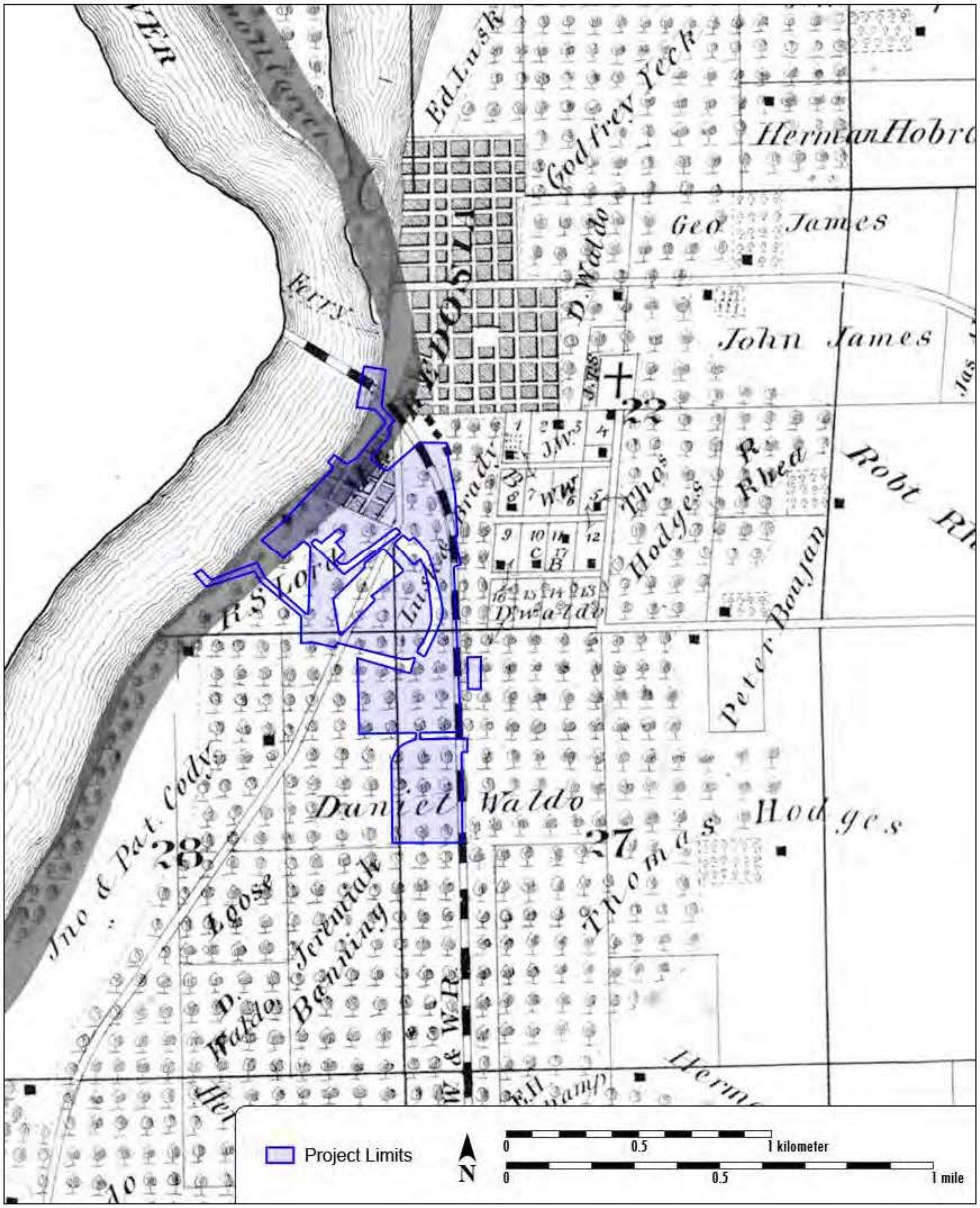


Figure 3. Location of the project corridor, Morgan County, Illinois (1872 Atlas Map of Morgan County, Illinois).

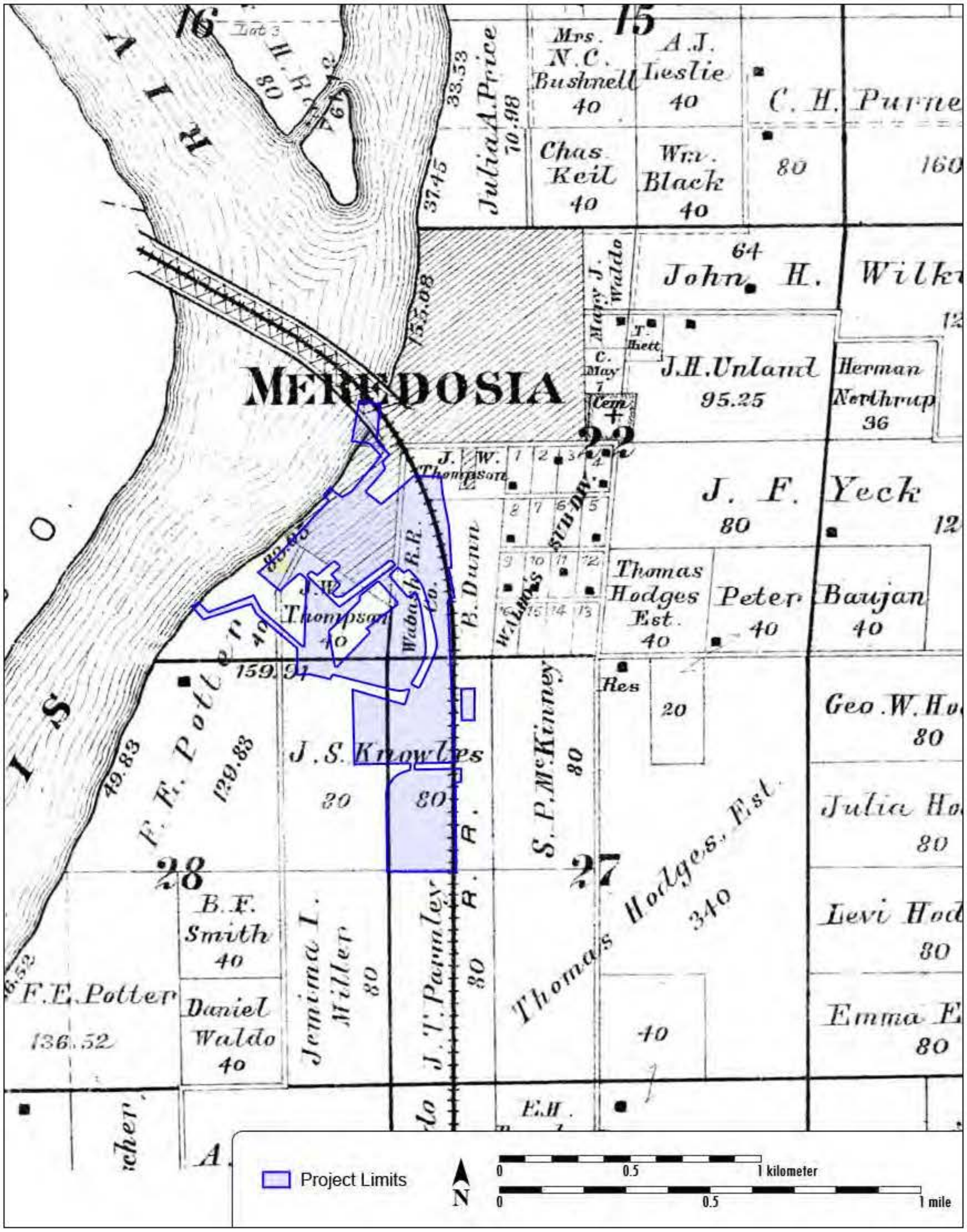


Figure 4. Location of the project area, Morgan County, Illinois (1894 Plat Book of Morgan County, Illinois).

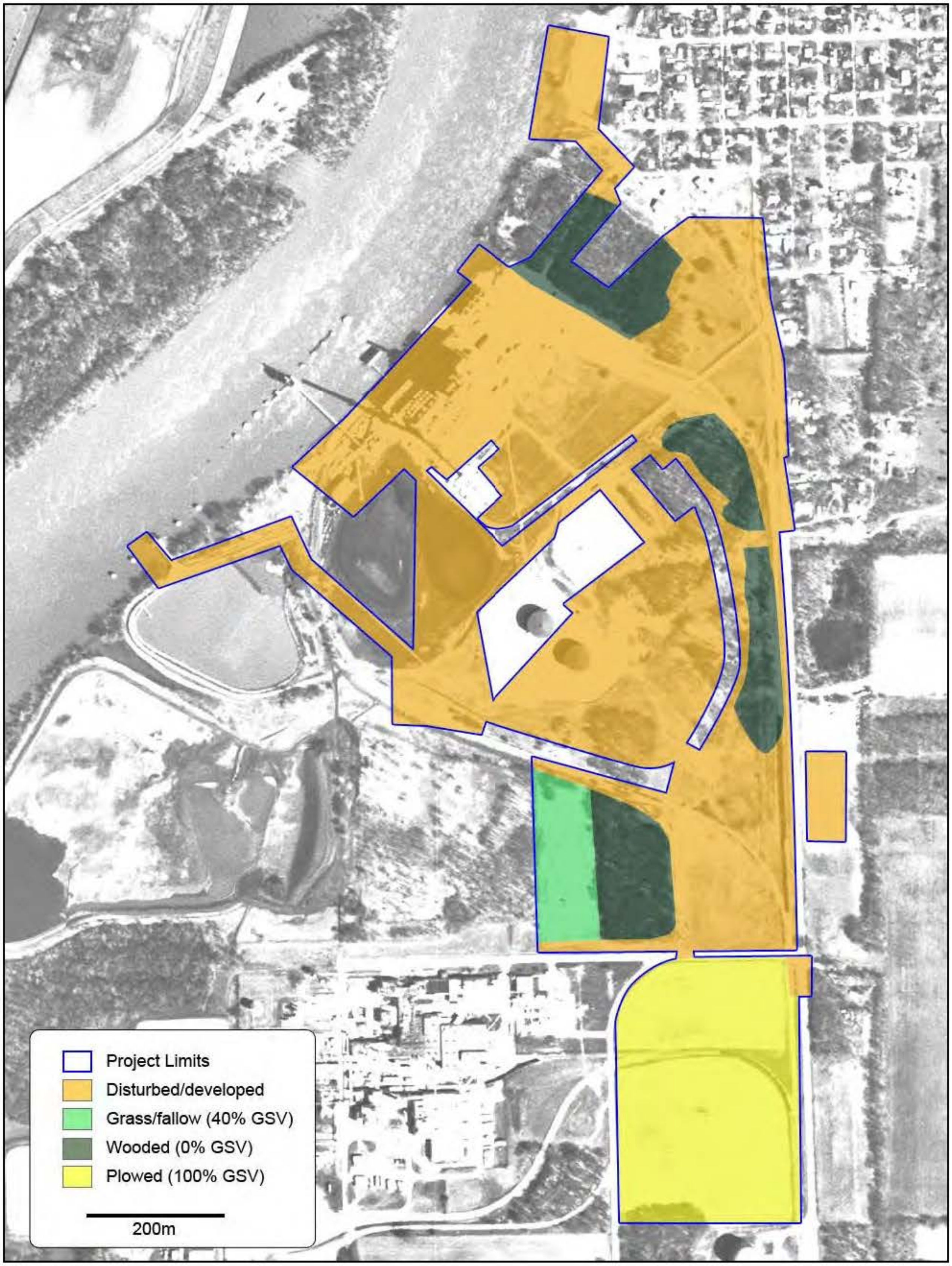


Figure 5. Ground surface visibility within the project area, Morgan County, Illinois.

APPENDIX A

Historical Research

Purchaser STEWART PETER
Residence of Purchaser MORGAN
Social Status

Legal Description
Aliquot Parts or Lot FRSEC
Section Number 21
Township 16N
Range 13W
Meridian 3
County of Purchase MORGAN

Details of Sale
Acres 41.52
Price per Acre 1.25
Total Price 51.90
Type of Sale FD
Date of Purchase 12/13/1831
Volume 068
Page 116

Purchaser STEWART WILLIAM
Residence of Purchaser MORGAN
Social Status

Legal Description
Aliquot Parts or Lot FRSEC
Section Number 21
Township 16N
Range 13W
Meridian 3
County of Purchase MORGAN

Details of Sale
Acres 41.53
Price per Acre 1.25
Total Price 51.91
Type of Sale FD
Date of Purchase 12/13/1831
Volume 068
Page 116

Purchaser BOSWELL WENNEY
Residence of Purchaser TAZEWELL
Social Status

Legal Description
Aliquot Parts or Lot W2SW
Section Number 22
Township 16N
Range 13W
Meridian 3
County of Purchase MORGAN

Details of Sale
Acres 80.00
Price per Acre 1.25
Total Price 100.00
Type of Sale FD
Date of Purchase 07/03/1832
Volume 068
Page 125

Purchaser WILLIAM JESSE
Residence of Purchaser SANGAMON
Social Status

Legal Description
Aliquot Parts or Lot W2NWPRE
Section Number 27
Township 16N
Range 13W
Meridian 3
County of Purchase MORGAN

Details of Sale
Acres 80.00
Price per Acre 1.25
Total Price 100.00
Type of Sale FD
Date of Purchase 09/07/1835
Volume 068
Page 255

Purchaser TURNER LYDIA
Residence of Purchaser SANGAMON
Social Status F

Legal Description
Aliquot Parts or Lot NEFRPRE
Section Number 28
Township 16N
Range 13W
Meridian 3
County of Purchase MORGAN

Details of Sale
Acres 79.95
Price per Acre 1.25
Total Price 99.94
Type of Sale FD
Date of Purchase 09/02/1835
Volume 068
Page 254

Purchaser TURNER WALTER
Residence of Purchaser SANGAMON
Social Status

Legal Description
Aliquot Parts or Lot NEFRPRE
Section Number 28
Township 16N
Range 13W
Meridian 3
County of Purchase MORGAN

Details of Sale
Acres 79.96
Price per Acre 1.25
Total Price 99.95
Type of Sale FD
Date of Purchase 09/02/1835
Volume 068
Page 254

APPENDIX B

ISM Site Form

ILLINOIS ARCHAEOLOGICAL SITE RECORDING FORM

County: Morgan **Site Name:** Northern Cross Railroad **Revisit:** N
Field Number: 08016-177 **State Site No.:** 473
Quadrangle (7.5'): Meredosia **Date Recorded:** 2010.07.20

LEGAL DESCRIPTION (to quarter quarter quarter section)

Align: SE	**1/4s:** NENESE	SESENW	**Section:** 21	**Township:** 16 N	**Range:** 13 W
Align: SW	**1/4s:** NWNWSW		**Section:** 22	**Township:** 16 N	**Range:** 13 W
Align:	**1/4s:**		**Section:** 0	**Township:** 0	**Range:** 0
Align:	**1/4s:**		**Section:** 0	**Township:** 0	**Range:** 0

UTM Coordinates (by ISM): **UTM Zone:** 15 **UTM North:** 4411007 **UTM East:** 708531
Ownership: Private

ENVIRONMENT

Topography: Floodplain **Elevation (in meters):** 131
Nearest Water Supply: Illinois **Drainage:** Lower Illinois
Soil Association: Oakville-Lamont-Alvin
Description: The site is located next to the Illinois River, just south of Meredosia.

SURVEY

Project Name: IL 104 Bridge **Site Area (square meters):** 30952
Ground Cover (List up to 3): Forest Brush Grass **Visibility (%):** 0
Survey Methods (List up to 2): Shovel Test **Standing Structures:** Y
Site Type (List up to 2): Commercial

SITE CONDITION

Extent of Damage: Moderate
Main Cause of Damage: Development

MATERIAL OBSERVED

Number of Prehistoric Artifacts (count or estimate): 0 **Number of Historic Artifacts (count or estimate):** 60
Prehistoric Diagnostic Artifacts: N **Historic Diagnostic Artifacts:** Y
Prehistoric Surface Features: N **Historic Surface Features:** N
Description: glass, metal, decorated ceramics, military button

TEMPORAL AFFILIATION (check all that apply)

			Colonial (1673-1780):
Prehistoric Unknown:	**Late Archaic:**	**Mississippian:**	**Pioneer (1781-1840):**
Paleoindian:	**Woodland:**	**Upper Mississippian:**	**Frontier (1841-1870):** Y
Archaic:	**Early Woodland:**	**Protohistoric:**	**Early Industrial (1871-1900):** Y
Early Archaic:	**Middle Woodland:**	**Historic Native American:**	**Urban Industrial (1901-1945):** Y
Middle Archaic:	**Late Woodland:**	**Historic (generic):**	**Post-War (1946-present):**

Description: Train depot dates to the 1870's. A sponge ware ceramic fragment appears to be from the 1850's. Military button dates post-1905.

Surveyor: Edwards-Ring **Institution:** ISA **Survey Date:** 6/30/2010 **Curation Facility:** UIU
Site Report by: J. Edwards-Ring **Institution:** ISA **Date:** 7/6/2010
IHPA Log No.: **IHPA First Sur. Doc. No.:**
Compliance Status: **NRHP Listing:** N

APPENDIX C

Photographs of Standing Structures[1]

[1] Ameren approves the release of photographs A through K associated with this report.

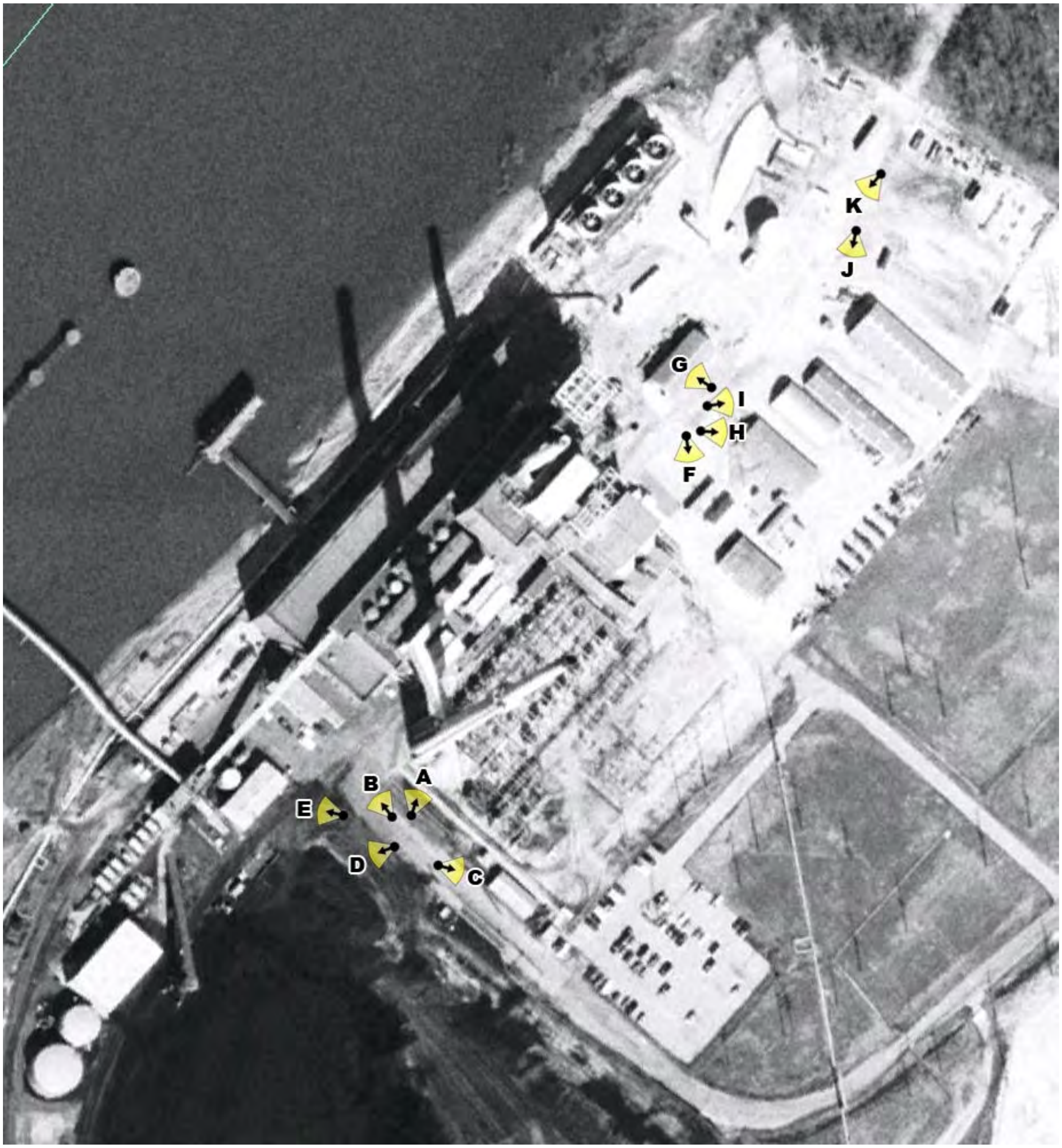


Photo index key


A


B


C


D


E


F


G


H


I


J


K

INTENTIONALLY LEFT BLANK

APPENDIX F4

PHASE I – BLUFF AREA PIPELINE RIGHT-OF-WAY SEGMENT SURVEY

INTENTIONALLY LEFT BLANK

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER Date: Accepted Rejected IHPA USE ONLY (Form ASSR0886)

PHASE I CULTURAL RESOURCE SURVEY

FUTUREGEN INDUSTRIAL ALLIANCE, INC.
BLUFF AREA PIPELINE RIGHT-OF-WAY SEGMENT
MORGAN COUNTY, ILLINOIS

Prepared For

Patrick Engineering, Inc.
300 West Edwards Street, Suite 200
Springfield, Illinois 62704

January 2012

Prairie Archaeology & Research

P.O. Box 5603 ● Springfield, Illinois 62705-5603 ● Phone 217.544.4881
www.prairiearchaeology.com

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER	
Date:	
Accepted	Rejected
IHPA USE ONLY (Form ASSR0886)	

IHPA Log #: 004042811

LOCATIONAL INFORMATION AND SURVEY CONDITIONS

County: Morgan **Quadrangle:** Meredosia, IL and Chapin, IL 7.5 minute USGS

Project Type/Title: FutureGen Industrial Alliance pipeline, Morgan County, Illinois (Figure 1).

Funding and/or Permitting Federal/State Agencies: U.S. Department of Energy

Township: 16 North **Range:** 12 West **Section(s):** 30
Township: 16 North **Range:** 13 West **Section(s):** 25

Project Description: A phase I cultural resource investigation of the approximately 990 m pipeline related to the FutureGen project in Morgan County, Illinois.

Topography: Bluff Slope/Uplands

Soils: Specific soils in the project area include: 30F – Hamburg silt loam, 20 to 35 percent slopes; 30G – Hamburg silt loam, 35 to 60 percent slopes; 53E – Bloomfield loamy sand, 18 to 35 percent slopes; 131B – Alvin fine sandy loam, 2 to 7 percent slopes; and 131D – Alvin fine sandy loam, 7 to 15 percent slopes.

Drainage: Coon Run to Illinois River

Land Use/Ground Cover (Include % Visibility): The project area consisted of 1-acre of woods and 4.6-acres of grass and fallow with no ground surface visibility. In total, approximately 1.4-acres of the project corridor were within sloping areas with a ten percent or greater grade.

Survey Limitations: Survey limitations were minimal.

ARCHAEOLOGICAL AND HISTORICAL INFORMATION

Historical Plats/Atlases/Sources: The following historical sources were examined: 1862 *United States General Land Office Plat* (T16N, R12W & R13W), 1872 *Atlas Map of Morgan County, Illinois* (Andreas, Lyter & Co.), 1894 *Plat Book of Morgan County, Illinois* (American Atlas Co.), and the 1983 *Chapin, IL* and 1980 *Meredosia, IL 7.5' Topographic Maps* (United States Geological Survey).

The 1833 GLO shows the project vicinity to be situated within timber. This source does not indicate any cultural landmarks (such as trails, fords, or roads) within the project boundaries (Figure 2).

The Illinois Public Domain Land Tract Database indicates the land parcels associated with the project corridor were purchased by several individuals. Absalom Smith and James Smith each purchased 80-acres of the northeast quarter of Section 25 from the federal government at the rate of $1.25 per acre on April 16, 1832. Absalom Smith also purchased the southwest quarter of the northwest quarter of Section 30 from the federal government at the rate of $1.25 per acre on

August 15, 1835. Additionally, the west half of the southwest quarter of Section 30 was purchased by Philip Aylesworth from the federal government at the rate of $1.25 per acre on September 23, 1835 (Appendix A: Historical Research).

The 1872 historical atlas indicates the parcels associated with the project corridor as owned by Emily Beagle and W. H. Wilday (Figure 3). The following 1894 atlas indicates all property as being owned by W. H. Wilday (Figure 4). Neither source indicates any structures in line with the project corridor.

Previous Surveys/ Reported Sites: A review of IHPA records indicates that no previous surveys or sites have been reported within the APE.

Regional Archaeologists Contacted: Databases maintained by the Illinois State Museum, the Illinois Department of Natural Resources, and the Illinois Historic Preservation Agency were reviewed.

Investigation Techniques: Shovel-probe reconnaissance at 15-meter intervals was conducted along the project corridor.

Field Time Expended: 32 man hours

Sites/Find Spots Located: none.

Cultural Material: none

(Curated at): n/a

Collection Techniques: n/a.

Area Surveyed (Acres & Square Meters): Approximately 5.6-acres (22,631.4 m^2).

<u>RESULTS OF INVESTIAGATIONS AND RECOMMENDATIONS (CHECK ONE)</u>

■ **Phase I Archaeological Reconnaissance Has Located No Archaeological Material; Project Clearance is Recommended.**

❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials: Site(s) Does (Do) Not Meet requirements for the National Register Eligibility; Project Clearance is Recommended.**

❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials; Site(s) May Meet Requirements for National Register Eligibility; Phase II Testing is Recommended.**

❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Does (Do) Not Meet Requirements for National Register Eligibility; Project Clearance is Recommended.**

❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Meet Requirements for National Register Eligibility; Formal Report is Pending and a Determination of Eligibility is Recommended.**

Comments: An intensive cultural resource survey of the area proposed to be impacted by site characterization activities associated the FutureGen project in Morgan County, Illinois was conducted on December 1 and 2, 2011. The project area's Area of Potential Effect (APE) is composed of a 23 meter wide corridor approximately 990 linear meters in length in wooded and grassy/fallow areas where 0 percent of the ground surface was visible to field investigators. Shovel-probe reconnaissance at 15-meter intervals was conducted within the wooded and fallow areas.

The current investigation included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, a review of the National Register of Historic Places (NRHP), and a review of the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency. Examination of archival and historical sources and resource databases did not identify that known prehistoric or historic sites, areas, or artifacts may be present within the boundaries of the APE or within the immediate vicinity of the APE.

Due to the APE's location along the bluff and uplands of Morgan County, it is unlikely that alluvial or colluvial depositional conditions have resulted in the deep burial of cultural deposits or remains. As a result, geomorphological investigative techniques to locate and assess deeply buried archaeological and historical resources or artifacts were deemed unnecessary.

Management Summary and Conclusions

A cultural resource inventory of the proposed development included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, and a review of the National Register of Historic Places (NRHP) and the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency. In addition to archival records and database examination, the subject property was examined by archaeologists utilizing shovel-probe reconnaissance at 15-meter intervals.

Based on the results of field investigations and information derived during archival and background research conducted by Prairie Archaeology & Research for the proposed FutureGen facility located in Morgan County, Illinois, additional cultural resource investigations are neither warranted nor recommend. It is our recommendation to State Historic Preservation Officer that concurrence and approval be provided.

Archaeological Contractor Information
Archaeological Contractor: Prairie Archaeology & Research.
Address/Phone: P.O. Box 5603, Springfield, IL 62705-5603 (217) 544-4881
Surveyors(s): Joseph Craig and Jason Rein
Survey Date(s): December 1 & 2, 2011
Report Completed By: Joseph Craig
Date: February 6, 2012
Submitted By (Signature and Title): ______________________

*Attachment Check List: (#1 through #4 are **MANDATORY)***

- ■ 1. Relevant Portion of USGS 7.5' Topographic Quadrangle Map(s) showing Project Location and Recorded Sites;
- ■ 2. Project Map(s) depicting Survey Limits and, when Applicable, Approximate Survey Limits, and Concentrations of Cultural Materials;
- ■ 3. Site Form(s); Two Copies of Each Form;
- ■ 4. All Relevant Project Correspondence;
- ☐ 5. Additional Information Sheets As Necessary

Address of Owner/Agent/Agency To Whom SHPO Comment Should Be Mailed

FutureGen Industrial Alliance, Inc. 1101 Pennsylvania Avenue, NW Sixth Floor Washington, D.C. 20004	**Contact Person:** Mr. Ken Humphreys, CEO **Phone Number:** (202) 280-6019 **Fax Number:** n/a
U. S. Department of Energy National Technology Laboratory 3610 Collins Ferry Road P. O. Box 880 Morgantown, WV 26507-0880	**Contact Person:** Mr. Cliff Whyte, NEPA Compliance Officer **Phone Number:** (304) 285-2098 **Fax Number:** n/a

Review Comments:

REFERENCES

Andreas, Lyter & Co.
1872 Atlas Map of Morgan County, Illinois. Davenport.

American Atlas Co.
1894 Plat Book of Morgan County, Illinois. Chicago.

United States Department of Agriculture
2012 http://websoilsurvey.nrcs.usda.gov

United States General Land Office
1862 General Land Survey Plats, T16N, R12W & R13W. Plats on file at the Illinois State Library, Springfield, Illinois.

United States Geological Survey
1980 Meredosia, IL 7.5 Minute Topographic Map
1983 Chapin, IL 7.5 Minute Topographic Map

FIGURES

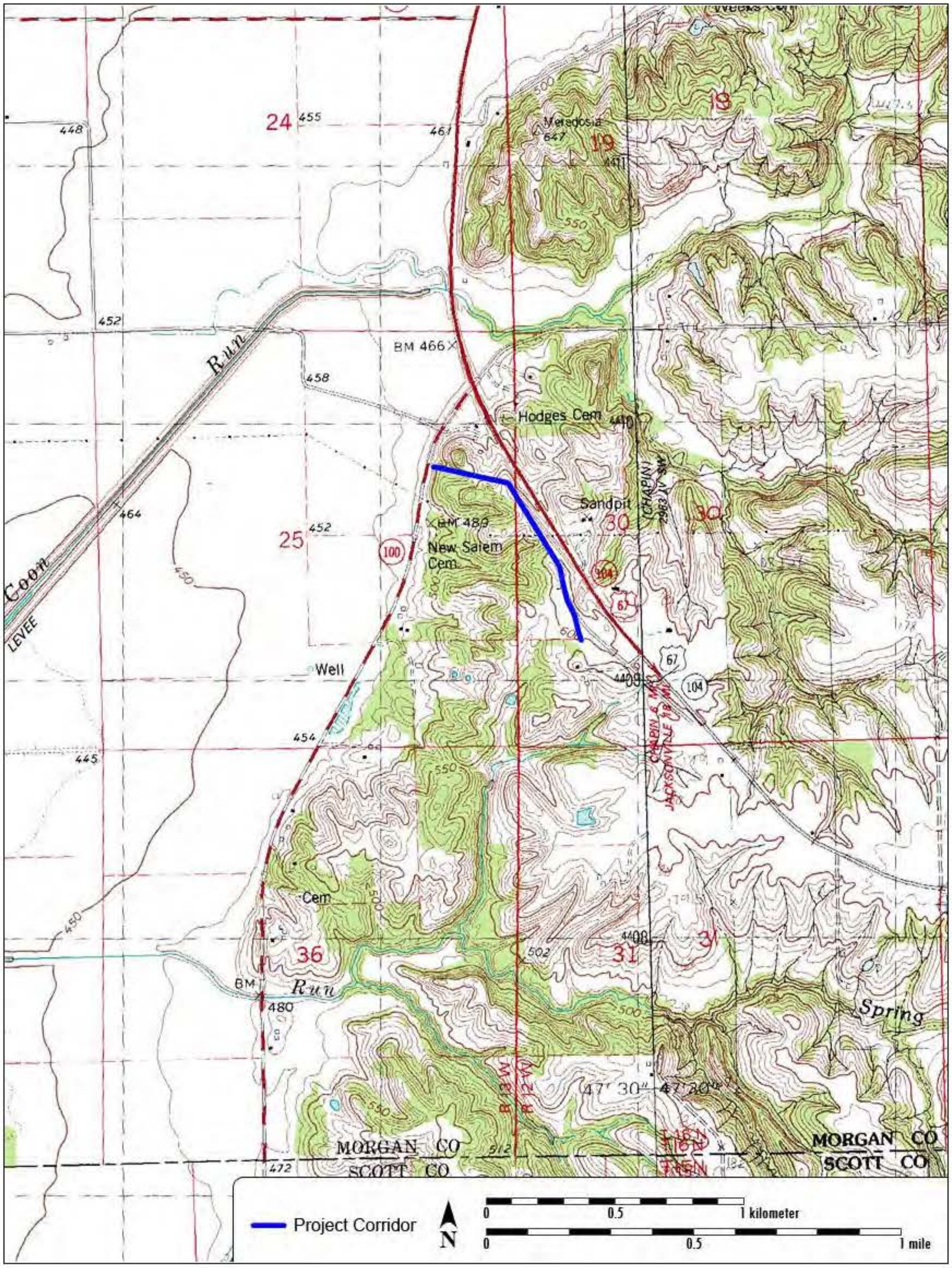


Figure 1. Location of the project corridor, Morgan County, Illinois (1980 Meredosia, IL and 1983 Chapin, IL 7.5' USGS Topographic Maps).

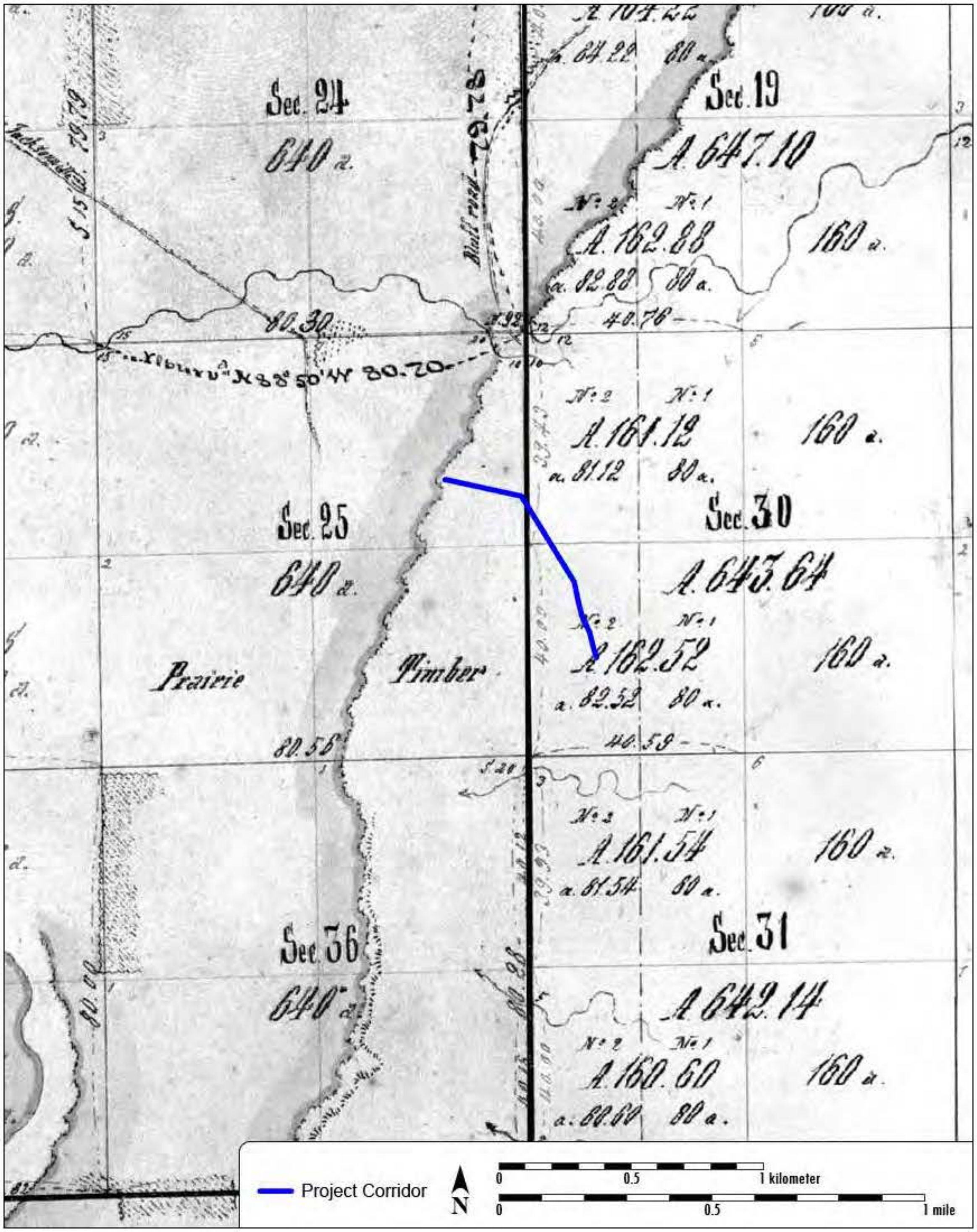


Figure 2. Location of the project corridor, Township 16 North, Range 12 & 13 West (1862 United States General Land Office Survey)

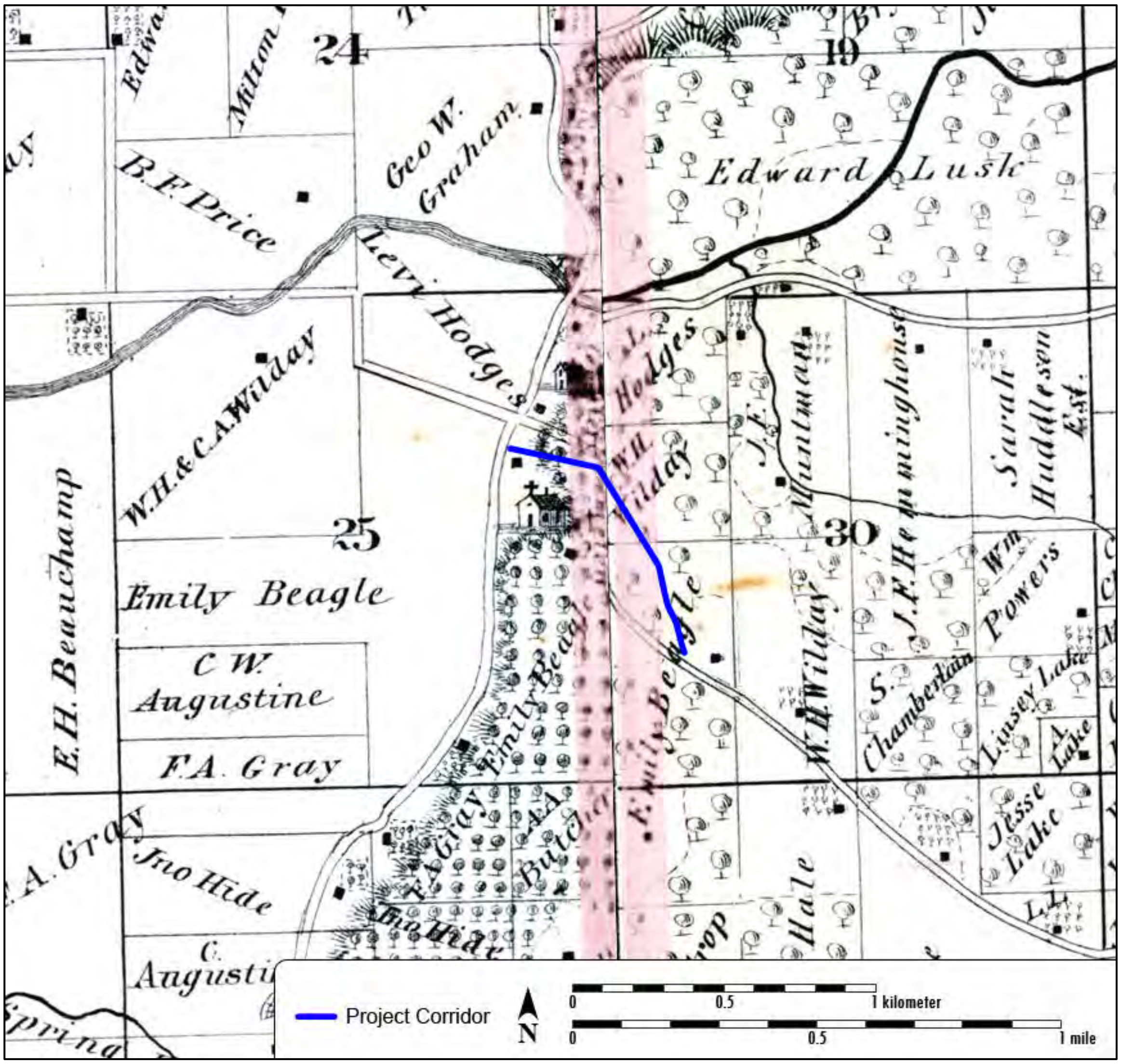


Figure 3. Location of the project corridor, Morgan County, Illinois (1872 Atlas Map of Morgan County, Illinois).

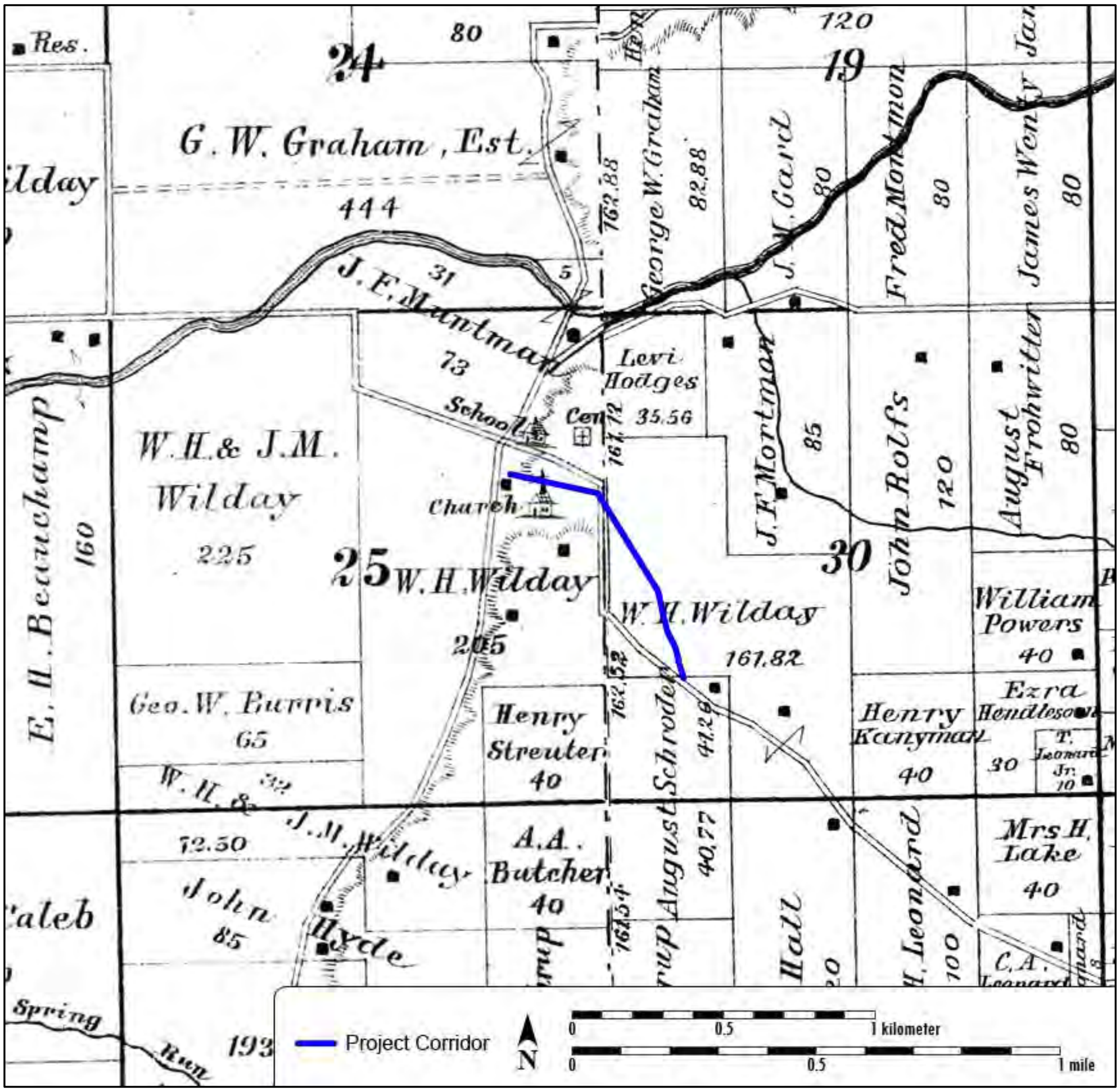


Figure 4. Location of the project area, Morgan County, Illinois (1894 Plat Book of Morgan County, Illinois).

APPENDIX A

Historical Research

Purchaser: SMITH ABSALOM
Residence of Purchaser: MORGAN
Social Status:

Legal Description:
Aliquot Parts or Lot: NEPRE
Section Number: 25
Township: 16N
Range: 13W
Meridan: 3
County of Purchase: MORGAN

Details of Sale:
Acres: 80.00
Price per Acre: 1.25
Total Price: 100.00
Type of Sale: FD
Date of Purchase: 03/16/1832
Volume: 068
Page: 119

Purchaser: SMITH ABSALOM
Residence of Purchaser: MORGAN
Social Status:

Legal Description:
Aliquot Parts or Lot: SWNW
Section Number: 30
Township: 16N
Range: 12W
Meridan: 3
County of Purchase: MORGAN

Details of Sale:
Acres: 40.50
Price per Acre: 1.25
Total Price: 50.62
Type of Sale: FD
Date of Purchase: 08/15/1835
Volume: 068
Page: 250

Purchaser: SMITH JAMES
Residence of Purchaser: MORGAN
Social Status:

Legal Description:
Aliquot Parts or Lot: NEPRE
Section Number: 25
Township: 16N
Range: 13W
Meridan: 3
County of Purchase: MORGAN

Details of Sale:
Acres: 80.00
Price per Acre: 1.25
Total Price: 100.00
Type of Sale: FD
Date of Purchase: 03/16/1832
Volume: 068
Page: 119

Purchaser: AYLESWORTH PHILIP
Residence of Purchaser: MORGAN
Social Status:

Legal Description:
Aliquot Parts or Lot: W2SW
Section Number: 30
Township: 16N
Range: 12W
Meridan: 3
County of Purchase: MORGAN

Details of Sale:
Acres: 82.52
Price per Acre: 1.25
Total Price: 103.15
Type of Sale: FD
Date of Purchase: 07/23/1835
Volume: 068
Page: 242

INTENTIONALLY LEFT BLANK

APPENDIX F5

PHASE I – SOIL GAS MONITORING LOCATIONS SURVEY

INTENTIONALLY LEFT BLANK

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER
Date:
Accepted Rejected
IHPA USE ONLY (Form ASSR0886)

PHASE I CULTURAL RESOURCE SURVEY

FUTUREGEN INDUSTRIAL ALLIANCE, INC.
SOIL GAS MONITORING LOCATIONS
MORGAN COUNTY, ILLINOIS

Prepared For

FutureGen Industrial Alliance, Inc.
1101 Pennsylvania Avenue, NW
Sixth Floor
Washington D.C. 20004

November 2011

Prairie Archaeology & Research

P.O. Box 5603 ● Springfield, Illinois 62705-5603 ● Phone 217.544.4881 / Fax 217.544.4988
www.prairiearchaeology.com

Archaeological Survey Short Report
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701 (217) 785-4997

REVIEWER	
Date:	
Accepted	Rejected
IHPA USE ONLY (Form ASSR0886)	

IHPA Log #: UNASSIGNED

LOCATIONAL INFORMATION AND SURVEY CONDITIONS

County: Morgan **Quadrangle:** Prentice, IL 7.5 minute USGS

Project Type/Title: FutureGen Industrial Alliance—Soil Gas Monitoring Locations, Morgan County, IL

Funding and/or Permitting Federal/State Agencies: U.S. Department of Energy

Township: 16 North **Range:** 9 West **Section(s):** 25, 26

Project Description: A phase I cultural resource investigation of the location for soil gas monitoring locations related to the FutureGen project in Morgan County, Illinois

Topography: Uplands

Soils: Specific soils in the project area include: 36C2 - Tama silt loam, 5 to 10 percent slopes, eroded; 43A - Ipava silt loam, 0 to 2 percent slopes; and 279B - Rozetta silt loam, 2 to 5 percent slopes.

Drainage: Indian Creek

Land Use/Ground Cover (Include % Visibility): The Area of Potential Effect (APE) consisted of approximately 5-acres of agricultural fields and 1-acre of fallow fields. Ground surface visibility within the agricultural fields ranged from 20 to 50 percent in harvested beans to 100 percent in plowed fields (Figure 6).

Survey Limitations: Survey limitations were minimal.

ARCHAEOLOGICAL AND HISTORICAL INFORMATION

Historical Plats/Atlases/Sources: The following historical sources were examined: 1823 *United States General Land Office Plat* (T16N, R9W), 1872 *Atlas Map of Morgan County, Illinois* (Andreas, Lyter & Co.), 1894 *Plat Book of Morgan County, Illinois* (American Atlas Co.), and the 1983 *Prentice, IL 7.5' Topographic Map* (United States Geological Survey).

The 1823 General Land Office (GLO) plat shows the project vicinity to be situated mostly within timber. This source does not indicate any cultural landmarks (such as trails, fords, or roads) within the project boundaries (Figure 2).

The Illinois Public Domain Land Tract Database indicates the land parcels associated with the project areas were purchased by four individuals (William O'Rear, Jacob Adams, and William Brown) between 1826 and 1836. All land was purchased from the federal government at the rate of $1.25 per acre (Figure 3).

The 1872 historical atlas indicates the parcels associated with the project areas as owned by William O'Rear, N. D., Maria Adams, and G. D. Strawn (Figure 4). This source does not indicate any structures within the APE.

The 1894 historical atlas indicates the parcels associated with the project areas as owned by the William O'Rear Estate, John Virgin, L. M. Thomas, James H. Martin, and D. G. Strawn (Figure 5). While this source indicates a structure adjacent to monitor location SG-2 on the O'Rear property, this is most likely due to mapping inconsistencies. No evidence of a structure or associated materials was recovered during this investigation.

Previous Surveys/ Reported Sites: A review of IHPA records indicates that no previous surveys or sites have been reported within the APE.

Regional Archaeologists Contacted: Databases maintained by the Illinois State Museum, the Illinois Department of Natural Resources, and the Illinois Historic Preservation Agency were reviewed.

Investigation Techniques: Pedestrian reconnaissance at 5-meter intervals was conducted within the agricultural fields. Shovel-probe reconnaissance at 15-meter intervals was conducted within fallow areas (Figure 7).

Field Time Expended: 1 man hour

Sites/Find Spots Located: None

Cultural Material: None

(Curated at): N/A

Collection Techniques: N/A

Area Surveyed (Acres & Square Meters): Approximately 6-acres (24,281 m^2).

<u>RESULTS OF INVESTIAGATIONS AND RECOMMENDATIONS (CHECK ONE)</u>

■ **Phase I Archaeological Reconnaissance Has Located No Archaeological Material; Project Clearance is Recommended.**

❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials: Site(s) Does (Do) Not Meet requirements for the National Register Eligibility; Project Clearance is Recommended.**

❑ **Phase I Archaeological Reconnaissance Has Located Archaeological Materials; Site(s) May Meet Requirements for National Register Eligibility; Phase II Testing is Recommended.**

❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Does (Do) Not Meet Requirements for National Register Eligibility; Project Clearance is Recommended.**

❑ **Phase II Archaeological Investigations Has Indicated that Site(s) Meet Requirements for National Register Eligibility; Formal Report is Pending and a Determination of Eligibility is Recommended.**

Comments: An intensive cultural resource survey of the area proposed to be impacted by soil gas monitoring activities associated the FutureGen project in Morgan County, Illinois was conducted on November 2, 2011. The project area is composed of approximately 5-acres in agricultural use where 20-50 percent of the ground surface was visible to field investigators and 1-acre of fallow fields with 0 percent ground surface visibility.

The current investigation included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, a review of the National Register of Historic Places (NRHP), and a review of the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency. Examination of archival and historical sources and resource databases did not identify that known prehistoric or historic sites, areas, or artifacts may be present within the boundaries of the APE or within the immediate vicinity of the APE.

Archaeological and cultural resource field examination of the APE included the use of pedestrian reconnaissance at 5-meter intervals and shovel-probe investigations at 15-meter intervals to locate evidence of unknown or unreported archaeological, historical or cultural sites, area, and artifacts. Field surveyors failed to find evidence of archaeological or historical resources, sites, or structures within the boundaries where soil gas monitoring activities will be conducted. Due to the APE's location within the interior uplands of Morgan County, it is unlikely that alluvial or colluvial depositional conditions have resulted in the deep burial of cultural deposits or remains. As a result, geomorphological investigative techniques to locate and assess deeply buried archaeological and historical resources or artifacts were deemed unnecessary.

Management Summary and Conclusions

A cultural resource inventory of the area proposed for soil gas monitoring activities related to the FutureGen Industrial Alliance facility in Morgan County, Illinois included an examination of historical maps and atlases pertinent to the subject property, a computer database search of the archaeological site files maintained by the Illinois State Museum, and a review of the National Register of Historic Places (NRHP), a review of the Illinois Register of Historic Sites (IRHS) maintained by the Illinois Historic Preservation Agency, and field investigations utilizing a pedestrian reconnaissance at 5-meter intervals.

Based on the results of field investigations and on information collected during archival and background research, the APE does not contain evidence for the presence of archaeological, historical, or cultural resources, sites, areas, or artifacts. As presently conceptualized, activities related to the soil gas monitoring of the Morgan County, IL FutureGen facility will not impact cultural resources. Further, additional cultural resource investigations are neither warranted nor recommend. State Historic Preservation Officer concurrence and approval is requested.

Archaeological Contractor Information

Archaeological Contractor: Prairie Archaeology & Research.
Address/Phone: P.O. Box 5603, Springfield, IL 62705-5603 (217) 544-4881
Surveyors(s): Joseph Craig and Jason Rein
Survey Date(s): November 2, 2011
Report Completed By: Jason Rein and Joseph Craig
Date: November 3, 2011
Submitted By (Signature and Title): ______________________

*Attachment Check List: (#1 through #4 are **MANDATORY**)*

- ■ 1. Relevant Portion of USGS 7.5' Topographic Quadrangle Map(s) showing Project Location and Recorded Sites;
- ■ 2. Project Map(s) depicting Survey Limits and, when Applicable, Approximate Survey Limits, and Concentrations of Cultural Materials;
- ■ 3. Site Form(s); Two Copies of Each Form;
- ■ 4. All Relevant Project Correspondence;
- ☐ 5. Additional Information Sheets As Necessary

Address of Owner/Agent/Agency To Whom SHPO Comment Should Be Mailed

FutureGen Industrial Alliance, Inc.
1101 Pennsylvania Avenue, NW
Sixth Floor
Washington, D.C. 20004

Contact Person: Mr. Ken Humphreys, CEO
Phone Number: (202) 280-6019
Fax Number: n/a

U. S. Department of Energy
National Technology Laboratory
3610 Collins Ferry Road
P. O. Box 880
Morgantown, WV 26507-0880

Contact Person: Mr. Cliff Whyte, NEPA Compliance Officer
Phone Number: (304) 285-2098
Fax Number: n/a

Review Comments:

REFERENCES

Andreas, Lyter & Co.
1872 Atlas Map of Morgan County, Illinois. Davenport.

American Atlas Co.
1894 Plat Book of Morgan County, Illinois. Chicago.

United States Department of Agriculture
2011 http://websoilsurvey.nrcs.usda.gov

United States General Land Office
1823 General Land Survey Plats, T16N, R9W. Plats on file at the Illinois State Library, Springfield, Illinois.

United States Geological Survey
1983 Prentice, IL 7.5 Minute Topographic Map

FIGURES

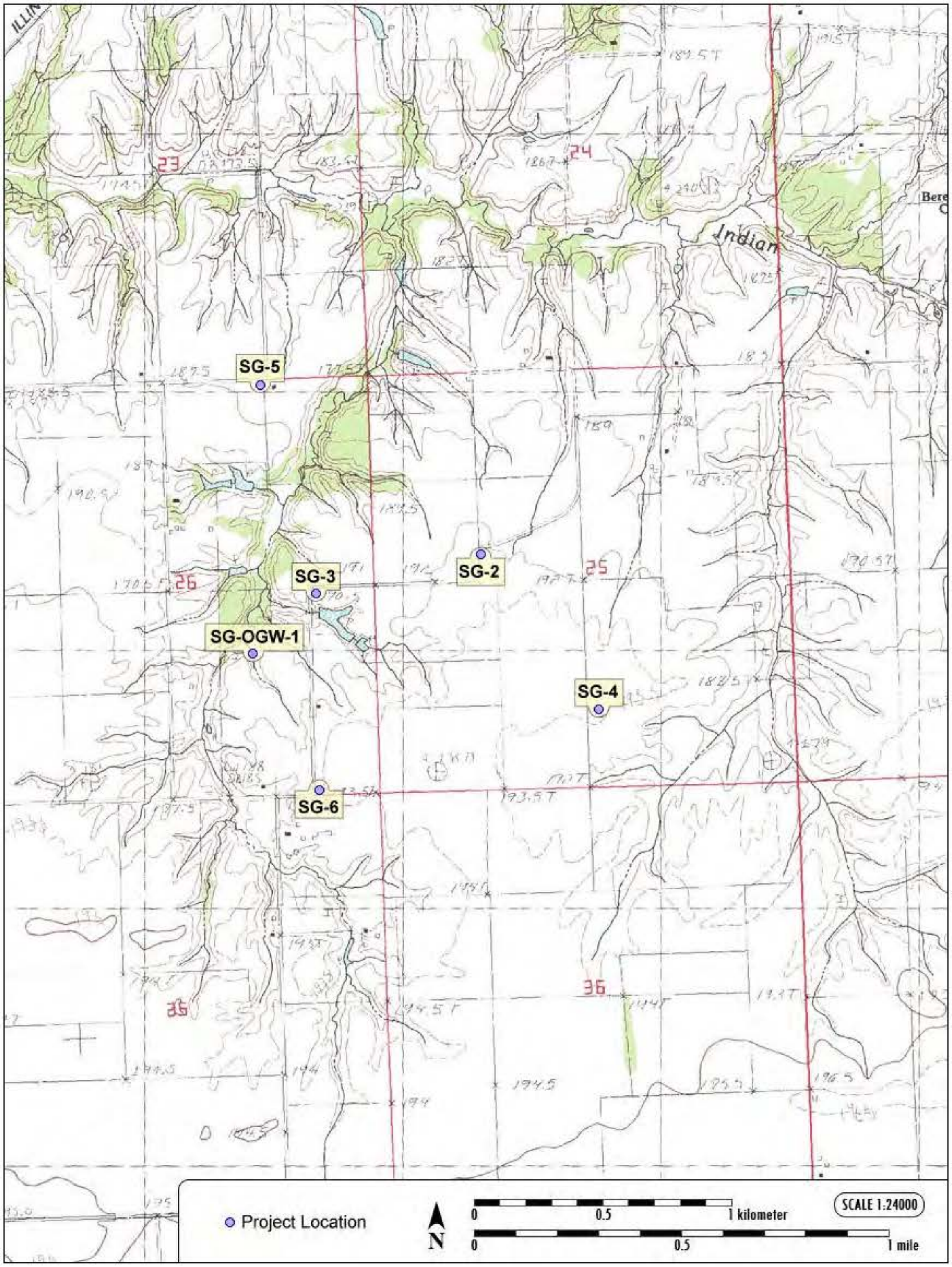


Figure 1. Location of the project area, Morgan County, Illinois (1983 Prentice, IL 7.5' USGS Topographic Map).

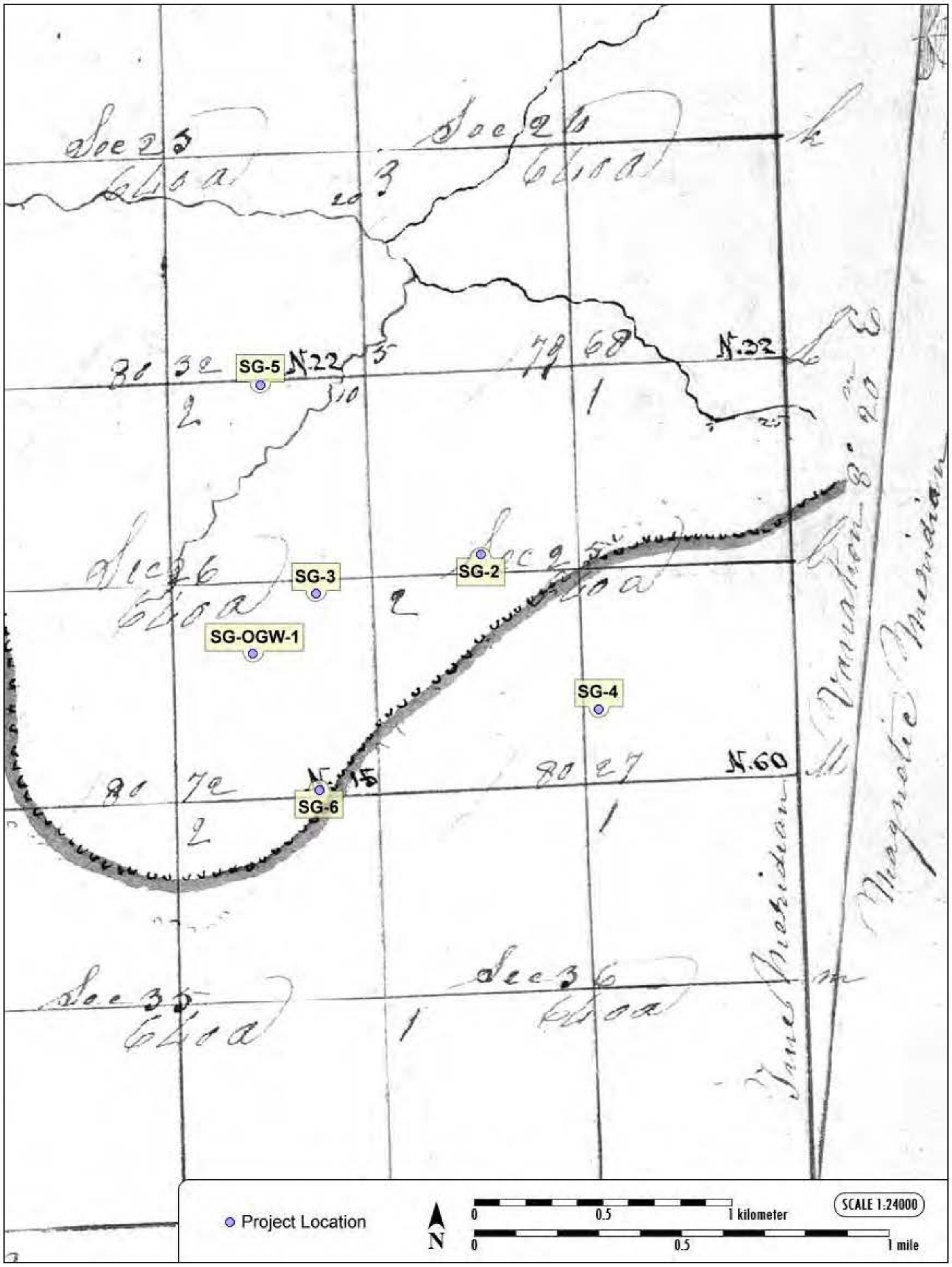


Figure 2. Location of the project area, Township 16 North, Ranges 9 West (1823 United States General Land Office Survey)

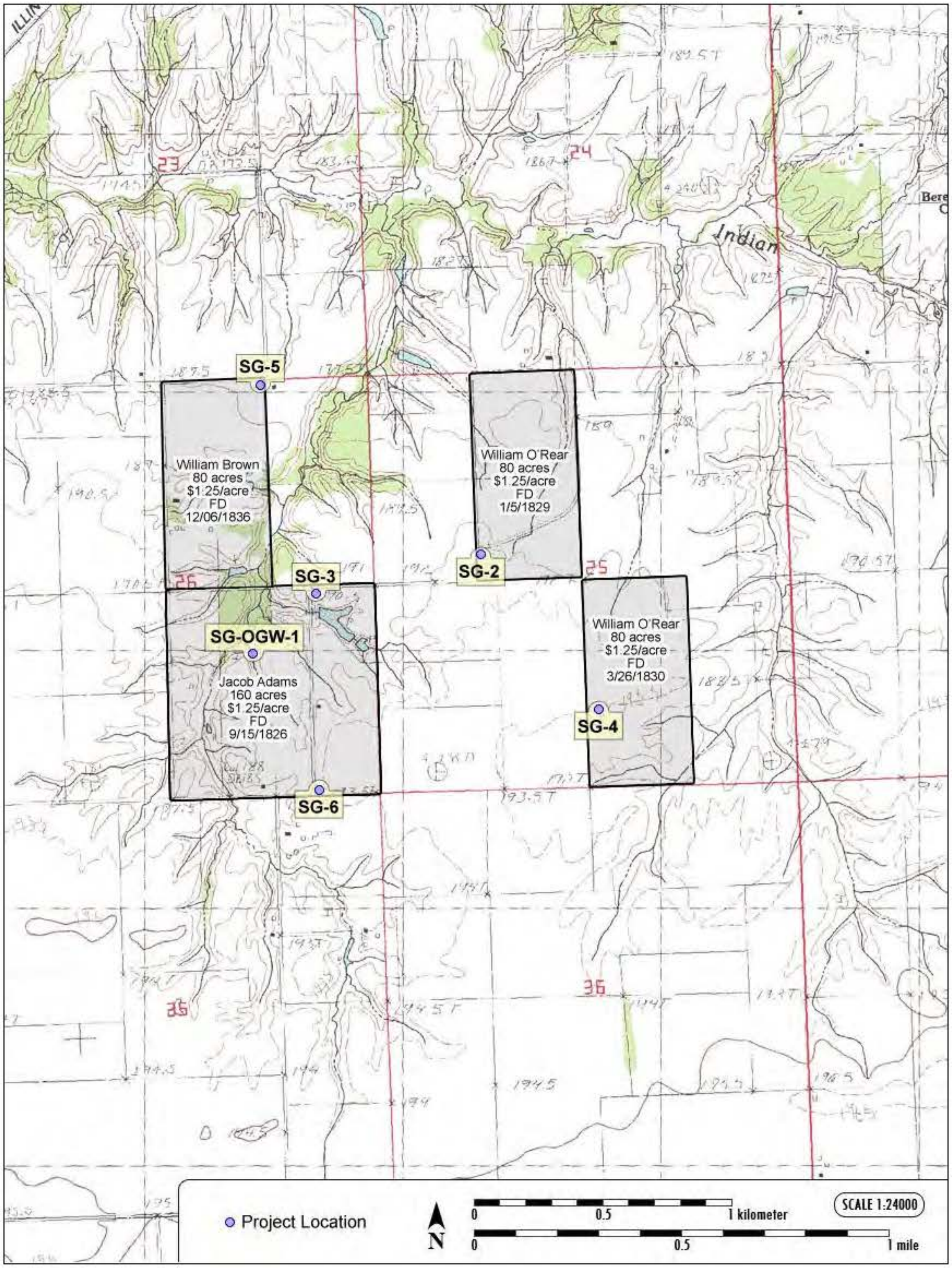


Figure 3. Initial land purchases within the project area.

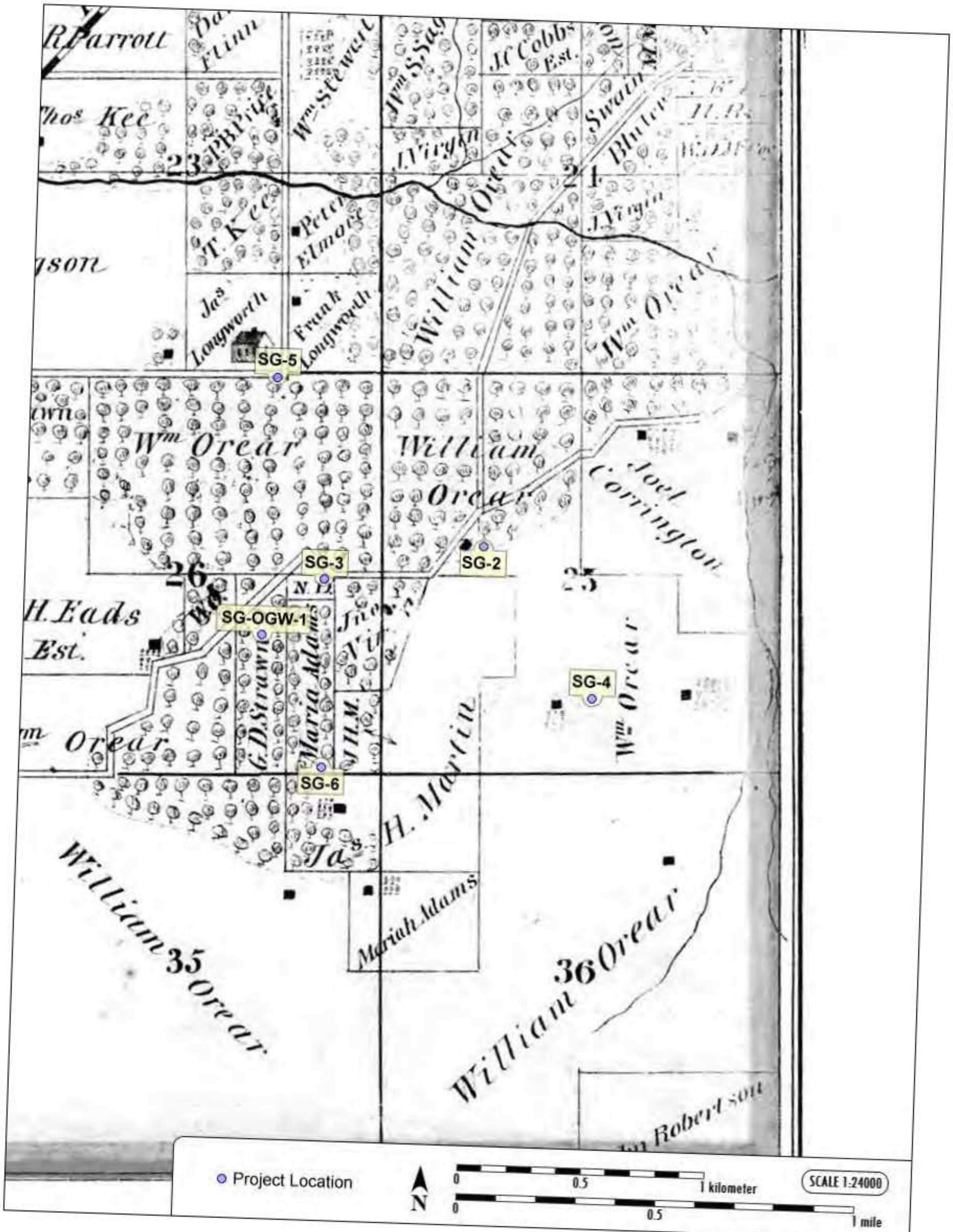


Figure 4. Location of the project area, Morgan County, Illinois (1872 Atlas Map of Morgan County, Illinois).

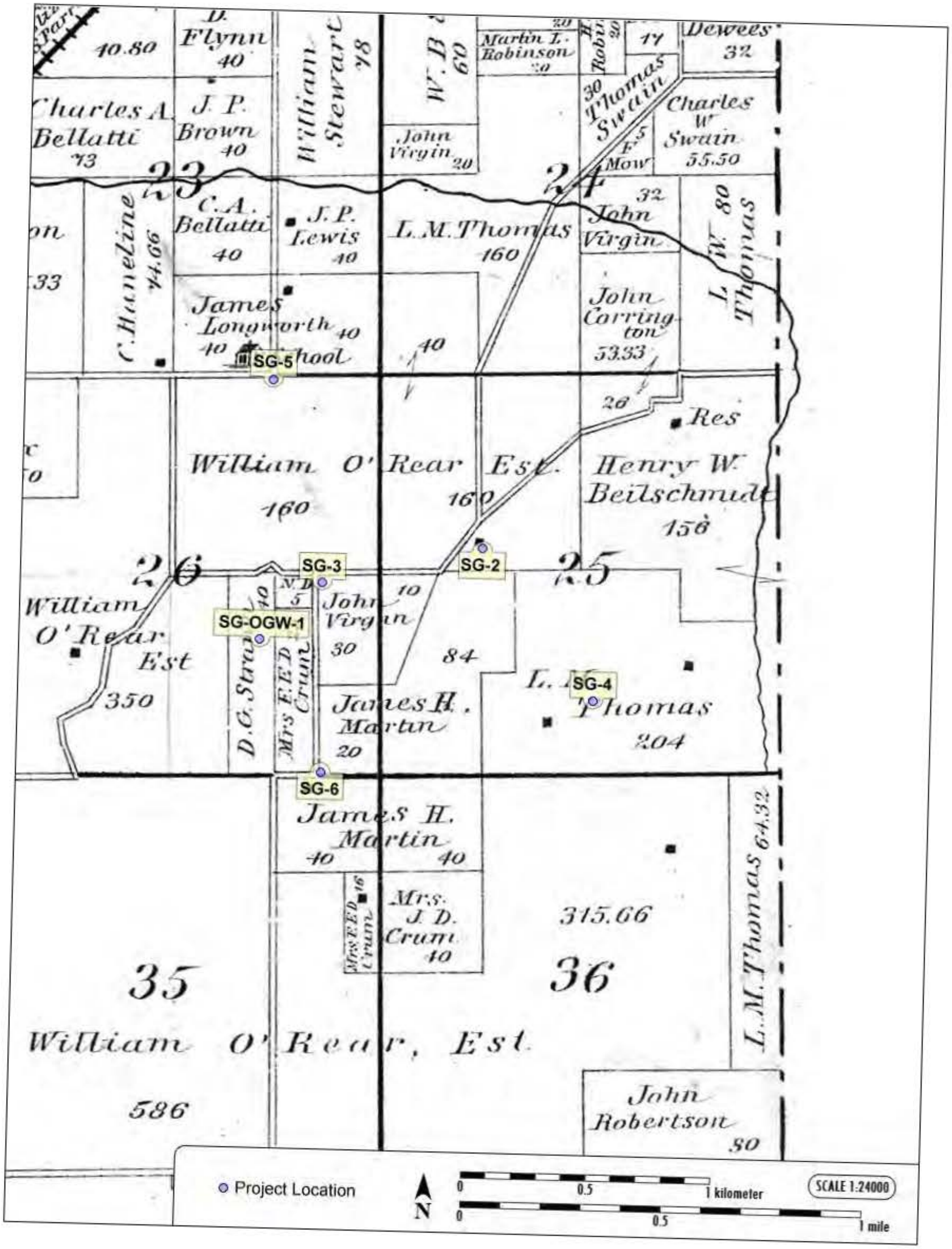


Figure 5. Location of the project area, Morgan County, Illinois (1894 Plat Book of Morgan County, Illinois).

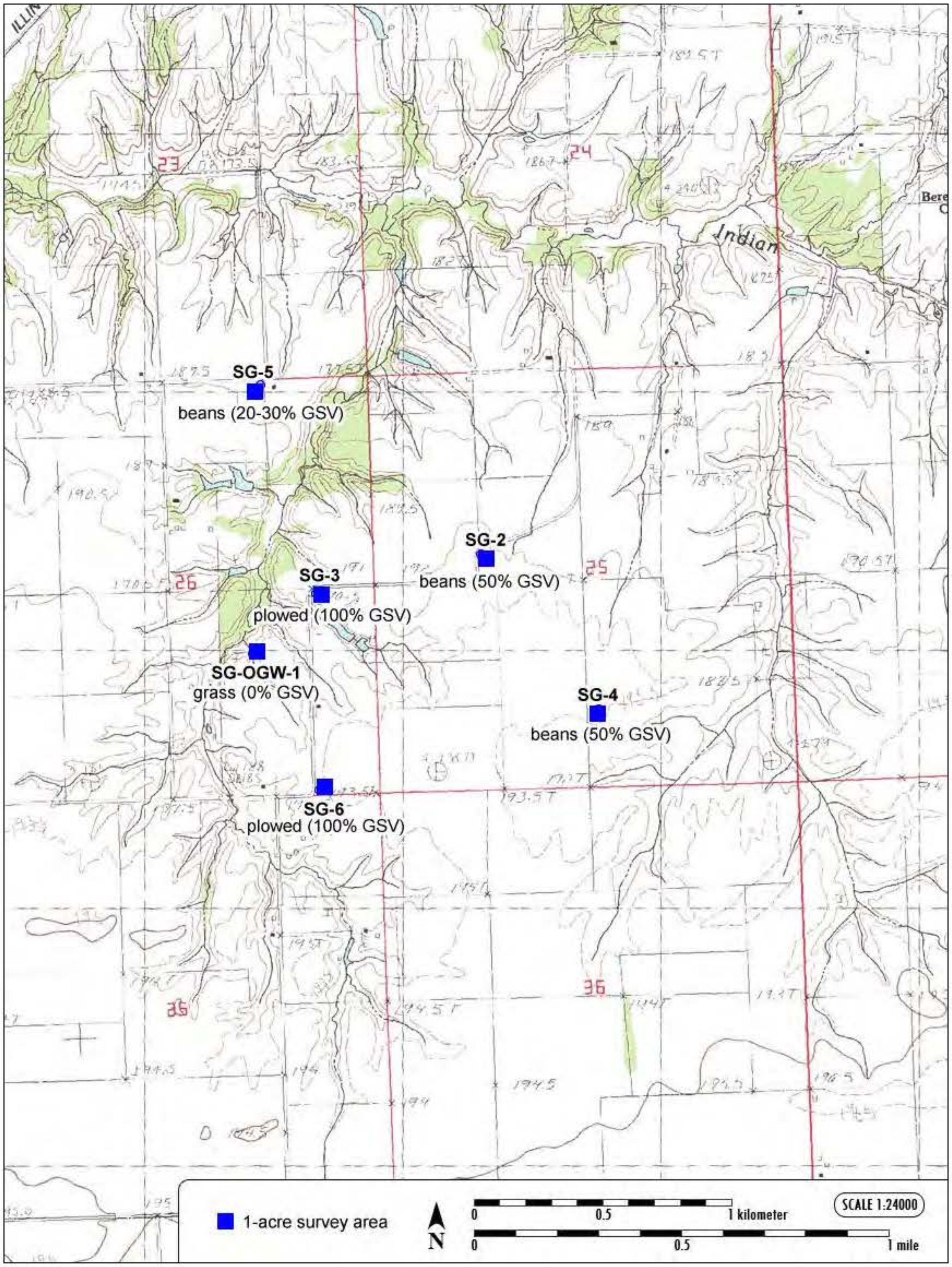


Figure 6. Ground surface visibility at each monitoring location at the time of survey.

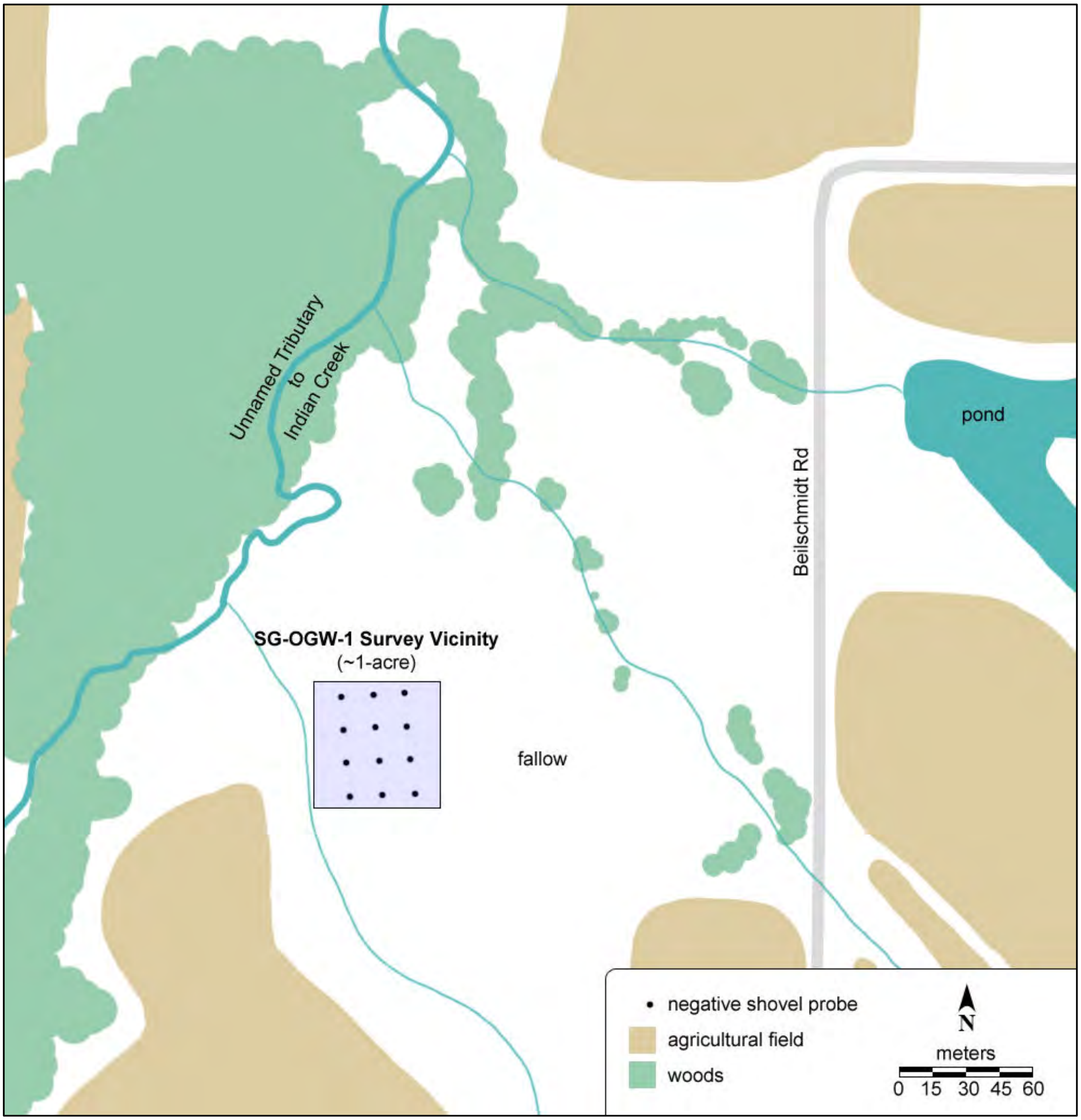


Figure 7. Location of shovel test probes within the vicinity of soil gas monitoring station SG-OGW-1

APPENDIX G

Geological Report

Technical Report: CO_2 Plume Delineation for the Morgan County CO_2 Storage Site

for the

Draft Environmental Impact Statement
FutureGen 2.0 Project
Meredosia, Illinois (Morgan County)

DOE/EIS-0460D
April 2013

INTENTIONALLY LEFT BLANK

Technical Report:
CO_2 Plume Delineation for the Morgan County CO_2 Storage Site
February 2013

1.0 Introduction and Background

After a siting process, the FutureGen Industrial Alliance, Inc. (Alliance) identified a site in Morgan County, Illinois as its preferred location for a permanent, safe, underground carbon dioxide (CO_2) storage site. The Morgan County CO_2 storage site is a component of the FutureGen 2.0 Project, a large-scale oxy-combustion repowering project that will use carbon capture and storage technology. The FutureGen 2.0 Project is a public-private partnership, with costs shared by the U.S. Department of Energy (DOE), the Alliance, and other project partners.

The Alliance plans to acquire a portion of the existing Meredosia Energy Center in Meredosia, Illinois, and repower one of its units with oxy-combustion and carbon capture technology. An oxy-combustion system burns coal with a mixture of oxygen and CO_2, instead of air, to produce a concentrated CO_2 stream that can be captured for geologic storage. The oxy-combustion boiler, air separation unit, and CO_2 purification and compression unit will allow the plant to capture at least 90 percent of its CO_2 emissions and reduce other emissions to near zero.

The captured CO_2 will be transported from the power plant through an underground pipeline to injection wells drilled into the Mount Simon Sandstone—sandstone that underlies central Illinois—so that the CO_2 can be sequestered within that geologic formation. The Alliance plans to inject approximately 1.1 million metric tons (MMT) of CO_2 annually into the Mount Simon Sandstone where it will be permanently stored. Visitor, research, and training facilities located near the CO_2 storage site will provide public education and outreach, as well as training and research opportunities associated with CO_2 capture and storage.

Working with Battelle and its Pacific Northwest Division, the Alliance has identified the approximate area in which the injection wells will be located, and, based on published and site-specific data, has estimated the size of the expected underground area in which the injected CO_2 will be permanently stored. The Alliance has used this information to (1) obtain the necessary property rights from local landowners, (2) provide information for DOE's National Environmental Policy Act (NEPA) process, and (3) prepare Underground Injection Control (UIC) permit applications to be submitted to the U.S. Environmental Protection Agency (EPA) pursuant to the Safe Drinking Water Act.

For DOE's NEPA process, the Alliance identified the area within which the CO_2 plume will be located as the "NEPA study area." The NEPA study area is approximately 5,300 acres, as shown in Figure 1.

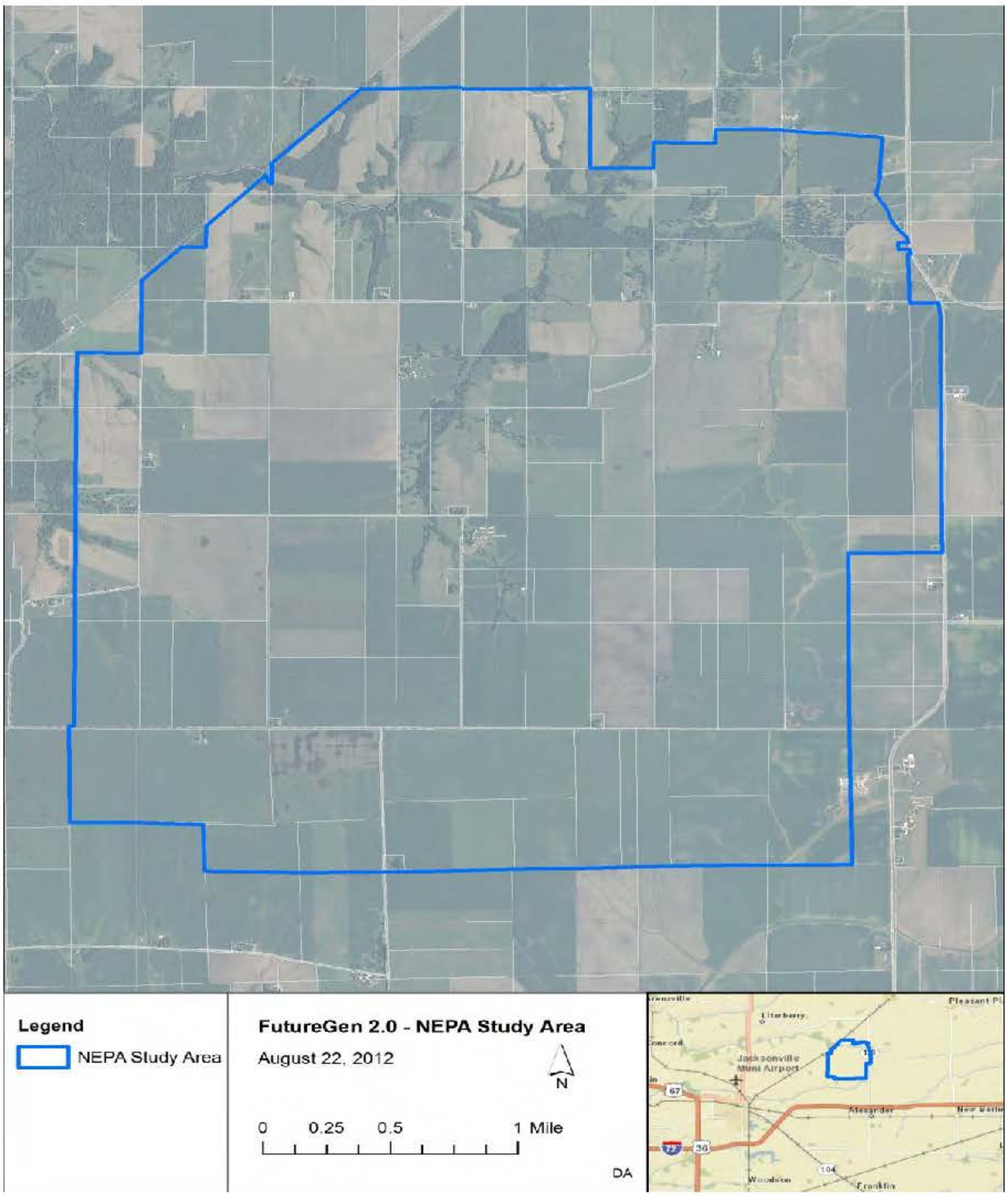


Figure 1. NEPA Study Area for the Morgan County CO_2 Storage Site

Because the exact location of the injection wells has not been determined, the exact location of the expected underground CO_2 plume has not been determined. However, based on computational modeling, the Alliance has identified the expected size of that plume after 20 years of injection at an annual rate of approximately 1.1 MMT (a total of 22 MMT). The expected 4,000- to 5,000-acre CO_2 plume will be contained within the 5,300-acre NEPA study area.

The Alliance evaluated several injection well configurations using both vertical and horizontal wells at one or two injection sites within the NEPA study area. The Alliance's original configuration was for two vertical injection wells to be located on separate injection well pads located 0.5 to 1 mile apart.

A *vertical well* is drilled from the ground surface to a specified completion depth in a straight line.

A *horizontal well* is drilled from the ground surface to a specified depth and then curved to proceed in a horizontal direction.

After consideration of site-specific data from the stratigraphic well, the Alliance is now proposing to construct and operate up to four horizontal injection wells for the annual injection of 1.1 MMT of CO_2 over a 20-year period (a total of 22 MMT). The Alliance will propose this configuration in the UIC permit applications it files with EPA.[1]

All four horizontal wells will originate from a common drilling pad and will operate independently of each other (i.e., separate wellheads). The injection well pad will also accommodate one or two monitoring wells.

The well pad will be a rectangle measuring approximately 640 feet by 500 feet, or approximately 7 acres (by comparison, the well pad for the Alliance stratigraphic well is approximately 350 feet by 350 feet, or approximately 3 acres). Surface facilities in close proximity to the injection well pad will consist of a Site Control Building and a Well Annulus Maintenance and Monitoring System Building. Surface facilities associated with the injection wells will require less than 25 acres for planned structures and access to monitoring points.

Each horizontal well will include a vertical section that extends through the Potosi Formation to an approximate depth of 3,150 feet and a 1,500- to 2,000-foot-long horizontal section in the Upper Mount Simon Formation at an approximate depth of 4,030 feet below

[1] It is possible, however, that the Alliance could propose a fewer number of horizontal wells at a later time. Any proposed injection well configuration will result in a CO_2 plume of between 4,000 and 5,000 acres that will be located within the NEPA study area.

ground surface (bgs).[2] Each horizontal well will be oriented along a different azimuth that is approximately 90 degrees from the two nearest (adjacent) wells to facilitate efficient distribution of the CO_2 and pore space use.

Figure 2 shows an injection well schematic with a cased-hole completion scenario. Figure 3 shows a conceptual arrangement of the four horizontal injection wells. Table 1 shows the length of each lateral leg and the mass rate of CO_2 injection for each well.

Table 1. Length and Mass Rate of CO_2 Injection for Each of the Injection Wells

Well	Length of Lateral Leg (feet)	Mass Rate of CO_2 Injection (MMT/year)
Injection well #1	2,000	0.3143
Injection well #2	1,500	0.2357
Injection well #3	2,000	0.3143
Injection well #4	1,500	0.2357

[2] This is the cased-well completion scenario, in which the long-string casing will be perforated across an approximately 1,500- to 2,000-foot long section of the Mount Simon Sandstone. A second possible scenario is an open-hole completion in which the 7-inch production casing will be set (i.e., terminated) on a formation packer shoe in the upper Elmhurst (approximate measured depth 3,950 feet bgs; approximate total vertical depth of 3,850 feet bgs) and the remainder of the penetrated Elmhurst and Mount Simon Formation would remain uncased.

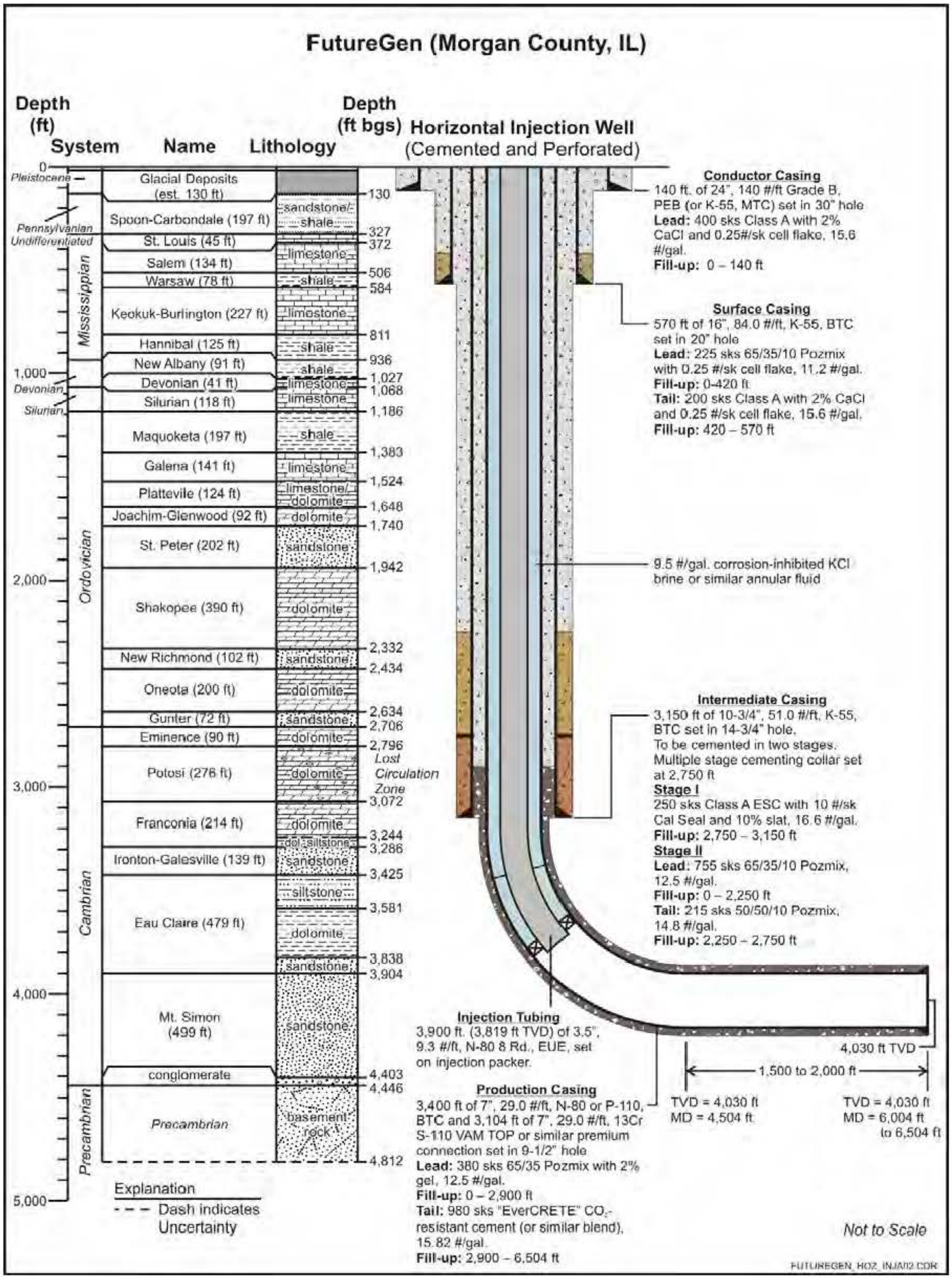


Figure 2. Injection Well Schematic – Cased-Hole Completion (geology and depths shown in this diagram are based on site-specific characterization data obtained from the FutureGen 2.0 stratigraphic well)

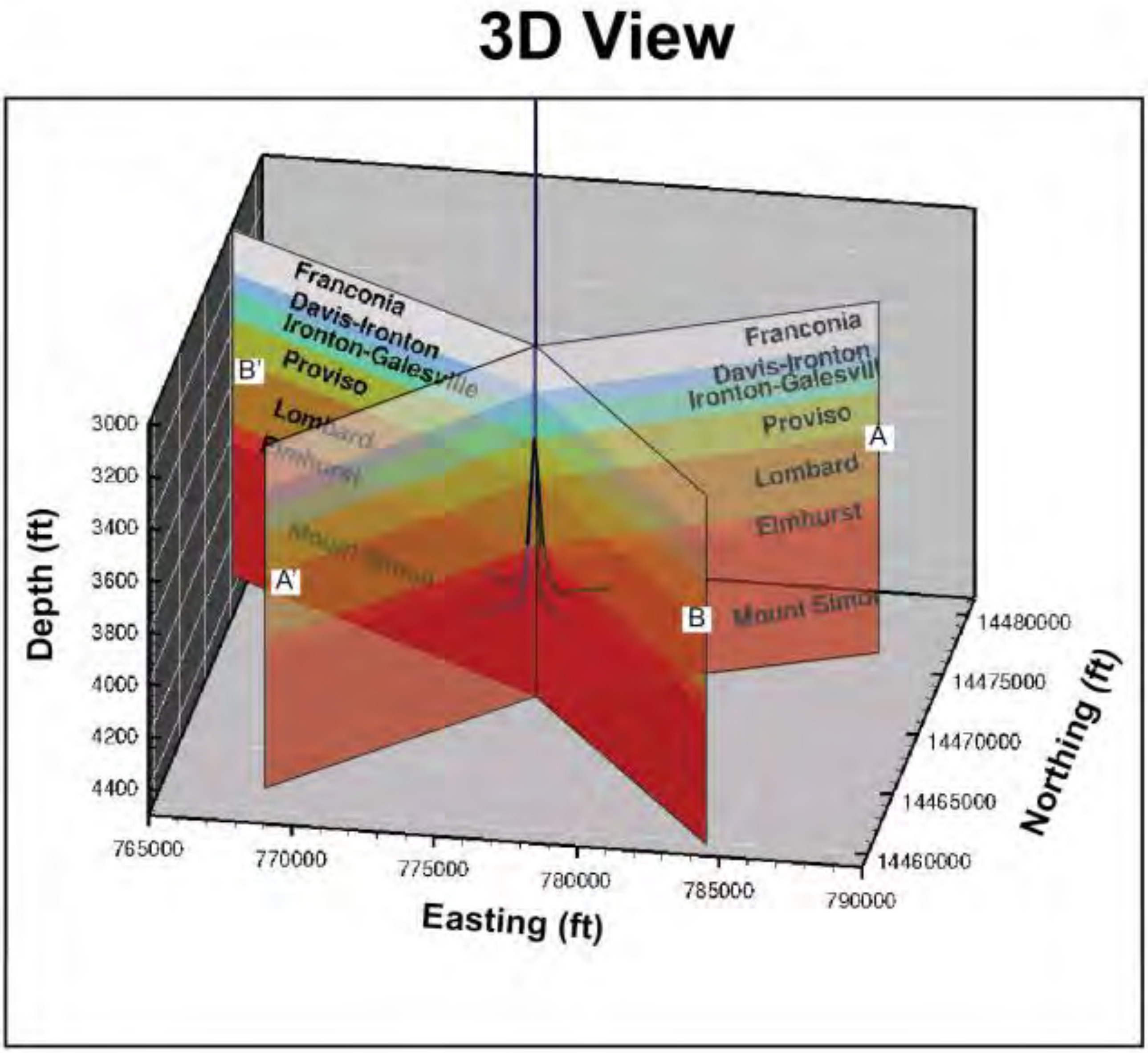


Figure 3. Conceptual Arrangement of Four Horizontal Injection Well Configuration

As currently planned, the injection wells will include the following casing strings: a 24-in.-diameter conductor string set at a depth of approximately 140 feet bgs; a 16-inch-diameter surface string set at a depth of approximately 570 feet bgs; a 10-3/4-inch-diameter intermediate string set at a depth of approximately 3,150 feet bgs; and a 7-inch-diameter long string set at an approximate (measured) depth of 6,504 feet bgs (approximate true vertical depth of 4,030 feet bgs) for a cased-hole completion scenario. The injection tubing will have an outer diameter of 3.5 inches and an inner diameter of 2.992 inches.[3]

Prior to construction of the injection wells and injection of CO_2, the Alliance will obtain a Class VI (CO_2 injection) UIC permit for each injection well as is required by EPA's Geologic Sequestration regulations (40 CFR §§ 146.81 – 146.95). The information in this technical report is consistent with the information that will be provided to EPA as part of the Alliance's UIC permit applications. It should be noted that the well configuration proposed in the Alliance's UIC permit applications could change. For example, the Alliance may propose a fewer number of horizontal wells. However, any injection well configuration proposed by the Alliance in its UIC permit applications will result in an underground CO_2 plume of between 4.000 and 5,000 acres and it will be located within the NEPA study area.

The remainder of this technical report describes how regional and site-specific geologic and hydrologic information was used in a computational model to delineate the CO_2 plume. It provides an overview of the geologic setting and describes the computational model, including a description of the simulator and the physical processes modeled, along with a description of the conceptual model and numerical implementation.

2.0 Overview of the Geologic Setting

The Alliance proposes to inject CO_2 into the Mount Simon Sandstone. The Mount Simon Sandstone is the thickest and most widespread potential CO_2 injection formation in Illinois (Leetaru and McBride 2009). The Mount Simon Sandstone has a proven injection-zone capacity, based on a number of natural-gas storage facilities across the Illinois Basin (Buschbach and Bond 1974; Morse and Leetaru 2005) and data from the Archer Daniels Midland (ADM) carbon

Injection Zone

The *injection zone* is defined in EPA's Class VI UIC regulations as "a geologic formation, group of formations, or part of a formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon dioxide through a well or wells associated with a geologic sequestration project." 40 CFR § 146.81(d). For the FutureGen 2.0 Project, the injection zone is the Mount Simon Sandstone Formation and the lower Eau Claire Formation (Elmhurst Sandstone member). However, the injection interval where the Alliance intends to inject CO_2 is the Mount Simon Sandstone Formation.

[3] For an open-hole completion, the open borehole will be between 6.5 and 9.5 inches in diameter. The difference depends on whether the borehole is drilled to total depth before installing/cementing the 7-inch production casing (9.5 inches) or if the 7-inch production casing is installed/cemented before drilling the open borehole section (6.5 inches).

storage site in Macon County, Illinois (Leetaru et al. 2009).

The Mount Simon Sandstone in the Illinois Basin represents a regional target for safe injection of anthropogenic CO_2 (Leetaru et al. 2005). The Illinois Basin covers an area of about 110,000 mi^2 over Illinois and parts of Indiana and Kentucky. The Illinois Basin contains approximately 120,000 mi^3 of Cambrian to Pennsylvanian marine and terrestrial sedimentary rocks with a maximum thickness of about 15,000 feet (Buschbach and Kolata 1991; Goetz et al. 1992; McBride and Kolata 1999).

More than 900 wells, mostly pre-1980, have been drilled into the Mount Simon Sandstone in the Illinois Basin (ISGS 2011); about 50 of these wells in Illinois extend to the Precambrian basement underlying the Mount Simon. Most of the wells drilled into the Mount Simon Sandstone prior to 1980 lack well-log suites suitable for quantitative analysis of porosity and permeability. In north-central Illinois where the Mount Simon Sandstone is used for natural-gas storage, some detailed analyses of porosity, permeability, and lithofacies connectivity are available, although most gas-storage wells only penetrate the upper part of the Mount Simon (Morse and Leetaru 2005).

Confining Zone

The *confining zone* is defined in EPA's Class VI UIC regulations as "a geologic formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as a barrier to fluid movement." 40 CFR § 146.81(d). For the FutureGen 2.0 Project, the confining zone is the Proviso and Lombard members of the Eau Claire Formation. The Franconia and Davis-Ironton Formations are a secondary confining zones. A confining zone is also referred to as a "caprock" or "seal."

The confining zone for the proposed injection zones consists of the Lombard and Proviso members of the Eau Claire Formation that overlies the Mount Simon and Elmhurst sandstones. The Eau Claire is the most important regional confining zone in Illinois (Leetaru et al. 2005, 2009). The Davis member of the Franconia Formation forms a secondary confining zone above the Eau Claire Formation. Impermeable Precambrian-aged basement rocks underlie the Mount Simon Sandstone and form a no-flow boundary.

The Eau Claire Formation is a widespread, heterolithic carbonate and fine siliciclastic unit present across west-central Illinois and parts of seven adjoining states (Sminchak 2011). The low-permeability Lombard and Proviso members of the Eau Claire form an effective confining layer at 38 natural-gas storage reservoirs in Illinois (Buschbach and Bond 1974; Morse and Leetaru 2005). The confining members of Eau Claire overlie the Elmhurst Sandstone member.

Regionally, the Lombard member of the Eau Claire Formation consists of glauconitic and sandy dolomite interbedded with mudstones and shale; the shale content increases to the south and sand content increases to the west and north (Willman et al. 1975). The Lombard member is overlain by the Proviso member, which is characterized by limestone, dolomite, sandy siltstone, and shale beds. The Lombard and Proviso members are continuous and extend across several buried Precambrian highs in the region. In addition to the Eau Claire Formation, the widespread, low-permeability Franconia Dolomite Formation (Kolata and Nimz 2010), is a secondary confining zone for the containment of CO_2 within the region.

The regional geology of Illinois is well known from wells and borings drilled in conjunction with hydrocarbon exploration, aquifer development and use, and coal and commercial mineral exploration. Related data are largely publicly available through the Illinois State Geological Survey (ISGS)[4] and the U.S. Geological Survey (USGS).[5] In addition, DOE has sponsored a number of studies by the Midwest Geologic Sequestration Consortium[6] to evaluate subsurface strata in Illinois and adjacent states as possible targets for the containment of anthropogenic CO_2.

In addition, to support the evaluation of the Morgan County site as a potential carbon storage site, the Alliance drilled and extensively characterized a deep stratigraphic well approximately 1 mile east of the planned injection site. The stratigraphic well reached a total depth of 4,826 feet bgs within the Precambrian basement. The well penetrated 479 feet of the Eau Claire Formation and 512 feet of the Mount Simon Sandstone.

Depth Measurements

Well depths, or points along a well, are provided in depths "below ground surface" (abbreviated bgs) or in depths "below kelly bushing" (abbreviated bkb or KB). A kelly bushing is a component of a drilling rig that is located above the ground surface on the drill rig used to drill the well. For the Alliance's stratigraphic well, the kelly bushing was 14 feet above the ground surface. Thus, for the stratigraphic well, the difference between a depth measured in bkb and a depth measured in bgs is 14 feet. If no specific designation is provided, the measurement is assumed to be bkb.

The stratigraphic well was extensively characterized, sampled, and geophysically logged during drilling. These resulting data, together with the regional data, form the basis for understanding the geologic setting at the proposed site. A total of 177 feet of whole core were collected from the lower Eau Claire-upper Mount Simon Sandstone and 34 feet were collected from lower Mount Simon Sandstone-Precambrian basement interval. In addition to whole drill core, a total of 130 side-wall core plugs were obtained from the combined interval of the Eau Claire Formation, Mount Simon Sandstone, and the Precambrian basement. Figure 4 shows the stratigraphic column at the Alliance's stratigraphic well on the Morgan County CO_2 storage site.

[4] http://www.isgs.uiuc.edu/
[5] http://www.usgs.gov/
[6] http://sequestration.org/

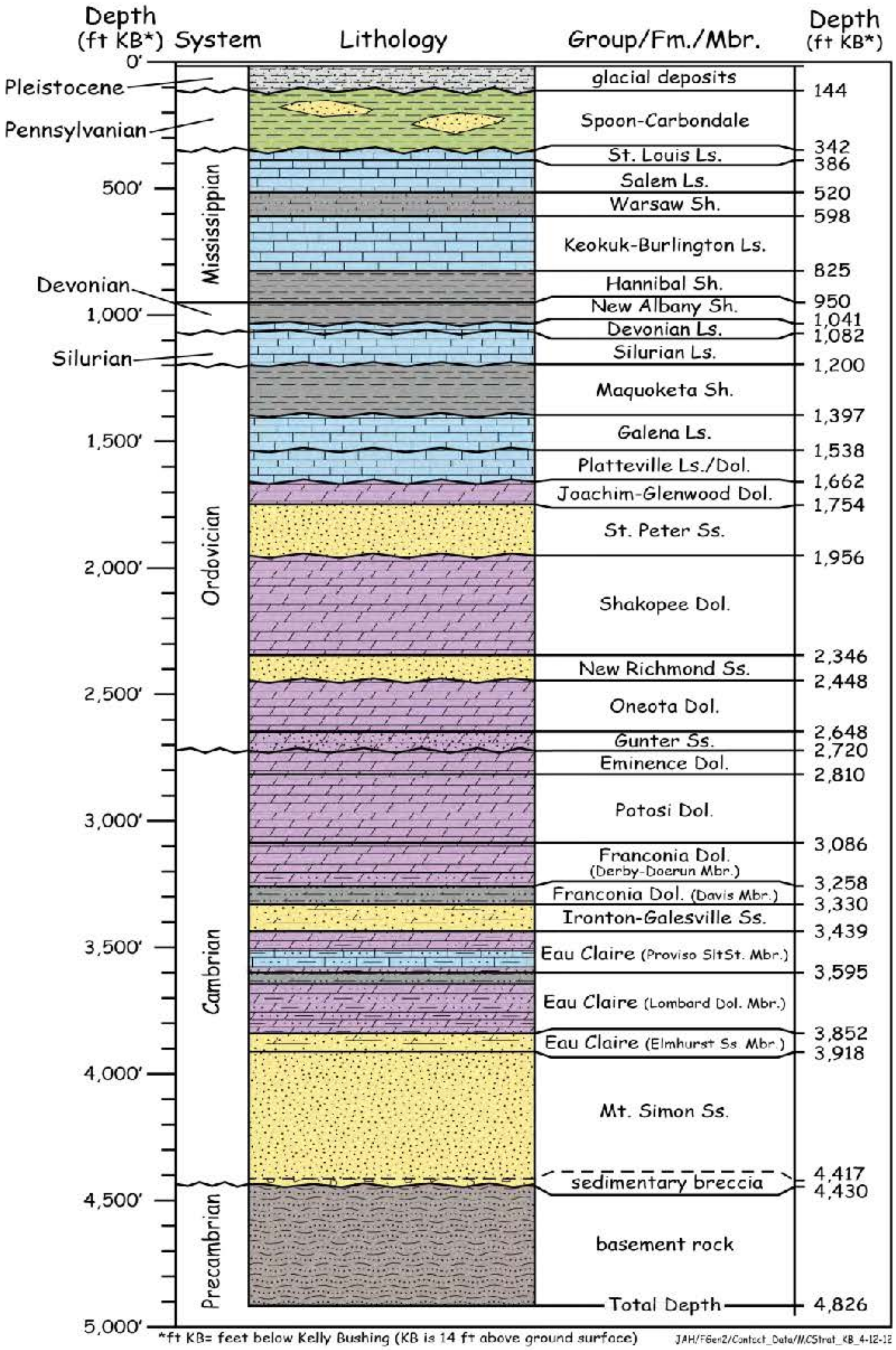


Figure 4. Stratigraphic Column at the Morgan County CO_2 Storage Site

Based on publicly available regional data and site-specific data obtained by the Alliance from its stratigraphic well drilled near the proposed injection site, the Mount Simon Sandstone at the site is sufficiently deep and has sufficient thickness, porosity, and permeability to store up to 33 MMT of CO_2. In addition, the Eau Claire Formation caprock at the site is of sufficient thickness, lateral continuity, and has low enough permeabilities to serve as the primary confining zone or caprock.

The site affords additional containment with several secondary confining zones, including the Franconian Formation. The basement rock was encountered at 4,430 feet and is a rhyolite, which will act as an impermeable lower boundary for the injection zones within the Mount Simon Sandstone.

3.0 Computational Modeling

Computational modeling comprises two elements: a computer code, or simulator, that implements the mathematics of scientific understanding, and implementation of the simulator as an analytical tool. These elements result in the ability to predict the quantity and distribution of CO_2 injected into saline reservoirs for permanent storage. This requires solving the mathematical equations that describe the migration and partition behavior of CO_2 as it is injected into geologic media for which the pore space is initially filled with an aqueous saline solution (brine). The equations that describe these flow and transport processes are too complex to solve directly. Therefore, the governing flow and transport equations are solved indirectly where space and time are divided into discrete elements. Space discretization involves dividing the storage reservoir into grid blocks and time discretization involves moving through time using finite steps. The discretization process transforms the governing flow and transport equations into forms that are solvable on high-speed computers. Both of the elements of the computational model that were used to determine the CO_2 plume for the Morgan County CO_2 storage site are described in the sections that follow.

4.0 Description of Simulator

Numerical simulation of CO_2 injection into deep geologic reservoirs requires the modeling of complex, coupled hydrologic, chemical, and thermal processes, including multi-fluid flow and transport, partitioning of CO_2 into the aqueous phase, and chemical interactions with aqueous fluids and rock minerals. The simulations conducted for this investigation were executed using the STOMP-CO2 simulator (White et al. 2012; White and Oostrom 2006; White and Oostrom 2000). STOMP-CO2 was verified against other codes used for simulation of geologic disposal of CO_2 as part of the GeoSeq code intercomparison study (Pruess et al. 2002).

Partial differential conservation equations for fluid mass, energy, and salt mass compose the fundamental equations for STOMP-CO2. Coefficients within the fundamental equations are related to the primary variables through a set of constitutive relationships. The salt transport equations are solved simultaneously with the component mass and energy conservation equations. The solute and reactive species transport equations are solved sequentially after the coupled flow and transport equations. The fundamental coupled flow equations are solved using an integral volume finite-difference approach with the nonlinearities in the discretized equations resolved through Newton-Raphson iteration. The dominant nonlinear functions within the STOMP-CO2 simulator are the relative permeability-saturation-capillary pressure (k-s-p) relationships.

The STOMP-CO2 simulator allows the user to specify these relationships through a large variety of popular and classic functions. Two-phase (gas-aqueous) k-s-p relationships can be specified with hysteretic or nonhysteretic functions or nonhysteretic tabular data. Entrapment of CO_2 with imbibing water conditions can be modeled with the hysteretic two-phase k-s-p functions. Two-phase k-s-p relationships span both saturated and unsaturated conditions. The aqueous phase is assumed to never completely disappear through extensions to the s-p function below the residual saturation and a vapor-pressure lowering scheme. CO_2 has the function of a gas in these two-phase k-s-p relationships.

For the range of temperature and pressure conditions present in deep saline reservoirs, four phases are possible: 1) water-rich liquid (aqueous), 2) CO_2-rich vapor (gas), 3) CO_2-rich liquid (liquid-CO_2) and 4) crystalline salt (precipitated salt). The equations of state express 1) the existence of phases given the temperature, pressure, and water, CO_2, and salt concentration; 2) the partitioning of components among existing phases; and 3) the density of the existing phases. Thermodynamic properties for CO_2 are computed via interpolation from a property data table stored in an external file. The property table was developed from the equation of state for CO_2 published by Span and Wagner (1996). Phase equilibria calculations in STOMP-CO2 use the formulations of Spycher et al. (2003) for temperatures below 100°C and Spycher and Pruess (2010) for temperatures above 100°C, with corrections for dissolved salt provided in Spycher and Pruess (2010). The Spycher formulations are based on the Redlich-Kwong equation of state with parameters fitted from published experimental data for CO_2-H_2O systems. Additional details regarding the equations of state used in STOMP-CO2 can be found in the guide by White et al. (2012).

A well model is defined as a type of source term that extends over multiple grid cells, where the well diameter is smaller than the grid cell. A fully coupled well model in STOMP-CO2 was used to simulate the injection of CO_2 under a specified mass injection rate, subject to a pressure limit. When the mass injection rate can be met without exceeding the specified pressure limit, then the well is considered to be flow controlled. Conversely, when the mass injection rate cannot be met without exceeding the specified pressure limit, then the well is considered to be pressure controlled and the mass injection rate is determined based on the injection pressure. The well model assumes a constant pressure gradient within the well and calculates the injection pressure at each cell in the well. The CO_2 injection rate is proportional to the pressure gradient between the well and surrounding formation in each grid cell. By fully integrating the well equations into the reservoir field equations, the numerical convergence of the nonlinear conservation and constitutive equations is greatly enhanced.

5.0 Physical Processes Modeled

Physical processes modeled in the reservoir simulations included non-isothermal multi-fluid flow and transport for a number of components (e.g., water, salt, and CO_2) and phases (e.g., aqueous and gas). The preliminary reservoir model assumes isothermal conditions, which are appropriate if the temperature of the injected CO_2 is similar to the formation temperature. Reservoir salinity is considered in the simulations because salt precipitation can occur near the injection well in higher permeability layers as the rock dries out during CO_2 injection. This can completely plug pore throats, making the layer impermeable, thereby reducing reservoir injectivity and affecting the distribution of CO_2 in the reservoir.

Injected CO_2 partitions in the reservoir between the free (or mobile) gas, entrapped gas, and aqueous phases. Sequestering CO_2 in deep saline reservoirs occurs through four mechanisms: 1) structural trapping, 2) aqueous dissolution, 3) hydraulic trapping, and 4) mineralization. Structural trapping is the long-term retention of the buoyant CO_2 phase in the pore space of the reservoir rock held beneath one or more impermeable caprocks. Aqueous dissolution occurs when CO_2 dissolves in the brine resulting in an aqueous-phase density greater than the ambient conditions. Hydraulic trapping is the pinch-off trapping of the CO_2 phase in pores as the brine re-enters pore spaces previously occupied by the CO_2 phase. Generally, hydraulic trapping only occurs upon the cessation of CO_2 injection. Mineralization is the chemical reaction that transforms formation minerals to carbonate minerals. In the Mount Simon Sandstone, the most likely precipitation reaction is the formation of iron carbonate precipitates. A likely reaction between CO_2 and shale is the dewatering of clays. Laboratory investigations are currently quantifying the importance of these reactions at the Morgan County CO_2 storage site. Therefore, the simulations described here did not include mineralization reactions. However, the STOMP-CO2 simulator does account for precipitation of salt during CO_2 injection.

The CO_2 stream provided by the plant to the storage site is 97 percent dry basis CO_2. Because the amount of impurities is small, for the purposes of modeling the CO_2 injection and redistribution for this project, it was assumed that the injectate was pure CO_2.

6.0 Geologic Model

A stratigraphic conceptual model of the geologic layers from the Precambrian basement to ground surface was constructed using the EarthVision® software package (Figure 5). The geologic setting and site-specific characterization data were the basis for the Morgan County CO_2 storage site model. Borehole data from the Alliance's stratigraphic well and data from regional boreholes and published regional contour maps were used as input data. However, units below the Shakopee Dolomite and above the Eau Claire Formation were assumed to have a constant thickness based on the stratigraphy observed at the stratigraphic well.

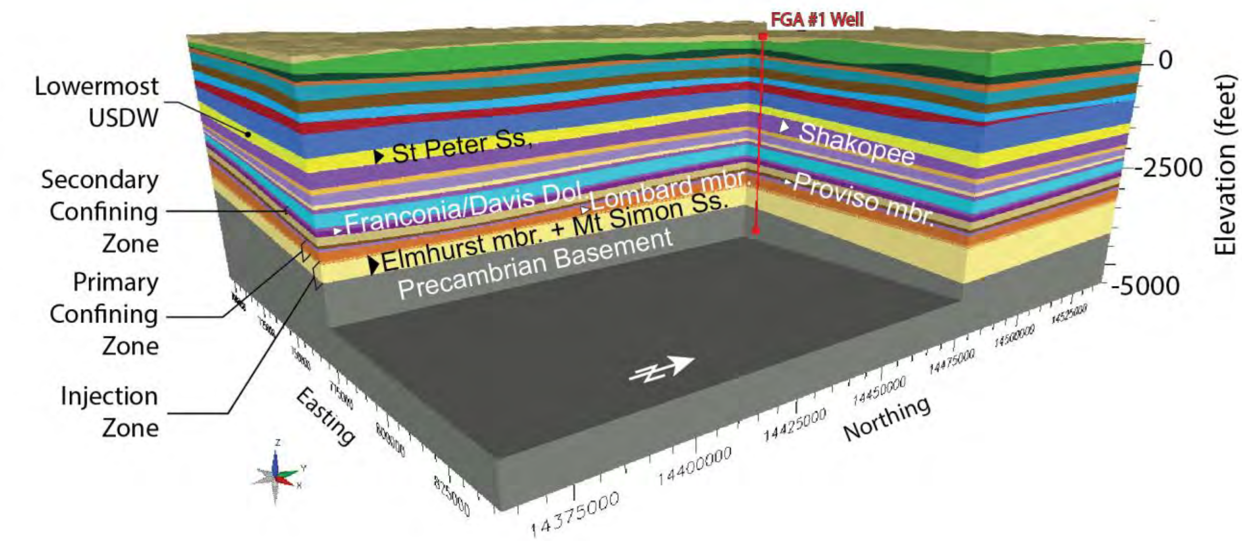


Figure 5. EarthVision® Solid Earth Model for the Proposed Morgan County CO_2 Storage Site. View to the southwest. For clarity, only the main formations have been labeled.

An expanded 100-mile x 100-mile geologic model was constructed to represent units below the Potosi including the Franconia, Ironton, Eau Claire (Proviso, Lombard and Elmhurst), Mount Simon, and Precambrian formations. These surfaces were gridded in EarthVision® based on borehole data and regional contour maps and make up the stratigraphic layers of the computational model.

6.1 Hydrogeologic Layers

The geologic model hydrogeologic layers were defined for each stratigraphic layer based on zones of similar hydrologic properties. The hydrologic properties (permeability, porosity) were deduced from geophysical well logs and side-wall cores. The lithology, deduced from wireline logs and core data, was also used to subdivide each stratigraphic layer of the model. Based on these data, the Mount Simon Sandstone was subdivided into 17 layers, and the Elmhurst Sandstone (member of the Eau Claire Formation) was subdivided into 7 layers as shown in Figure 6. These units form the injection zone. The Lombard and Proviso members of the Eau Claire Formation were subdivided respectively into 14 and 5 layers. The Ironton Sandstone was divided into four layers, the Davis Dolomite into three layers, and the Franconia Formation into one layer. One can also note that some layers ("split" label in Figure 6) have similar properties but have been subdivided to maintain a reasonable thickness of layers within the injection zone as represented in the computational model.

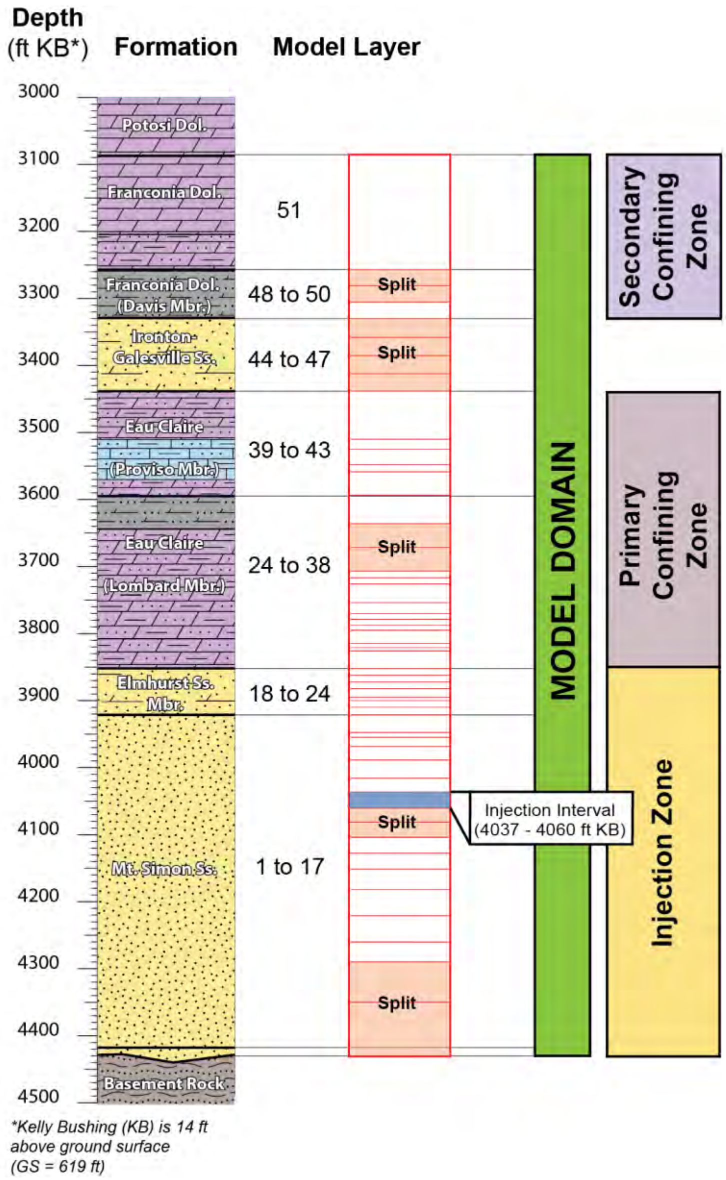


Figure 6. Division of Stratigraphic Layers to Create Computational Model Layers

The thickness of the layers varies from 4 to 172 feet, with an average of 26 feet. The assignment of hydrologic properties to these layers is described in the next sections.

6.2 Hydrologic and Porous Media Properties

Continuous wireline log results are commonly calibrated using discrete laboratory core measurements to provide a more continuous record for the particular characterization parameter (e.g., permeability, porosity). From these calibrated wireline-survey measurements, statistical or average values for the hydrologic parameter can be assigned to layers used in numerical models for the purpose of predicting fluid movement within targeted reservoirs.

A number of characterization data sources and methods were used to assign hydrologic properties to the various model layers. Available data sources for the Morgan County site include results from continuous wireline surveys (compensated magnetic resonance [CMR], ELAN), standard and side-wall cores (SWCs), and hydrologic tests (Modular Formation Dynamics Tester [MDT] and packer tests).

Because of differences in lithology and in the borehole construction, the method used to assign properties varied for different vertical zones of the conceptual model.

Horizontal Permeability

Intrinsic permeability is the property of the rock/formation that relates to its ability to transmit fluid, and is independent of the in situ fluid properties. For modeling of sedimentary rock formations, two permeabilities are commonly used: permeability in the horizontal direction, k_h (permeability parallel to sedimentary layering [also Kh]) and permeability in the vertical direction, k_v (permeability perpendicular to layering [also Kv]). The subsequent discussion pertains to assigned horizontal permeability values for the various borehole sections.

Intrinsic permeability data sources for the FutureGen 2.0 stratigraphic well include computed geophysical wireline surveys (CMR and ELAN logs), and where available, laboratory measurements of rotary SWCs, core plugs from the whole core intervals and hydrologic tests (including wireline [MDT]), and packer tests.

Intrinsic Permeability in the Injection Zone (Mount Simon and Elmhurst Sandstone)

For model layers within the injection zone (i.e., Elmhurst Sandstone and Mount Simon Sandstone; 3,852 to 4,432 feet) a correlation/calibration approach was applied. Wireline log CMR- and ELAN-computed permeability model responses were first correlated with and then calibrated to rotary side-wall and core plug permeability results. The correlation process was facilitated using natural gamma ray responses and clay or shale abundance to establish correlation data sets. This calibration provided a continuous permeability estimate over the entire injection reservoir section (curve permKCal).

Intrinsic Permeability in the Confining Zones (Franconia to Lombard Formations)

The sources of data are similar to those for the injection zone reservoir. For each model layer the core data were reviewed, and a simple average of the available horizontal Klinkenburg permeabilities was then calculated for each layer. Core samples that were noted by Core Lab as having potential cracks and/or were very small were eliminated if the results appeared to be unreasonable based on the sampled lithology. If no core samples were available and the arithmetic mean of the PermKCal was below 0.01 mD, a default value of 0.01 mD was applied (Lombard9 is the only layer with a 0.01-mD default value).

Because the sandstone intervals of the Ironton-Galesville Sandstone have higher permeabilities that are similar in magnitude to the modeled reservoir layers, the Ironton-Galesville Sandstone model layer permeabilities were derived from the arithmetic mean of the PermKCal permeability curve.

Figure 7 shows the depth profile of the horizontal permeability assigned to each layer of the model (actual values assigned are listed in Table 7).

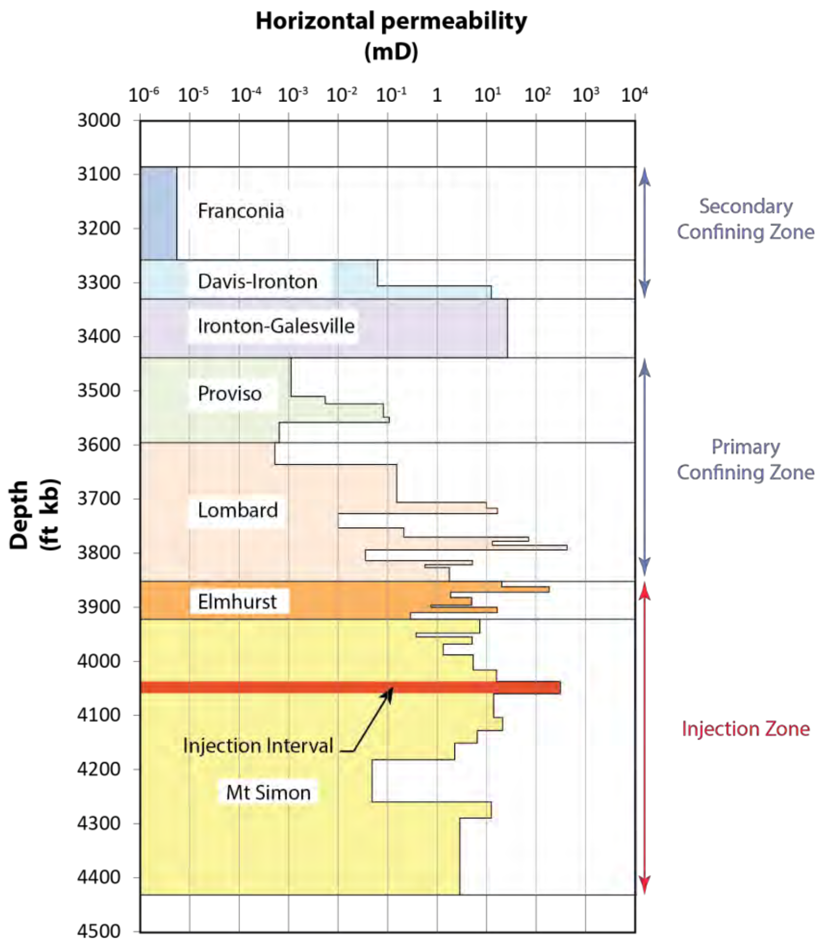


Figure 7. Horizontal Permeability Versus Depth in Each Model Layer

Vertical Permeability

Sedimentation can create an intrinsic permeability anisotropy, caused by sediment layering and preferential directions of connected-pore channels. Kv/Kh ratios were successfully determined for 20 vertical/horizontal siliciclastic core plug pairs cut from intervals of whole core from the stratigraphic well. Horizontal permeability data in the stratigraphic well far outnumber vertical permeability data, because vertical permeability could not be determined from rotary SWCs.

Effective vertical permeability in siliciclastic rocks is primarily a function of the presence of mudstone or shale (Ringrose et al. 2005). The siliciclastic lithologies (sandstones, siltstones, mudstones and shales) are heterolithic in the cored interval of the lower Lombard, and in rotary SWCs from the upper Lombard and non-carbonate Proviso. Core plug samples of heterolithic siliciclastics are poorly representative of larger vertical intervals (Meyer and Krause 2006).

Because the vertical permeability anisotropy of the model layers is not likely to be represented by the sparse data from the stratigraphic well, the following lithology-specific permeability anisotropy averages from literature studies representing larger sample sizes are used for the model layers (Table 2).

The literature-based permeability anisotropy values listed in Table 3 were used to assign Kv/Kh to each layer of the model. Figure8 shows the depth profile of the anisotropy assigned to each layer of the model. Actual values assigned for each layer are listed in Table 7.

Table 2. Lithology-Specific Permeability Anisotropy Averages from Literature

Facies or Lithology	Kv/Kh	Reference
1. Heterolithic, laminated shale/mudstone/siltstone/sandstone	0.1	Meyer and Krause (2006)
2. Herringbone cross-stratified sandstone. Strat dips to 18 degrees	0.4	Meyer and Krause (2006)
3. Paleo weathered sandstone (coastal flat)	0.4	Meyer and Krause (2006)
4. Accretionary channel bar sandstones with minor shale laminations	0.5	Ringrose et al. (2005); Meyer and Krause (2006)
6. Alluvial fan, alluvial braided stream plain to shallow marine sandstones, low clay content	.3	Kerr et al. (1999)
7. Alluvial fan, alluvial plain sandstones, sheet floods, paleosols, higher clay content	0.1	Hornung and Aigner (1999)
8. Dolomite mudstone	0.007	Saller et al. (2004)

Table 3. Summary of the Scaling Factors Applied for the Modeling

Model Layer	Kv/Kh
Franconia Carbonate	0.007
Davis-Ironton	0.1
Ironton-Galesville	0.4
Proviso (layers 4 and 5)	0.1
Proviso (layers 1 to 3)	0.007
Lombard	0.1
Elmhurst	0.4
Mount Simon (layers 12, 13, 14, 15, 17)	0.4
Mount Simon (layer 16)	0.1
Mount Simon (layer 11, injection interval)	0.5
Mount Simon (layers 6, 7, 8, 9, 10)	0.3
Mount Simon (layers 1, 2, 3, 4, 5)	0.1

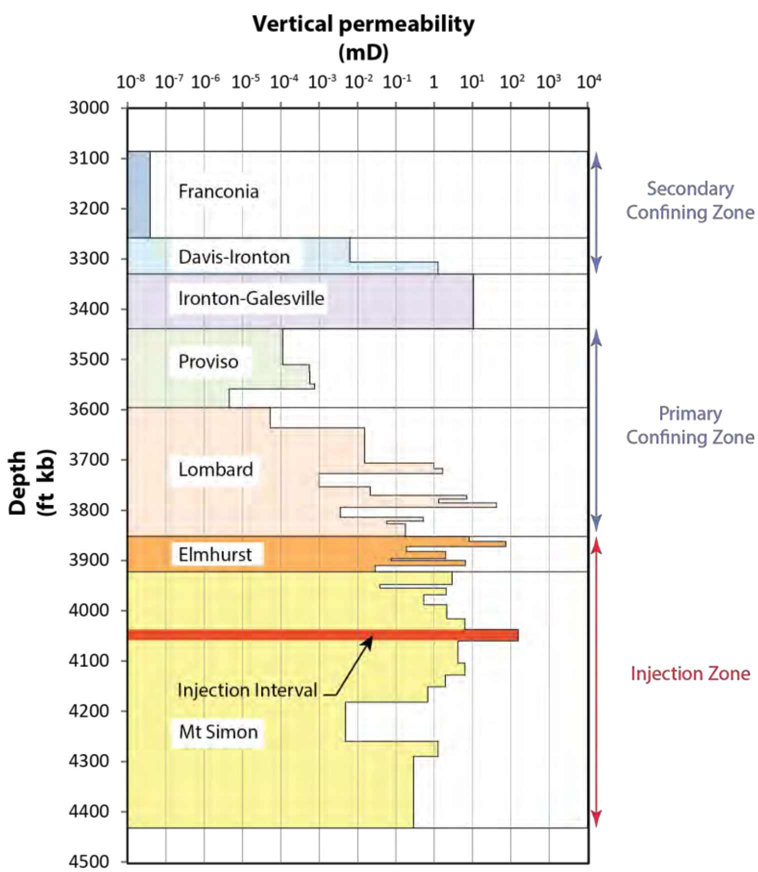


Figure 8. Vertical Permeability Versus Depth in Each Model Layer

Porosity

Total (or absolute) porosity is the ratio of void space to the volume of whole rock. Effective porosity is the ratio of interconnected void space to the volume of the whole rock.

As a first step in assigning porosity values for the FutureGen 2.0 numerical model layers, Schlumberger ELAN porosity log results were compared with laboratory measurements of porosity as determined from SWC and core plugs for specific sampling depth within the Mount Simon.

Figure9 shows the depth profile of the assigned model layer porosities based on the average of the calibrated ELAN values. The actual values assigned for each layer are listed in Table 7.

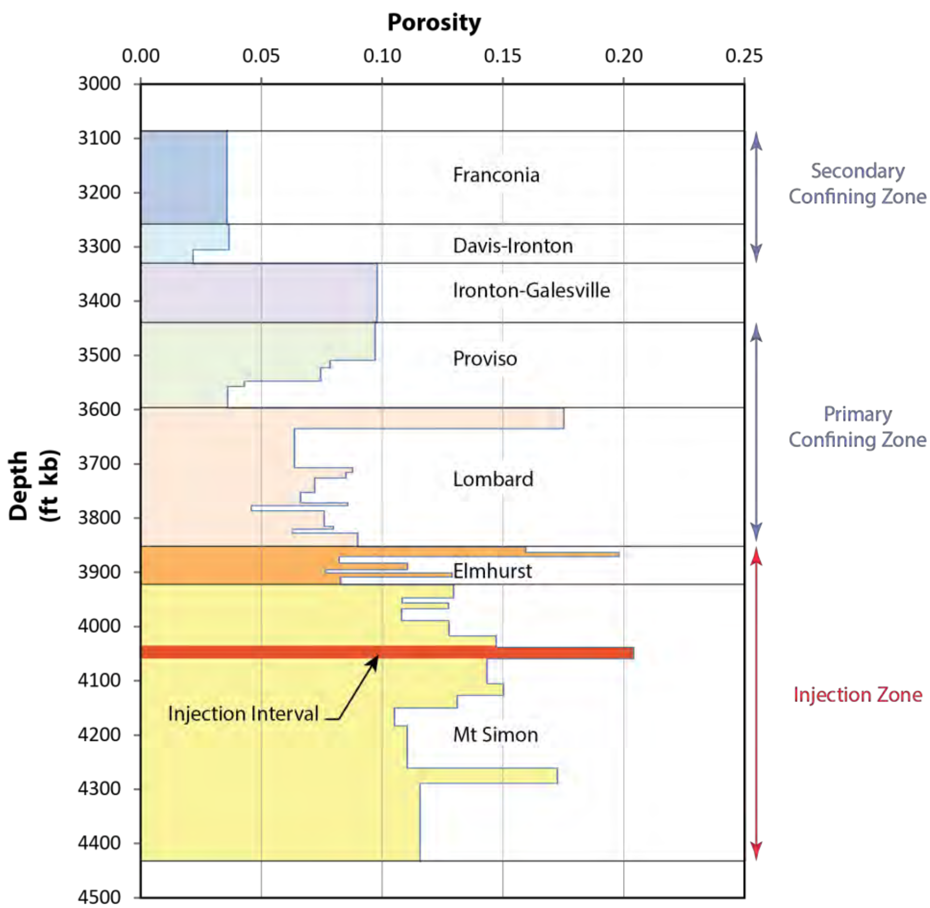


Figure 9. Porosity Versus Depth in Each Model Layer

Rock (Bulk) Density and Grain Density

Grain density data were calculated from laboratory measurements of SWCs. The data were then averaged (arithmetic mean) for each main stratigraphic layer in the model. Only the Proviso member (Eau Claire Formation) has been divided in two sublayers to be consistent with the lithology changes. Figure10 shows the calculated grain density with depth. The actual values assigned to each layer of the model are listed in Table 7. Grain density is the input parameter specified in the simulation input file, and STOMP-CO2 calculates the bulk density from the grain density and porosity for each model layer.

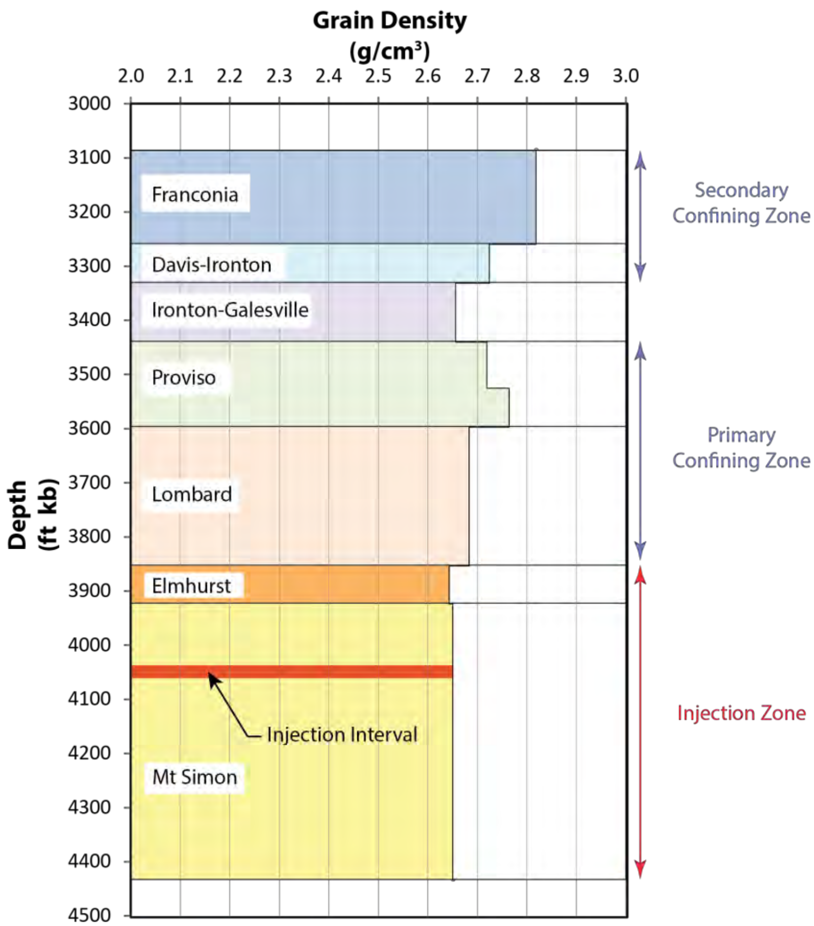


Figure 10. Grain Density Versus Depth in Each Model Layer

Capillary Pressure and Saturation Functions

Capillary pressure is the pressure difference across the interface of two immiscible fluids (e.g., CO_2 and water). The entry capillary pressure is the minimum pressure required for

an immiscible non-wetting fluid (i.e., CO_2) to overcome capillary and interfacial forces and enter pore space containing the wetting fluid (i.e., saline formation water).
Capillary pressure data determined from site-specific cores were not available at the time the model was constructed. However, tabulated capillary pressure data were available for several Mount Simon gas storage fields in the Illinois Basin. The data for the Manlove Hazen well were the most complete. Therefore, these aqueous saturation and capillary pressure values were plotted and a user-defined curve fitting was performed to generate Brooks-Corey parameters for four different permeabilities (Figure 11). These parameters were then assigned to layers based on a permeability range as shown in

Table 4.

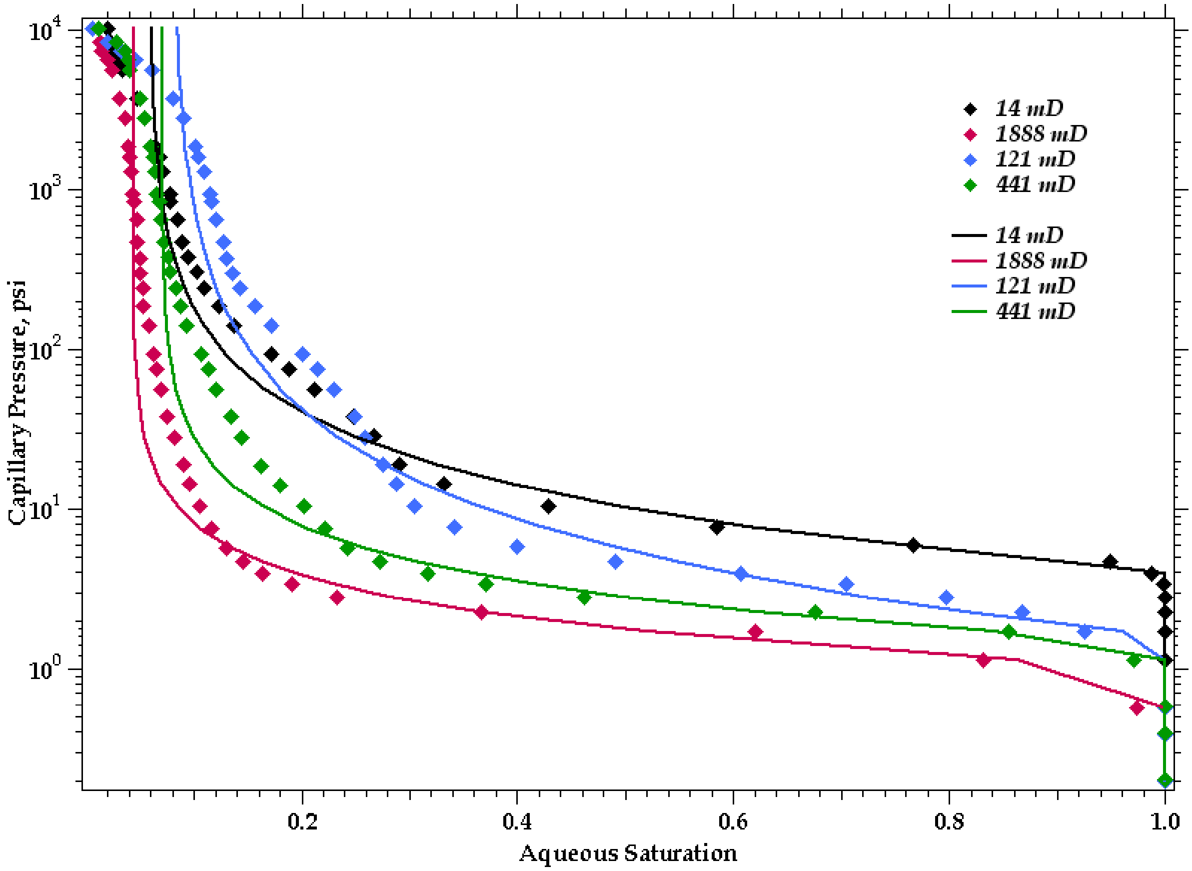


Figure 11. Aqueous Saturation Versus Capillary Pressure Based on Mercury Injection Data from the Hazen No. 5 Well at the Manlove Gas Field in Champagne County, Illinois

Table 4. Permeability Ranges Used to Assign Brooks-Corey Parameters to Model Layers

Permeability (mD)	Psi (ψ)	Lambda (λ)	Residual Aqueous Saturation
< 41.16	4.116	0.83113	0.059705
41.16 to 231	1.573	0.62146	0.081005
231 to 912.47	1.450	1.1663	0.070762
> 912.47	1.008	1.3532	0.044002

Gas Entry Pressure

No site-specific data were available for gas entry pressure; therefore, this parameter was estimated using the Davies- (1991) developed empirical relationships between air entry pressure, P_e, and intrinsic permeability, k, for different types of rock:

$$P_e = a\,k^b,$$

where P_e takes the units of MPa and k the units of m^2, a and b are constants and are summarized below for shale, sandstone, and carbonate (Davies 1991; Table 5).

Table 5. Values for Constants a and b for Different Lithologies

	Shale	Sandstone	Carbonate
a	7.60E-07	2.50E-07	8.70E-07
b	-0.344	-0.369	-0.336

The dolomite found at the Morgan County site is categorized as a carbonate. The P_e for the air-water system is further converted to that for the CO_2-brine system by multiplying the interfacial tension ratio of a CO_2-brine system β_{cb} to an air-water system β_{aw}. An approximate value of 30 mN/m was used for β_{cb} and 72 mN/m for β_{aw}.

Formation Compressibility

Limited information about formation (pore) compressibility estimates is available. The best estimate for the Mount Simon Sandstone (Table 6) is that back-calculated by Birkholzer et al. (2008) from a pumping test at the Hudson Field natural-gas storage site, found 80 miles northeast of the Morgan County CO_2 storage site. The back-calculated pore-compressibility estimate for the Mount Simon of 3.71E−10 Pa^{-1} was used as a spatially constant value for their basin-scale simulations. In other simulations, Birkholzer et al. (2008) assumed a pore compressibility value of 4.5E−10 Pa^{-1} for aquifers and 9.0E−10 Pa^{-1} for aquitards. Zhou et al. (2010) in a later publication used a pore compressibility value of 7.42E−10 Pa^{-1} for both the Eau Claire Formation and Precambrian granite, which were also used for these initial simulations (Table 6).

Because the site-specific data are limited to a single reservoir sample, only these two published values have been used for the model. The first value (3.71E-10 Pa^{-1}) has been used for sands that are compressible because of the presence of porosity. The second value (7.42E-10 Pa^{-1}) is assigned for all other rocks that are less compressible (dolomite, limestone, shale, and rhyolite). Table 7 lists the hydrologic parameters assigned to each model layer.

Table 6. Formation Compressibility Values Selected from Available Sources

Hydrogeologic Unit	Formation (Pore) Compressibility, Pa^{-1}
Franconia	7.42E-10 $Pa\text{-}^{1}$
Davis-Ironton	3.71E-10 Pa^{-1}
Ironton-Galesville	3.71E-10 Pa^{-1}
Eau Claire Formation (Lombard and Proviso)	7.42E-10 Pa^{-1}
Eau Claire Formation (Elmhurst)	3.71E-10 Pa^{-1}
Mount Simon Sandstone	3.71E-10 Pa^{-1}

Table 7. Summary of the Hydrologic Properties Assigned to Each Model Layer

Zone	Model Layer	Top Depth (ft bkb)	Top Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Porosity	Horizontal Permeability (mD)	Vertical Permeability (mD)	Grain Density (g/cm3)	Compressibility (1/Pa)
Primary Conf. Zone	Franconia	3086.00	-2453	-2625	172	0.0358	5.50E-06	3.85E-08	2.82	7.42E-10
	Davis-Ironton3	3258.00	-2625	-2649	24	0.0367	6.26E-02	6.26E-03	2.73	3.71E-10
	Davis-Ironton2	3282.00	-2649	-2673	24	0.0367	6.26E-02	6.26E-03	2.73	3.71E-10
	Davis-Ironton1	3306.00	-2673	-2697	24	0.0218	1.25E+01	1.25E+00	2.73	3.71E-10
	Ironton-Galesville4	3330.00	-2697	-2725	28	0.0981	2.63E+01	1.05E+01	2.66	3.71E-10
	Ironton-Galesville3	3358.00	-2725	-2752	27	0.0981	2.63E+01	1.05E+01	2.66	3.71E-10
	Ironton-Galesville2	3385.00	-2752	-2779	27	0.0981	2.63E+01	1.05E+01	2.66	3.71E-10
	Ironton-Galesville1	3412.00	-2779	-2806	27	0.0981	2.63E+01	1.05E+01	2.66	3.71E-10
Primary Confining Zone	Proviso5	3439.00	-2806	-2877	71	0.0972	1.12E-03	1.12E-04	2.72	7.42E-10
	Proviso4	3510.00	-2877	-2891	14	0.0786	5.50E-03	5.50E-04	2.72	7.42E-10
	Proviso3	3524.00	-2891	-2916	25	0.0745	8.18E-02	5.73E-04	2.77	7.42E-10
	Proviso2	3548.50	-2916	-2926	10	0.0431	1.08E-01	7.56E-04	2.77	7.42E-10
	Proviso1	3558.50	-2926	-2963	38	0.0361	6.46E-04	4.52E-06	2.77	7.42E-10
	Lombard14	3596.00	-2963	-3003	40	0.1754	5.26E-04	5.26E-05	2.68	7.42E-10
	Lombard13	3636.00	-3003	-3038	35	0.0638	1.53E-01	1.53E-02	2.68	7.42E-10
	Lombard12	3671.00	-3038	-3073	35	0.0638	1.53E-01	1.53E-02	2.68	7.42E-10
	Lombard11	3706.00	-3073	-3084	11	0.0878	9.91E+00	9.91E-01	2.68	7.42E-10
	Lombard10	3717.00	-3084	-3094	10	0.0851	1.66E+01	1.66E+00	2.68	7.42E-10
	Lombard9	3727.00	-3094	-3121	27	0.0721	1.00E-02	1.00E-03	2.68	7.42E-10
	Lombard8	3753.50	-3121	-3138	17	0.0663	2.13E-01	2.13E-02	2.68	7.42E-10
	Lombard7	3770.50	-3138	-3145	8	0.0859	7.05E+01	7.05E+00	2.68	7.42E-10
	Lombard6	3778.00	-3145	-3153	8	0.0459	1.31E+01	1.31E+00	2.68	7.42E-10
	Lombard5	3785.50	-3153	-3161	9	0.0760	4.24E+02	4.24E+01	2.68	7.42E-10
	Lombard4	3794.00	-3161	-3181	20	0.0604	3.56E-02	3.56E-03	2.68	7.42E-10
	Lombard3	3814.00	-3181	-3189	8	0.0799	5.19E+00	5.19E-01	2.68	7.42E-10
	Lombard2	3821.50	-3189	-3194	5	0.0631	5.71E-01	5.71E-02	2.68	7.42E-10
	Lombard1	3826.50	-3194	-3219	26	0.0900	1.77E+00	1.77E-01	2.68	7.42E-10

Table 7. (contd)

Injection Zone

Model Layer	Top Depth (ft bkb)	Top Elevation (ft)	Bottom Elevation (ft)	Thickness (ft)	Porosity	Horizontal Permeability (mD)	Vertical Permeability (mD)	Grain Density (g/cm3)	Compressibility (1/Pa)
Elmhurst7	3852.00	-3219	-3229	10	0.1595	2.04E+01	8.17E+00	2.64	3.71E-10
Elmhurst6	3862.00	-3229	-3239	10	0.1981	1.84E+02	7.38E+01	2.64	3.71E-10
Elmhurst5	3872.00	-3239	-3249	10	0.0822	1.87E+00	1.87E-01	2.64	3.71E-10
Elmhurst4	3882.00	-3249	-3263	14	0.1105	4.97E+00	1.99E+00	2.64	3.71E-10
Elmhurst3	3896.00	-3263	-3267	4	0.0768	7.52E-01	7.52E-02	2.64	3.71E-10
Elmhurst2	3900.00	-3267	-3277	10	0.1291	1.63E+01	6.53E+00	2.64	3.71E-10
Elmhurst1	3910.00	-3277	-3289	12	0.0830	2.90E-01	2.90E-02	2.64	3.71E-10
MtSimon17	3922.00	-3289	-3315	26	0.1297	7.26E+00	2.91E+00	2.65	3.71E-10
MtSimon16	3948.00	-3315	-3322	7	0.1084	3.78E-01	3.78E-02	2.65	3.71E-10
MtSimon15	3955.00	-3322	-3335	13	0.1276	5.08E+00	2.03E+00	2.65	3.71E-10
MtSimon14	3968.00	-3335	-3355	20	0.1082	1.33E+00	5.33E-01	2.65	3.71E-10
MtSimon13	3988.00	-3355	-3383	28	0.1278	5.33E+00	2.13E+00	2.65	3.71E-10
MtSimon12	4016.00	-3383	-3404	21	0.1473	1.59E+01	6.34E+00	2.65	3.71E-10
MtSimon11 *(injection Interval)*	4037.00	-3404	-3427	23	0.2042	3.10E+02	1.55E+02	2.65	3.71E-10
MtSimon10	4060.00	-3427	-3449	22	0.1434	1.39E+01	4.18E+00	2.65	3.71E-10
MtSimon9	4082.00	-3449	-3471	22	0.1434	1.39E+01	4.18E+00	2.65	3.71E-10
MtSimon8	4104.00	-3471	-3495	24	0.1503	2.10E+01	6.29E+00	2.65	3.71E-10
MtSimon7	4128.00	-3495	-3518	23	0.1311	6.51E+00	1.95E+00	2.65	3.71E-10
MtSimon6	4151.00	-3518	-3549	31	0.1052	2.26E+00	6.78E-01	2.65	3.71E-10
MtSimon5	4182.00	-3549	-3588	39	0.1105	4.83E-02	4.83E-03	2.65	3.71E-10
MtSimon4	4221.00	-3588	-3627	39	0.1105	4.83E-02	4.83E-03	2.65	3.71E-10
MtSimon3	4260.00	-3627	-3657	30	0.1727	1.25E+01	1.25E+00	2.65	3.71E-10
MtSimon2	4290.00	-3657	-3717	60	0.1157	2.87E+00	2.87E-01	2.65	3.71E-10
MtSimon1	4350.00	-3717	-3799	82	0.1157	2.87E+00	2.87E-01	2.65	3.71E-10

6.3 Reservoir Properties

Fluid Pressure

An initial fluid sampling event from the Mount Simon Formation was conducted December 14, 2011, in the stratigraphic well during the course of conducting open-hole logging. Sampling was attempted at 22 discrete depths using the MDT tool in the Quicksilver Probe configuration and from one location using the conventional (dual-packer) configuration. Pressure data were obtained at 7 of the 23 attempted sampling points, including one duplicated measurement at a depth of 4,048 feet bkb (Table 8).

Table 8. Pressure Data Obtained from the Mount Simon Formation Using the MDT Tool. (Red line delimits the samples within the injection zone.)

Sample Number	Sample Depth (ft bkb)	Absolute Pressure (psia)
7	4130	1828
8	4131	1827.7
9	4110.5	1818.3
11	**4048**	**1790.2**
17	**4048 (duplicated)**	**1790.3**
21	4248.5	1889.2
22	4246	1908.8
23	4263	1896.5[a]

(a) Sample affected by drilling fluids (not representative)

Temperature

The best fluid temperature depth profile was performed on February 9, 2012, as part of the static borehole flow meter/fluid temperature survey that was conducted prior to the constant-rate injection flow meter surveys. Two confirmatory discrete probe depth measurements that were taken prior to the active injection phase (using colder brine) corroborate the survey results. The two discrete pressure probe temperature measurements have been plotted on the temperature/depth profile plot (Figure 12).

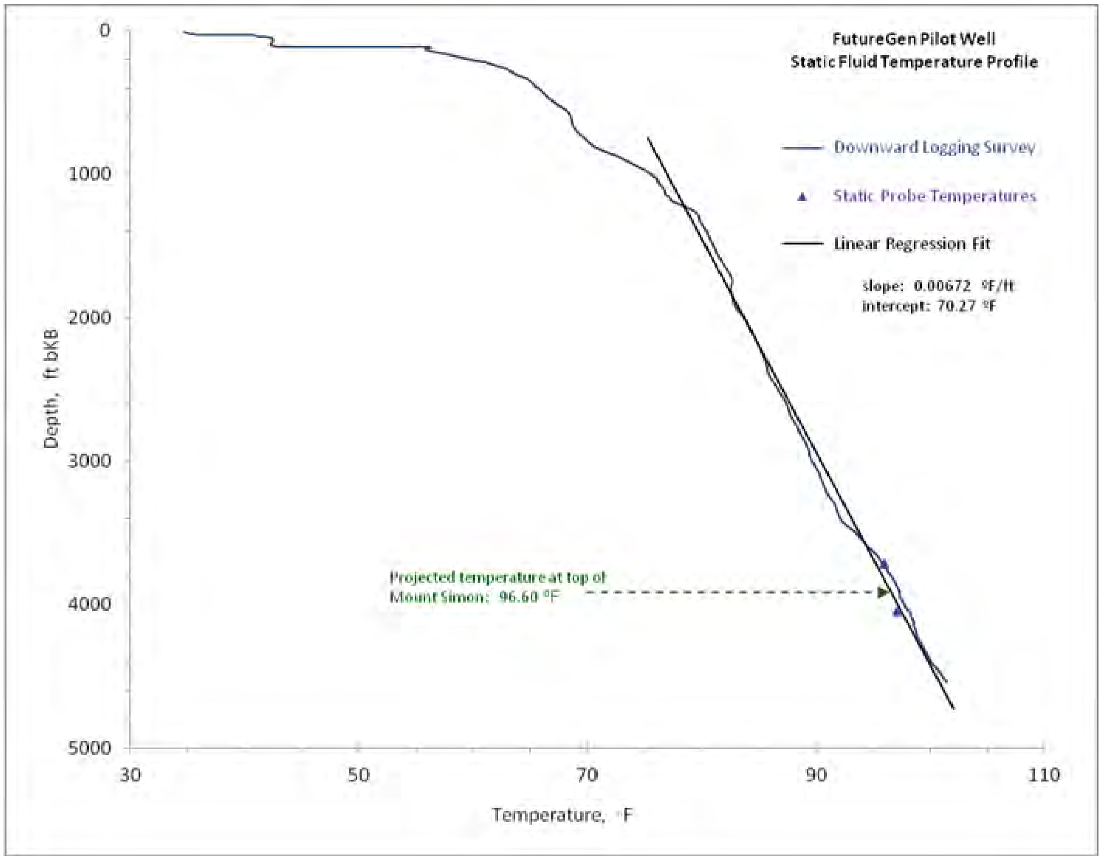


Figure 12. Static Fluid Temperature Profile Performed on February 9, 2012 in the Stratigraphic Well

The discrete static measurement for the depth of 3,712 feet is a pressure probe temperature gauge that has been installed below the tubing packer used to facilitate running of the dynamic flow meter survey. It is in the well casing so there is very little to no vertical movement of fluid and we have static measurements at this depth for more than 12 hours before starting any testing within the borehole. The value for this depth (3,712 feet) was 95.9°F. This value plots exactly on the static, continuous fluid temperature survey results for this depth.

The second discrete static probe temperature measurement is from the MDT probe for the successful sampling interval of 4,048 feet. This sample is perhaps less "static" in that fluid was produced through the tool for a period of time as part of the sampling process; however, it does provide a consistent value with the continuous fluid temperature survey. So the bottom line is that the static fluid temperature of February 9, 2012, looks to be a valid representation of well fluid column conditions.

Based on that conclusion, a linear-regression temperature/depth relationship was developed for use by modeling. The regression data set analyzed was for temperature data over the depth interval of 1,300 to 4,547 feet. Based on this regression a projected temperature for the reference datum at the top of the Mount Simon (3,918 feet bkb) of 96.60°F is indicated. A slope (gradient) of 6.72^{-3}°F/foot and intercept of 70.27°F is also calculated from the regression analysis.

Brine Density

Although this parameter is determined by the simulator using pressure, temperature, and salinity, based on the upper and lower Mount Simon reservoirs tests, the calculated in situ reservoir fluid density is 1.0315 g/cm^3.

Salinity

During the process of drilling the well, fluid samples were obtained from discrete-depth intervals in the St. Peter Formation and the Mount Simon Formation using wireline-deployed sampling tools (MDTs) on December 14, 2011. After the well had been drilled, additional fluid samples were obtained from the open borehole section of the Mount Simon Formation by extensive pumping using a submersible pump.

The assigned salinity value for the Mount Simon (upper zone) 47,500 ppm is as indicated by both the MDT sample (depth 4,048 feet) and the multiple samples collected during extensive composite pumping of the open borehole section.

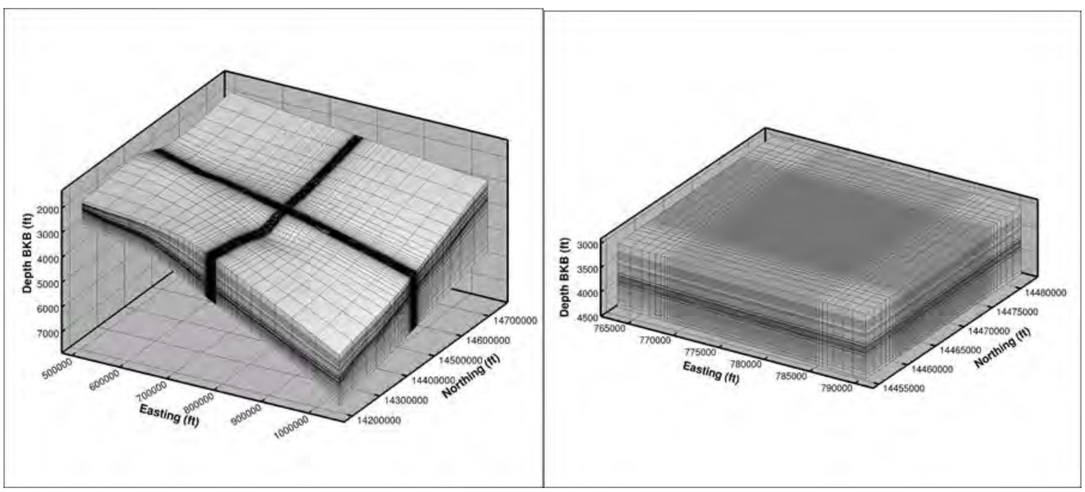
6.4 Chemical Properties

EPA (2011a) identified a number of chemical properties as relevant parameters for multiphase flow modeling. These include the aqueous diffusion coefficient, aqueous solubility, and solubility in CO_2. The properties change significantly relative to temperature, pressure, salinity, and other variables, and are predicted by equations of state used by the model to calculate properties at conditions encountered in the simulation as they change with location and time.

7.0 Numerical Model Implementation

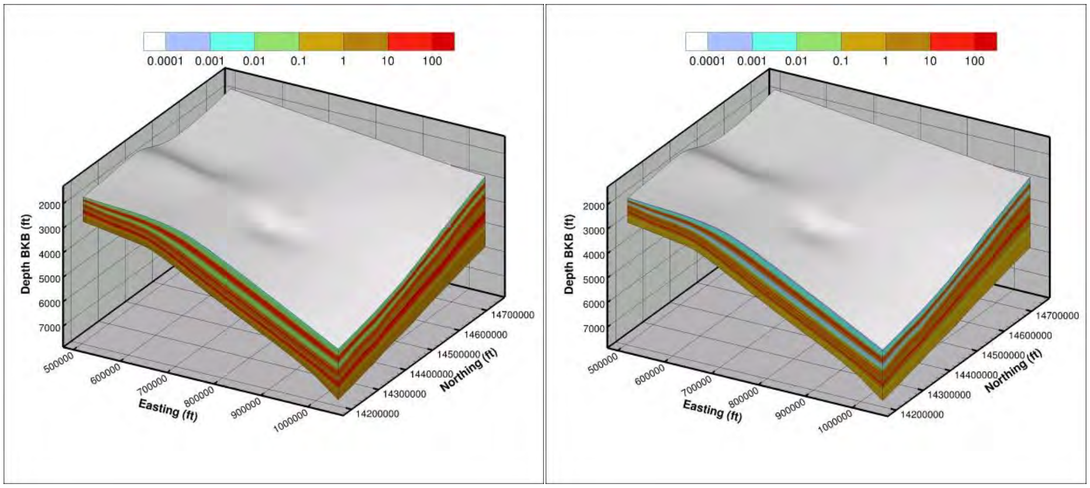
As described above, the model domain for the Morgan County CO_2 storage site consists of the injection zone (Mount Simon and Elmhurst), the primary confining zone (Lombard and Proviso), the Ironton-Galesville, and the secondary confining zone (Davis-Ironton and the Franconia). Preliminary simulations were conducted to determine the extent of the model domain so that lateral boundaries were distant enough from the injection location so as not to influence the model results. The three-dimensional, boundary-fitted numerical model grid was designed to have constant grid spacing with higher resolution in the area influenced by the CO_2 injection (3-mile by 3-mile area), with increasingly larger grid spacing moving out in all lateral directions toward the domain boundary.

Figure13 shows the numerical model grid for the entire 100-mile by 100-mile domain and also for the 3-mile by 3-mile area with higher grid resolution and uniform grid spacing of 200 feet by 200 feet. The model grid contains 125 nodes in the x-direction, 125 nodes in the y-direction, and 51 nodes in the z-direction for a total number of nodes equal to 796,875. The expanded geologic model was queried at the node locations of the numerical model to determine the elevation of each surface for the stratigraphic units at the numerical model grid cell centers (nodes) and cell edges. Then each of those layers was subdivided into the model layers by scaling the thickness to preserve the total thickness of each stratigraphic unit. Once the vertical layering was defined, material properties were mapped to each node in the model. Figure 14 shows the distribution of horizontal and vertical permeability as it was assigned to the numerical model grid.



(a) (b)

Figure 13. Numerical Model Grid for a) Full Domain, and b) Finer Resolution Area Containing the Injection Wells



(a) (b)

Figure 14. Permeability Assigned to Numerical Model a) Horizontal Permeability; b) Vertical Permeability

7.1 Initial Conditions

The reservoir is assumed to be under hydrostatic conditions with no regional or local flow conditions. Therefore the hydrologic flow system is assumed to be at steady state until the start of injection. To achieve this with the STOMP-CO2 simulator one can either run an initial simulation (executed for a very long time period until steady-state conditions are achieved) to generate the initial distribution of pressure, temperature, and salinity conditions in the model from an initial guess, or one can specify the initial conditions at a reference depth using the hydrostatic option, allowing the simulator to calculate and assign the initial conditions to all the model nodes. Site-specific data were available for pressure, temperature, and salinity, and therefore the hydrostatic option was used to assign initial conditions. A temperature gradient was specified based on the geothermal gradient, but the initial salinity was considered to be constant for the entire domain. A summary of the initial conditions is presented in Table 9.

Table 9. Summary of Initial Conditions

Parameter	Reference Depth (bkb)	Value
Reservoir Pressure	4,048 ft	1,790.2 psi
Aqueous Saturation		1.0
Reservoir Temperature	3,918 ft	96.6 °F
Temperature Gradient		0.0672 °F/ft
Salinity		47,500 ppm

7.2 Boundary Conditions

Boundary conditions were established with the assumption that the reservoir is continuous throughout the region and that the underlying Precambrian unit is impermeable. Therefore, the bottom boundary was set as a no-flow boundary for aqueous fluids and for CO_2 gas. The lateral and top boundary conditions were set to hydrostatic pressure using the initial condition with the assumption that each of these boundaries is distant enough from the injection zone to have minimal to no effect on the CO_2 plume migration and pressure distribution.

7.3 Simulation Time Period

The EPA Geologic Sequestration regulations require that owners or operators must "Predict, using existing site characterization, monitoring and operational data, and computational modeling, the projected lateral and vertical migration of the CO_2 plume and formation fluids in the subsurface from the commencement of injection activities until the plume movement ceases, until pressure differentials sufficient to cause the movement of injected fluids or formation fluids into an underground source of drinking water are no longer present, or until the end of a fixed time period as determined by the Director." 40 CFR § 146.84(c)(1). Preliminary simulations were conducted to determine the total simulation time needed to satisfy the required conditions, and those results are presented in this section.

Figure15 shows the plume area over time relative to the plume extent at 30 years, with the plume area being defined as the areal extent containing 99 percent of the separate-phase (gas-phase) CO_2 mass. While the CO_2 is still redistributing long after injection ceases, it can be seen that the change in the areal extent of the plume becomes insignificant after the end of the injection period. The pressure differential, however, dissipates much more slowly. As indicated in Figure 16, the pressure dissipates more than 90 percent within the first 100 years. Hence, the final representative case simulations were executed for a period of 100 years.

FutureGen ALLIANCE
Clean Energy for a Secure Future

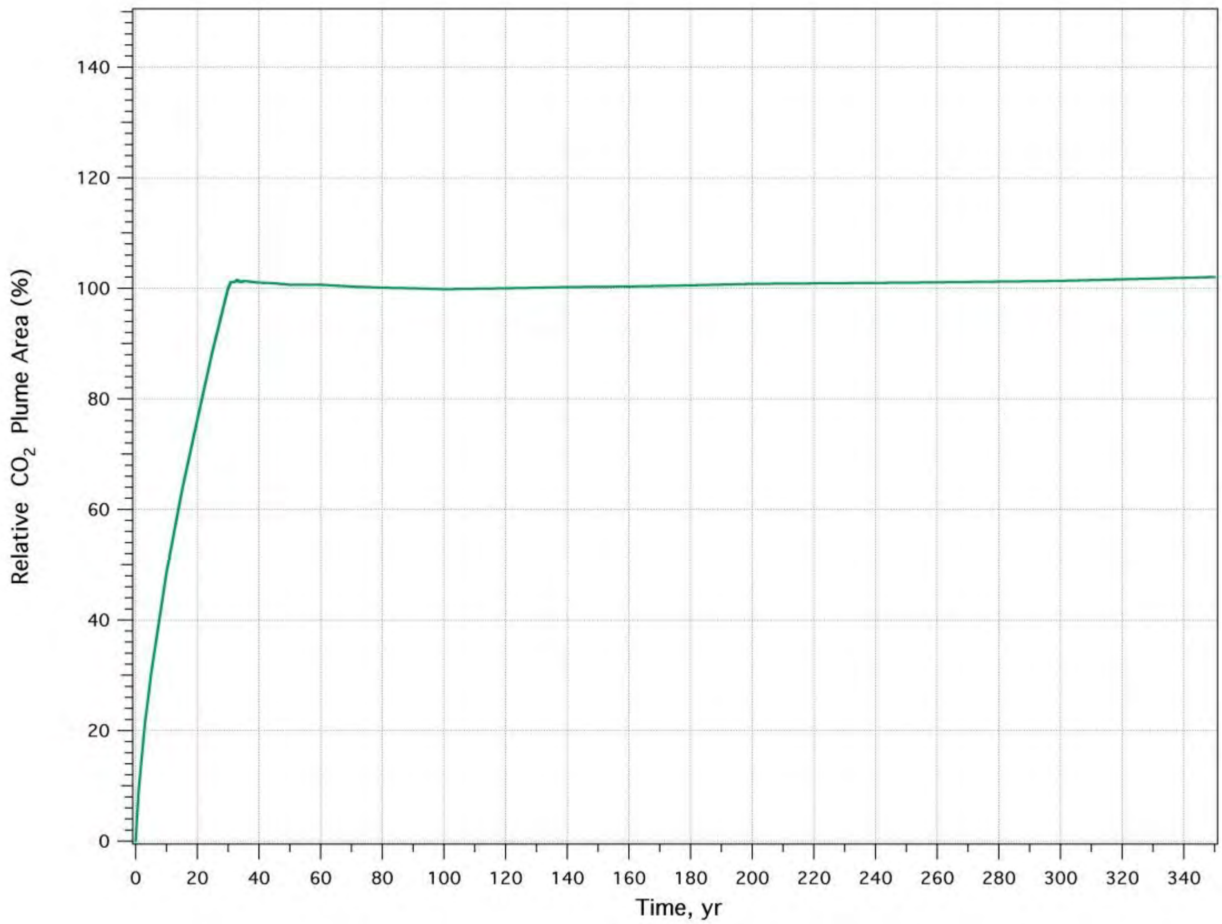


Figure 15. CO_2 Plume Area Versus Time Relative to Plume Extent at 30 Years Based on Preliminary Model Results. Areal plume extent is defined by 99 percent of separate-phase CO_2 mass.

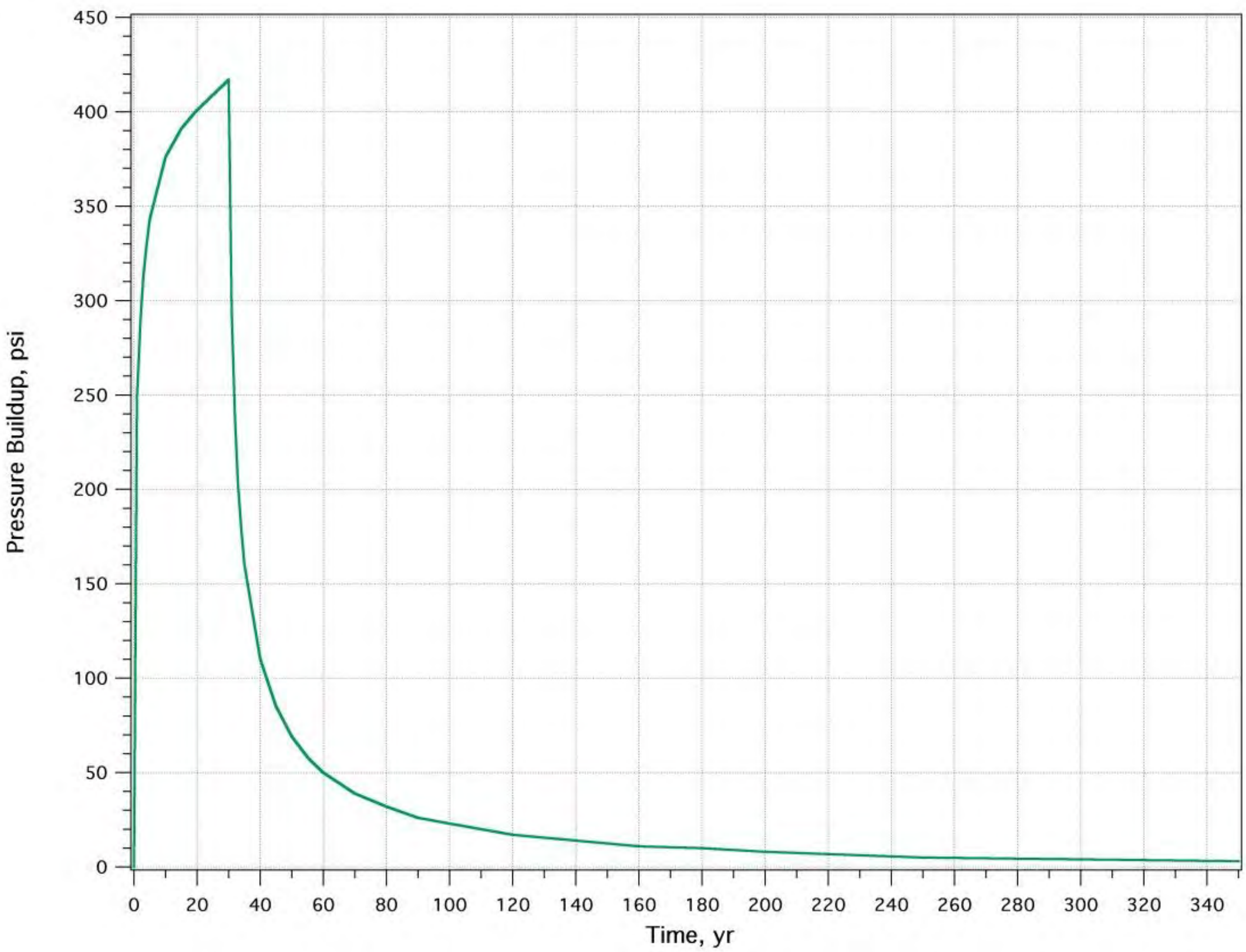


Figure 16. Pressure Buildup (relative to initial formation pressure) Versus Time at the Injection Well Based on Preliminary Model Results

20-Year Injection Period

Although Figures 15 and 16 are based on a 30-year injection period, the actual injection duration will be 20 years. Revised figures showing results for a 20-year injection period were not available in time for inclusion in this report. However, the available figures effectively demonstrate the expected late-time response (i.e., only small changes in plume extent over time and an exponential pressure recovery response). For revised figures showing a 20-year injection period, full plume development and onset of pressure recovery would be shifted ten years earlier.

The modeling described above results in an underground CO_2 plume with four "lobes." The simulated shape and size of the CO_2 plumes after 20 years of injection and 50 years after injection ceases are shown in Figure 17. The predicted area of the 20-year CO_2 plume that will result from injecting a total of 22 MMT of CO_2 into four horizontal injection wells is estimated to be approximately 3,970 acres. The area of the CO_2 plume 50 years after injection ceases (i.e., 70 years) is predicted to be slightly larger at approximately 3,980 acres.

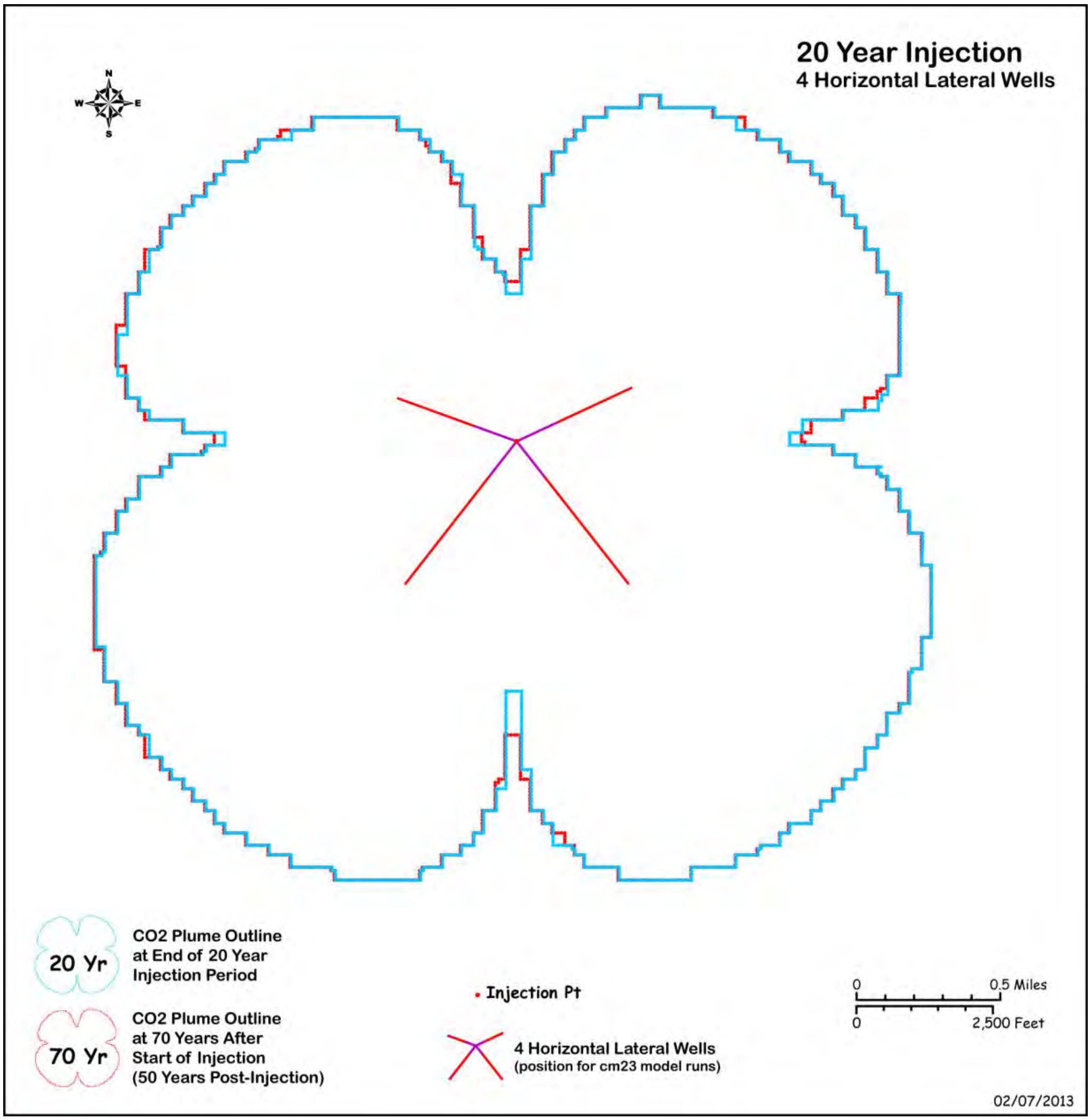


Figure 17. CO_2 Plume Outline after 20 Years of Injection and 50 Years after Injection Ceases

8.0 Sensitivity Analysis

Modeling underground CO_2 storage involves many conceptual and quantitative uncertainties. The major problem is the uncertainty in parameters such as permeability and porosity, and the geologic description of the injection zone and confining zone. To fully address these uncertainties, Monte Carlo simulation was conducted. Because the model results serve as a basis for calculating the plume delineation, the sensitivity analysis focuses on a set of parameters that strongly influence the plume calculation.

The effects of scaling factors associated with porosity, permeability, and fracture gradient were evaluated. The three scaling factors are independent variables, while the rock type and other mechanical/hydrological properties for the geological layers are dependent variables, which vary according to scaling.

The sensitivity of selected output variables including the percent of CO_2 mass injected, the acreage of the plume, the acreage of the projected plume, and the percent variation of plume area relative to the representative case (4 horizontal injection wells, 20 years of injection) was analyzed. The projected acreage of the plume is calculated for cases where less than 100 percent of the CO_2 mass was injected, providing a normalization of the plume area for direct comparison across cases. Both marginal (individual) and joint (combined) effects were evaluated.

Whether a response curve (2D) or response surface (3D or higher dimension) is representative or reliable depends on the efficiency of the sampling approach. A good sampling approach should be able to explore the parameter space without clumping or gapping. As can be seen Figure 18, the quasi Monte Carlo (QMC) approach (right), with controlled locations of the samples, has better scatters than regular Monte Carlo (left) and Latin-hypercube samples (right).

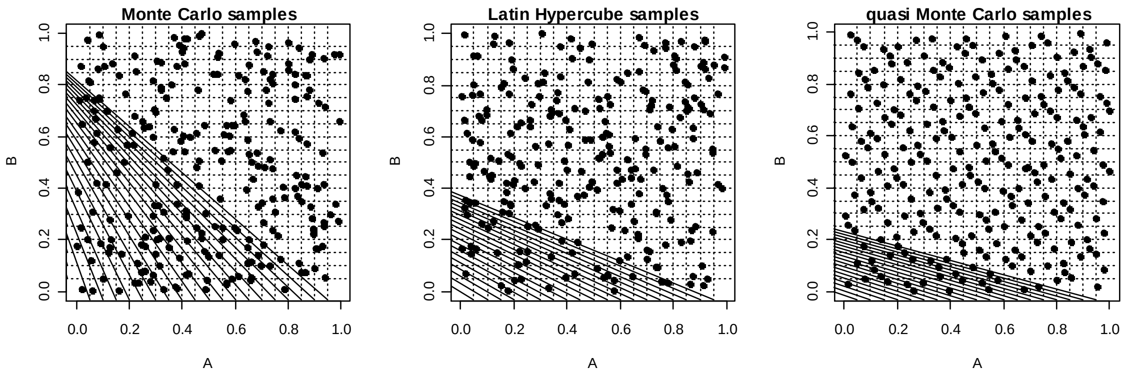


Figure 18. Scatter Plots of Monte Carlo, Latin-Hypercube, and Quasi Monte Carlo Samples. QMC samples are well dispersed in the parameter space and therefore are exploratory and efficient without clumping points and gapping.

The scaling factors used for generating these samples were based on an evaluation of the site characterization data to determine reasonable bounding values. These scaling factors are shown in Table 10.

Table 10. Scaling Factors Evaluated for Parameter Sensitivity Analysis

Parameter	Minimum	Representative Case	Maximum
Porosity	.75	1.0	1.25
Permeability	.75	1.0	1.25
Fracture Gradient	.88	1.0	1.10

Thirty-two cases were defined from the representative case model using the QMC sampling technique to represent a statistical distribution of possible cases based on the parameters varied. All other inputs were the same as in the representative case.

Simulation results show that increasing the porosity results in a smaller predicted plume area, while decreasing the fracture gradient results in an increase in the predicted plume area. Varying the permeability has very little effect on the plume area. The reason for this is that injectivity is mainly controlled by the injection rate, and as long as the average permeability is large enough and the injection pressure permitted is large enough, the injection rate is the limiting factor in predicted plume size.

A generalized linear model analysis was performed for the simulated CO_2 plume area and the final model was obtained through AIC (Akaike information criterion) -based step-wise backward removal approach and the statistical t-values and P-values were obtained. When a P-value is larger than the significance level (e.g., 0.05), the corresponding variable (input parameter) is relatively insignificant. Considering only the marginal linear effects, the fracture gradient and porosity are the most significant parameters for determining plume size. However, when the interactions are included, the combination of permeability and fracture gradient becomes significant.

The injectivity varied from the representative base case by about 50 percent for cases either with low permeability, low fracture gradient, or a combination of both. Because the injection rate was specified as a maximum rate, it was not possible to determine if, in some cases, more than 100 percent of the mass could be injected and if so, how much more. The predicted plume area varied from the representative case by about 80 to 120 percent, which is approximately the same as the variation in permeability and porosity.

9.0 References

Birkholzer JT, J Apps, L Zhenge, Y Zhang, T Xu and C Tzang. 2008. *Research Project on CO_2 Geological Storage and Groundwater Resources: Large-Scale Hydrological Evaluation and Modeling of the Impact on Groundwater Systems Annual Report: October 1, 2007, to September 30, 200*8. Lawrence Berkeley National Laboratory, Berkeley, California.

Buschbach TC and DC Bond. 1974. *Underground Storage of Natural Gas in Illinois – 1973*. Illinois Petroleum 101, Illinois State Geological Survey, Champaign, Illinois.

Davies PB. 1991. *Evaluation of the Role of Threshold Pressure in Controlling Flow of Waste-Generated Gas into Bedded Salt at the Waste Isolation Pilot Plant (WIPP)*.SAND 90-3246, Sandia National Laboratory, Albuquerque, New Mexico.

EPA (U.S. Environmental Protection Agency). 2011a. Draft Underground Injection Control (UIC) Program Class VI Well Area of Review Evaluation and Corrective Action Guidance for Owners and Operators. EPA 816-D-10-007, EPA Office of Water, Washington, D.C.

Hornung J and T Aigner. 1999. "Reservoir and aquifer characterization of fluvial architectural elements: Stubensandstein, Upper Triassic, southwest Germany." *Sedimentary Geology* 129(3–4): 215-280.

ISGS (Illinois State Geological Survey). 2011. Illinois Oil and Gas Resources (ILOIL) Internet Map Service. Last accessed on October 8, 2011 at http://moulin.isgs.uiuc.edu/ILOIL/webapp/ILOIL.html

Kerr DR, L Ye, A Bahar, BM Kelkar, and S Montgomery. 1999. "Glenn Pool Field, Oklahoma: A Case of Improved Production from a Mature Reservoir." *American Association of Petroleum Geologists Bulletin*, 83(1):1-18.

Kolata DR and CK Nimz. 2010. *Geology of Illinois*. Illinois State Geologic Survey, Urbana, Illinois.

Leetaru HE and JH McBride. 2009. "Reservoir uncertainty, Precambrian topography, and carbon sequestration in the Mt. Simon Sandstone, Illinois Basin." *Environmental Geosciences* 16(4):235-243.

Leetaru HE, DG Morse, R Bauer, SM Frailey, D Keefer, DR Kolata, C Korose, E Mehnert, S Rittenhouse, J Drahovzal, S Fisher, JH McBride. 2005. "Saline reservoirs as a sequestration target." In *An Assessment of Geological Carbon Sequestration Options in the Illinois Basin*, Final Report for U.S. DOE Contract: DE-FC26-03NT41994, Principal Investigator: Robert Finley. Midwest Geological Sequestration Consortium, Champaign, Illinois.

Leetaru HE, SM Frailey, D Morse, RJ Finley, JA Rupp, JA Drahozval, and JH McBride. 2009. "Carbon sequestration in the Mount Simon Sandstone saline reservoir." *In* Grobe M, JC Pashin, and RL Dodge (eds.), Carbon dioxide sequestration in geological media—State of the science, *AAPG Studies in Geology* 59:261-277.

McBride JH and DR Kolata. 1999. "Upper Crust Beneath Central Illinois Basin, United States". *GSA Bulletin* 111(3)375-394.

Meyer R and FF Krause. 2006. "Permeability Anisotropy and Heterogeneity of a Sandstone Reservoir Analogue: An Estuarine to Shoreface Depositional System in the Virgelle Member, Milk River Formation, Writing-On-Stone Provincial Park, Southern Alberta." *Bulletin of Canadian Petroleum Geology*, 54(4):301-318.

Morse DG and HE Leetaru. 2005. *Reservoir characterization and three-dimensional models of Mt. Simon Gas Storage Fields in the Illinois Basin*. Circular 567, Illinois State Geological Survey, Urbana, Illinois (CD-ROM).

Pruess K, J Garcia, T Kovscek, C Oldenburg, J Rutqvist, C Steefel, and T Xu. 2002. *Intercomparison of Numerical Simulation Codes for Geologic Disposal of CO_2*. LBNL-51813, Lawrence Berkeley National Laboratory, Berkeley, California.

Ringrose P, K Nordahl, and RJ We. 2005. "Vertical permeability estimation in heterolithic tidal deltaic sandstones." *Petroleum Geoscience* 11(1):29-36.

Saller AH, J Schwab, S Walden, S Robertson, R Nims, H Hagiwara, and S Mizohata. 2004. "Three-dimensional seismic imaging and reservoir modeling of an upper Paleozoic "reefal" buildup, Reinecke Field, west Texas, United States." Pp. 107-125 *in* GP Eberli, JL Masaferro, and JF Sarg (eds.), *Seismic Imaging of Carbonate Reservoirs and Systems*, Volume 81, American Association of Petroleum Geologists, Tulsa, Oklahoma.

Sminchak J. 2011. *Conceptual Model Summary Report Simulation Framework for Regional Geologic CO_2 Storage Along Arches Province of Midwestern United States*, Topical Report. Battelle Memorial Institute, Columbus, Ohio.

Span R and W Wagner. 1996. "A New Equation of State for Carbon Dioxide Covering the Fluid Region from the Triple-Point Temperature to 1100 K at Pressures Up to 800 MPa." *J Phys Chem Ref Data* 25:1509-1596.

Spycher N and K Pruess. 2010. "A Phase-Partitioning Model for CO2-Brine Mixtures at Elevated Temperatures and Pressures: Application to CO_2-Enhanced Geothermal Systems." *Transport in Porous Media*, 82:173-196, doi:10.1007/s11242-009-9425-y.

Spycher N, K Pruess, and J Ennis-King. 2003. "CO_2-H_2O mixtures in geological sequestration of CO_2. I. Assessment and calculation of mutual solubilities from 12 to 100°C and up to 600 bar." *Geochimica et Cosmoschimica Acta*, 67(16):3015-3031, doi:10.1016/s0016-7037(03)00273-4.

White MD, DH Bacon, BP McGrail, DJ Watson, SK White, and ZF Zhang. 2012. *STOMP Subsurface Transport Over Multiple Phases: STOMP-CO2 and STOMP-CO2e Guide, Version 1.0*. PNNL-21268, Pacific Northwest National Laboratory, Richland, Washington.

White MD and M Oostrom. 2006. *STOMP Subsurface Transport Over Multiple Phases, Version 4: User's Guide.* PNNL-15782, Pacific Northwest National Laboratory, Richland, Washington.

White MD and M Oostrom. 2000. *STOMP Subsurface Transport Over Multiple Phases: Theory Guide*. PNNL-12030, Pacific Northwest National Laboratory, Richland, Washington.

Willman HB, E Atherton, TC Buschbach, C Collinson, JC Frey, ME Hopkins, JA Lineback, and JA Simon. 1975. *Handbook of Illinois Stratigraphy*. Bulletin 95, Illinois State Geological Survey, Urbana, Illinois.

Zhou Q, JT Birkholzer, E Mehnert, Y-F Lin, and K Zhang. 2010. "Modeling basin- and plume-scale processes of CO_2 storage for full-scale deployment." *Ground Water* 48(4):494–514.