

[XXXX-XX-X]

DEPARTMENT OF ENERGY

Record of Decision, FutureGen Project

AGENCY: Department of Energy

ACTION: Record of Decision

SUMMARY: The U.S. Department of Energy (DOE) prepared an Environmental Impact Statement (EIS) (DOE/EIS-0394) to assess the potential environmental impacts associated with the proposed action of providing Federal financial assistance to the FutureGen Industrial Alliance, Inc. (Alliance) for the FutureGen Project. The Alliance, which is a non-profit industrial consortium led by the coal-fueled electric power industry and the coal production industry, intends to plan, design, construct and operate a coal-fueled electric power plant that will be integrated with capture and geologic sequestration of the by-product carbon dioxide (CO₂). Based on DOE's review and consideration of relevant factors, including potential environmental consequences associated with the proposed Project at four alternative sites, and subject to future technical, cost, business and environmental decision points, DOE has decided to proceed with financial assistance for the FutureGen Project. All practicable means to avoid or minimize environmental harms have been adopted.

During June 2008, DOE discontinued support for the Project allowing its cooperative agreement with the Alliance to expire without continuation or renewal. More recently, DOE reassessed that decision and reached an agreement with the Alliance to complete a

preliminary design, a revised cost estimate and a funding plan pursuant to a new eight- to ten-month limited-scope cooperative agreement valued at approximately \$17.5 million. Prior to the expiration of this cooperative agreement, DOE and the Alliance will make a mutual decision on whether to move forward into the subsequent phases.

Federal financial assistance for the subsequent phases (i.e., detailed design, construction and operations) would occur under the terms of a new full-scope cooperative agreement to be negotiated between DOE and the Alliance sometime during early 2010. As of early 2007, the project cost estimate was approximately \$1.7 billion (in as spent dollars), based on a conceptual design and generic cost data. DOE and the Alliance recognize that the costs may be as much as \$700 million higher and will use the new limited-scope cooperative agreement to explore cost reduction options and refine the estimate. If the Project continues, DOE anticipates committing \$1 billion in funds under the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) plus remaining funds from prior year annual appropriations. The balance of project funding is expected to come from (1) the Alliance (\$400 to 600 million), (2) revenues from sales of electricity, and (3) other funding sources to be identified in the project funding plan.

The FutureGen Project includes the planning, design, construction and operation by the Alliance of a coal-fueled electric power plant that features sub-systems for capture and geologic sequestration of the by-product carbon dioxide (CO₂) fully integrated into the power generation system. Electricity will be generated using an integrated gasification combined-cycle (IGCC) system sized for a nominal 275-megawatt (MW) output. The

plant will be designed for at least 90 percent CO₂ capture but may be operated in the early years at 60 percent capture to validate plant integration and sequestration capability before increasing the capture rate to 90 percent by the third year of operation. The plant will compress the captured CO₂ and pipe the captured CO₂ to one or more injection wells, where the CO₂ will be injected into saline reservoirs located thousands of feet beneath the land surface. The plant will also be designed to reduce air emissions of nitrogen oxides, sulfur oxides, mercury, and particulates to very low levels. The Project will include an option for a research platform to support development of technologies for future power plants that capture and sequester CO₂.

DOE considered four sites as reasonable alternatives: (1) Mattoon, Illinois; (2) Tuscola, Illinois; (3) Jewett, Texas; and (4) Odessa, Texas. After careful consideration of the potential environmental impacts of the proposed project at each of the four alternative sites, along with consideration of program goals and objectives in accordance with its obligations under the National Environmental Policy Act (NEPA), DOE has decided to provide financial assistance to the Alliance to implement the FutureGen Project at any one of the four alternative sites. In addition, DOE considered potential mitigation opportunities in the EIS, and several mitigation requirements are specified in this Record of Decision (ROD). Floodplain and wetland environmental review requirements (10 CFR Part 1022) were incorporated into the EIS and NEPA process. This ROD briefly describes mitigation steps to be taken.

DOE issued the Final EIS on November 9, 2007, and the U.S. Environmental Protection Agency's (EPA) Notice of Availability of the EIS was published in the *Federal Register* on November 16, 2007 (72 FR 64619 (2007)). The cooperative agreement in effect at that time gave the Alliance the right to select the site after DOE issued a ROD. The Alliance announced their preference for the Mattoon site in December 2007. Therefore, DOE acknowledges that the Alliance intends to formally select Mattoon after issuance of this ROD. Since December 2007, the Alliance has acquired property at the Mattoon site (without using Federal funds) and has continued to conduct preliminary design work.

ADDRESSES: The Final EIS is available on the DOE NEPA website at:

<http://www.gc.energy.gov/NEPA/final-EIS-0394.htm> and on the DOE National Energy Technology Laboratory website at:

www.netl.doe.gov/technologies/coalpower/futuregen/EIS. This ROD also is available on the same websites. Copies of the Final EIS and this ROD may be obtained from Mr.

Mark L. McKoy, Environmental Manager, U.S. Department of Energy, National Energy Technology Laboratory, P.O. Box 880, Morgantown, WV 26507-0880, ATTN:

FutureGen Project EIS; telephone: 304-285-4426; toll-free number: 1-800-432-8330 (ext 4426); fax: 304-285-4403; or e-mail: FutureGen.EIS@netl.doe.gov.

FOR FURTHER INFORMATION CONTACT: To obtain additional information about this project, the EIS or the ROD, contact Mr. Mark. L. McKoy by the means specified above under "ADDRESSES". For general information on the DOE NEPA process, contact Ms. Carol M. Borgstrom, Director, Office of NEPA Policy and

Compliance (GC-20), U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, DC 20585; telephone: 202-586-4600; fax: 202-586-7031; or leave a toll-free message at: 1-800-472-2756.

SUPPLEMENTARY INFORMATION: DOE prepared this ROD pursuant to Council on Environmental Quality regulations for implementing the procedural provisions of NEPA [40 Code of Federal Regulations (CFR) Parts 1500 – 1508] and DOE NEPA regulations (10 CFR Part 1021). This ROD is based in part on DOE's Final EIS for the FutureGen Project (DOE/EIS-0394, November 2007).

Background

On February 27, 2003, then President Bush announced that the United States would undertake a large-scale research project to build the world's first coal-fueled power plant to produce electricity and hydrogen gas (H₂) with near-zero emissions, including CO₂. In response to this announcement, DOE developed plans for the FutureGen Project, which was intended to establish the technical and economic feasibility of producing electricity and H₂ from coal – a low-cost and abundant energy resource – while capturing and geologically storing the CO₂ generated in the process.

On April 21, 2003, the Department of Energy (DOE) issued a Request for Information (RFI) in the *Federal Register* seeking public comment in the form of expressions of interest from prospective consortia. FutureGen is anticipated to be a complex undertaking; therefore, DOE believes project success is best achieved through a

collaboration of the industries most heavily impacted by potential future limitations on carbon emissions. Thus, DOE outlined a plan to enter into a noncompetitive cooperative agreement with a consortium led by the coal-fueled electric power industry and the coal production industry. In response to the RFI, the FutureGen Industrial Alliance, Inc. was proposed to represent the industry collaboration, and on July 27, 2005, the Alliance was incorporated. A limited-scope cooperative agreement was signed by DOE and the Alliance on December 2, 2005 to initiate the Project with a project definition phase that yielded a conceptual design report and project plans. This phase also led to the signing of a full-scope cooperative agreement on March 23, 2007 that was intended to establish the remainder of the Project.

On June 15, 2008, in response to DOE's concerns about escalating costs, DOE allowed the cooperative agreement to expire without continuation or renewal. During February 2009, the General Accounting Office issued a report (GAO-09-248), which concluded that DOE's decision to restructure the FutureGen Project should be based on a comprehensive analysis of costs, benefits and risks. Subsequently, the Department reassessed the Project and determined that additional information is required for DOE and the Alliance to make an informed decision on whether to continue the Project to completion. In a June 12, 2009 press release, Secretary Chu announced an agreement for the Alliance to begin performance of the following activities:

- Rapid restart of preliminary design activities.
- Completion of a site-specific preliminary design and up-dated cost estimate.
- Expansion of the Alliance sponsorship group.

- Development of a complete funding plan.
- Potential additional subsurface characterization.

These activities would occur pursuant to a new eight- to ten-month limited-scope cooperative agreement valued at approximately \$17.5 million. Prior to the expiration of this cooperative agreement and based on the new information (preliminary design, revised cost estimate, and funding plan, anticipated early in 2010), DOE and the Alliance will make a mutual decision on whether to move forward. The preferred outcome is a mutual decision to move forward and to establish a full-scope cooperative agreement for the detailed design, construction and operation of the Project, subject to additional NEPA review as appropriate.

Purpose and Need for Agency Action

The purpose of the agency action is to implement the FutureGen Initiative, and support the Nation's climate change mitigation strategy through the application of technologies currently feasible for carbon capture and storage (CCS) and large-scale production of H₂. The Federal action is to fund the construction and operation of the cleanest coal-fueled power plant system in the world for producing electricity from H₂. As the Nation's most abundant fossil fuel, coal is expected to have an important role in the Nation's energy future. However, fossil fuel combustion has been identified as a major source of CO₂ concentration increases in the atmosphere. Electric power generation contributes 40 percent of all CO₂ emissions in the U.S. In 2006, 82 percent of all electricity production-related CO₂ emissions resulted from the burning of coal.

EIS Process

On February 26, 2006, DOE published in the *Federal Register* (71 FR 8283) an Advance Notice of Intent to prepare an EIS. Subsequently, on July 28, 2006, DOE published a Notice of Intent to prepare the FutureGen EIS and to hold public scoping meetings (71 FR 42840). DOE held a public scoping meeting near each of the four alternative sites during the public scoping period, which ended September 13, 2006. DOE addressed scoping comments in the Draft EIS.

On June 1, 2007, DOE published in the *Federal Register* (72 FR 30572) a Notice of Availability and an announcement of public hearings for the Draft EIS. The four public hearings also were announced in local newspapers. One public hearing was held near each of the four alternative sites. Comments were solicited at the public hearings and throughout the public comment period, which ended July 16, 2007. Comments on the Draft EIS included statements of support as well as concerns about public health and safety, aesthetics, noise, air emissions and air quality, water consumption and protection (surface water and groundwater), monitoring methods and permanence of geologic storage, co-sequestration of hydrogen sulfide (H₂S), employment, impacts on farming, disposal of wastes, public outreach, technology development, and promotion of alternate sources of energy. In the Final EIS, DOE considered and, as appropriate, responded to public comments on the Draft EIS.

DOE issued the Final EIS during November 2007, and the Environmental Protection Agency published a Notice of Availability for the Final EIS in the *Federal Register* on

November 16, 2007 (72 FR 64619). On December 18, 2007, the Alliance announced its intention to select the Mattoon site, pending the issuance of DOE's Record of Decision. Under the terms of the cooperative agreement in effect at that time, the Alliance would select the FutureGen site from among the sites found to be acceptable by DOE, as published in the ROD. Since December 2007, the Alliance has acquired property at the Mattoon site (without using Federal funds) and has continued to conduct preliminary design work.

Proposed Action and Project Description

The Proposed Action is for DOE to provide financial assistance to the Alliance for the FutureGen Project. Under the terms of a new \$17.5 million limited-scope cooperative agreement, DOE and the Alliance will complete a preliminary design, a revised cost estimate and a funding plan for the FutureGen Project. Based on these work products, DOE and the Alliance will mutually decide prior to the expiration of this agreement whether to move forward into subsequent phases.

In an effort to reduce costs, improve plant reliability, and generate revenue from sales of electricity, DOE and the Alliance will consider several design and operational features not presented in the Final EIS, including the following specific features:

- Design the facility for at least 90 percent CO₂ capture but operate in the early years at 60 percent capture to validate plant integration and sequestration capability before increasing the capture rate to 90 percent by the third year of operation.

- Design the combined-cycle power generation portion of the facility so that it may be operated on natural gas during the period when the gasification plant is under construction, and thereafter if syngas is not available.
- Design the facility so that it is optimized for a single coal type, which may decrease capital costs of the facility.

As explained herein (see sections on “Air Quality” and “Climate and Meteorology”), DOE believes incorporation of these features into the Project does not significantly change the environmental impacts of the project as presented in the Final EIS.

If DOE and the Alliance mutually decide in early 2010 to move forward with the remainder of the Project, DOE would share costs in the planning, design, construction, and operation of the Project, as specified in a follow-on full-scope cooperative agreement. The Alliance is a non-profit corporation that represents a global coalition of coal and energy companies that would share in the Project costs.

As of early 2007, the Project cost estimate was approximately \$1.7 billion (in as spent dollars), based on a conceptual design and generic cost data. DOE and the Alliance recognize that the costs may be as much as \$700 million higher and will use the new limited-scope cooperative agreement to explore cost reduction options and refine the estimate. If the Project continues, DOE anticipates committing \$1 billion in funds under the American Recovery and Reinvestment Act of 2009 (P.L. 111-5) plus remaining funds from prior year annual appropriations. The remainder of project funding is expected to

come from (1) the Alliance (\$400 to 600 million), (2) revenues from sales of electricity, and (3) other funding sources to be identified in the project funding plan.

The FutureGen Project will be a low-emissions coal-fueled power plant supporting cutting-edge research to develop promising new energy-related technologies on a commercial scale. Low carbon emissions will be achieved by integrating CO₂ capture and sequestration operations with the power generation system. Performance and economic test results from the FutureGen Project will be shared among the participants, the industry, the environmental community, and the public.

The power plant will be a nominal 275-megawatt (MW) output IGCC system. Geologic storage of CO₂ is planned to occur at an operational rate of at least 1.1 million tons [1 million metric tons (MMT)] of CO₂ per year. The following are major components of the FutureGen Project: a power plant and plant infrastructure; a sequestration site for one or more CO₂ injection wells and related infrastructure; a deep saline reservoir (an underground geologic formation whose pore space contains salt water); utility connections and corridors (water supply pipeline, sanitary wastewater pipeline, electricity transmission line, natural gas pipeline, and CO₂ pipeline); and rail and truck transportation of coal and other materials consumed or generated by the power plant.

Construction is anticipated to begin in 2011, with initial startup of the facility in 2014. DOE-sponsored activities will include design, construction and four years of plant operation, testing, and research, followed by two years of additional geologic monitoring

of the sequestered CO₂. After DOE-sponsored activities conclude, the Alliance or its successor will manage and operate the plant, likely as a commercial venture. DOE expects the plant will operate for at least 20 to 30 years, and potentially up to 50 years.

As preliminary design for the FutureGen Project continues and more information regarding the site and costs becomes available, it may become necessary to modify the design and/or goals of the Project. Changes made to the Project and additional information about the selected site will be examined in a Supplement Analysis, which DOE will use to determine if a Supplemental EIS is warranted.

Site Alternatives

DOE analyzed four reasonable alternative sites for the FutureGen Project. These sites were identified by the Alliance through a rigorous competitive solicitation and screening process. DOE reviewed the Alliance's process and findings to ensure that all reasonable alternatives were considered for analysis in the EIS.

As noted above, the Alliance has stated its intention to formally select the Mattoon site, pending the issuance of DOE's Record of Decision. The following paragraphs briefly describe each alternative site, as conditions existed at the time the EIS was prepared.

Mattoon, Illinois. The Mattoon Site consists of approximately 444 acres of flat-lying farmland about 1 mile northwest of the City of Mattoon, Coles County, Illinois. The power plant and sequestration site would be located in the same area. Currently, the site

is 93 percent farmland and 3 percent public rights-of-way (ROW), with the remainder being rural residential development and woodlands.

Tuscola, Illinois. The Tuscola Site consists of approximately 345 acres of flat-lying farmland about 1.5 miles west of the City of Tuscola, Douglas County, Illinois. The site is currently farmland and is located adjacent to facilities of the Cabot Corporation and Lyondell-Equistar Chemical Company. The sequestration site is a 10-acre parcel located 11 miles south of the power plant site in Douglas County. The sequestration site currently consists of agricultural land located south of the City of Arcola.

Jewett, Texas. The Jewett Site is located in east-central Texas on approximately 400 acres of formerly mined land about 7 miles northwest of the City of Jewett. The site is located at the intersection of Leon, Limestone, and Freestone counties. The area is characterized by very gently rolling grassed areas (reclaimed mine lands) and post oak forest adjacent to an operating lignite mine and the NRG Limestone Generating Station. The sequestration wells would be located on private ranchland and/or state-owned land approximately 33 miles northeast of the plant site in Anderson and Freestone counties. Land at the sequestration sites is used for ranching and agriculture and includes part of the property of a state prison farm.

Odessa, Texas. The Odessa Site is located on approximately 600 level acres about 15 miles southwest of the City of Odessa, Ector County, Texas. The site is north of the town of Penwell on land historically used for ranching plus oil and gas activities. The

sequestration site is located 58 miles south of the plant site in Pecos County. This sparsely populated area is on semi-arid land adjacent to Interstate Highway I-10, about 13 miles east of Fort Stockton. The sequestration site property is owned by the University of Texas.

No-Action Alternative

Under the No-Action Alternative, DOE would not share in the cost for constructing and operating the FutureGen Project. Without DOE funding, the Alliance would not likely undertake the commercial-scale integration of CO₂ capture and geologic sequestration with a coal-fueled power plant. Therefore, the No-Action Alternative is considered a “No-Build” Alternative.

Potential Environmental Impacts and Mitigation Measures

In making its decision, DOE considered the environmental impacts of the Proposed Action and No-Action Alternative on potentially affected environmental resource areas. These include air quality, climate and meteorology, geology, physiography and soils, groundwater, surface water, wetlands and floodplains, biological resources, cultural resources, land use, aesthetics, traffic and transportation, noise and vibration, human health and safety (including accidents and sabotage scenarios), socioeconomics, and environmental justice. The EIS evaluates the impacts of the FutureGen Project on these environmental resource areas at each of the four candidate sites. It also examines potential incremental impacts of the Project in combination with other past, present, and

reasonably foreseeable future actions (i.e., cumulative impacts). The following sections provide key findings related to potential environmental impacts and mitigation measures.

Air Quality

The FutureGen Project will be categorized as a major source of air pollutants under Clean Air Act regulations because emissions of some criteria pollutants will exceed 100 tons per year. However, compared to conventional coal-fueled power plants of the same size, the Project will emit very low levels of criteria and hazardous air pollutants, including those from initial startup, restarts and flaring events. During these periods, emissions will increase temporarily while process gases are flared for a short period of time. There is less than a two percent chance that critical weather conditions would coincide with a plant upset or restart to cause a local, short-duration exceedance of National Ambient Air Quality Standards at any of the four sites (chance of exceedance of the 3-hour sulfur dioxide [SO₂] criterion is: Mattoon, 0.23 percent; Tuscola, 0.22 percent; Jewett, 1.66 percent; Odessa, 0.09 percent).

Although air quality impacts will be small at any of the sites, the FutureGen Project will reduce emissions and impacts to the fullest extent practicable. Specifically, the Project will employ advanced particulate control devices such that the concentration of particulates in the syngas will be less than 0.005 lb/MM Btu (pounds per million metric British thermal units) of coal gasified, which is far lower than current environmental standards for coal plants. For controlling emissions of nitrogen oxides, the Project will use state-of-the-art combustion-control technologies (e.g., using nitrogen gas and/or

steam as a diluent in the combustion gas turbine to adjust the firing temperature and thereby reduce the thermal formation of nitrogen oxides). Downstream from the gasifier, a water-gas-shift reactor will convert carbon monoxide (CO) and water into CO₂ and H₂. Further downstream, an acid gas removal system will capture CO₂ and sulfur compounds, thus minimizing emissions.

During the up-coming continuation of the preliminary design phase, DOE and the Alliance will consider several design and operational features not presented in the Final EIS: a temporary (two to three year period) reduction in CO₂ capture rate from 90 percent to 60 percent, short-term periods of firing the combustion turbine on natural gas (including a potential one-year startup period), and the optimization of the power plant for gasifying a single coal type (see the above section on "Proposed Action and Project Description"). Air emissions of criteria and hazardous pollutants associated with these potential changes in the scope of the project are estimated to result in no change in the findings of the EIS.

For example, during periods that the facility operates on coal at 60 percent CO₂ capture, emissions of SO₂, particulates and mercury would be unchanged because the syngas and flue gas clean-up systems would operate the same as they would when the facility operates at 90 percent CO₂ capture. Additionally, when capturing 60 percent of the CO₂, emissions of NO_x and CO are expected to be unchanged. Therefore, the estimated emission rates of these criteria pollutants at 60 percent CO₂ capture would be equal to

those used for air quality modeling in the EIS. Estimated emissions of CO₂ are described in the next section, "Climate and Meteorology".

During short-term periods of operation on natural gas, emissions of SO₂, particulates and mercury would be negligible. Emissions of CO are estimated to be below the emission rate of CO during operation on coal and therefore below the emission rates used for air quality modeling in the EIS. Emissions of NO_x when firing natural gas are expected to require control using selective catalytic reduction and, therefore, would be typical of emission levels for state-of-the-art natural gas combined-cycle power plants. These emission rates would be well below the emission rates used for air quality modeling in the EIS.

To validate the Project's accomplishments, the Alliance shall prepare (at a minimum) annual reports during the term of the cooperative agreement that document engineering and research activities demonstrating technical and economic progress toward developing the design and operational basis for future near-zero emissions coal-fueled power plants. Annual reports shall include summary information on the emissions of criteria pollutants and CO₂ from the Project. These reports shall indicate the performance and emissions of the Project during normal operations. If air emissions data are collected during periods of operation outside normal, steady-state conditions, this information also shall be summarized in the report.

Climate and Meteorology

Construction and operation of the FutureGen Project will not cause measurable impacts on local, regional or global climate and meteorology. The Project's primary objective is to test and help develop coal-fueled power plants that greatly reduce emissions of greenhouse gases. If the Project's technologies are widely deployed in fossil-fueled power plants built in the future, these plants collectively could reduce national and world-wide greenhouse gas emissions (compared to a scenario of not using carbon capture and sequestration on new coal-fueled power plants), thereby lessening the potential for global climate change.

If the Project adopts potential changes in the CO₂ capture rate, fuel source and plant operations, as discussed in the section on "Proposed Action and Project Description", the amount of CO₂ emitted to the atmosphere would increase during the first two or three years of project operations. At 60 percent CO₂ capture levels, facility operations on coal are estimated to add additional emissions of 485,000 to 685,000 metric tons of CO₂ per year of operation. One year of facility operations on natural gas is estimated to add additional emissions of 750,000 metric tons of CO₂. Facility operations on natural gas if syngas is not available are only expected to result in additional emissions during the period when the facility is usually operated at 90 percent CO₂ capture levels. These additional emissions are estimated to be between 110,000 to 215,000 metric tons per year of operation. Over the potential 5 year project operations period (four years of coal-fueled operations plus one year of natural-gas-fueled operations prior to completion of plant construction), an estimated additional 2,200,000 to 2,400,000 metric tons of CO₂ may be emitted to the global atmosphere. The additional estimated average annual CO₂ emissions

(430,000 to 470,000 metric tons per year) represent nearly double the emissions of CO₂ compared to the maximum predicted emissions when the normally operating plant (fueled with coal) captures 90 percent of the CO₂ (250,000 metric tons per year).

A principal goal of FutureGen testing is to gather operational and cost data on a coal-fueled power plant that is integrated with CO₂ capture and geologic sequestration. The FutureGen facility will be designed for 90 percent CO₂ capture. However, since this is a first-of-a-kind project in terms of technology integration for large-scale electric power plant applications, testing may be performed initially at the 60 percent CO₂ capture rate as a risk mitigation strategy, and increased later during operational testing. Additionally, the 60 percent CO₂ capture rate will demonstrate operation of a coal-fueled power plant with a CO₂ emission level that is comparable to a state-of-the-art natural gas combined-cycle power plant.

Geology

Construction of the proposed power plant and related facilities would not significantly change geologic conditions at the proposed sites. However, since geological sequestration of CO₂ is one of the Project's goals, the subsurface target reservoirs will be used to store CO₂. Estimated radii of the plumes of injected CO₂ would be of the same relative magnitude at all four sites (1.0 to 1.7 miles radius per well after injecting 1.1 million tons [1.0 MMT] per year for 50 years), although the number of injection wells (and associated plumes) would differ among the sites (probably one well at the Illinois sites; two to three wells at the Jewett site; and three to ten wells at the Odessa site). CO₂ will be injected

into an underlying saline reservoir at the selected sequestration site at a planned operational rate of between 1.1 and 2.8 million tons (1.0 to 2.5 MMT) per year. Although reservoir space will be used to store the injected CO₂, no adverse impacts are expected to occur to geological resources.

DOE will require monitoring of the injected CO₂ to assess its fate and to verify storage integrity. To fully support the monitoring and assessment activities, the Alliance shall install a sufficient number (at least two) of monitoring wells into the target reservoirs near a primary injection well to provide the data to validate the expected migration of CO₂. One or more monitoring wells may serve as backup injection wells. After further site characterization studies at the selected site, and subject to land access and property rights, DOE and the Alliance will mutually agree on the placement of monitoring wells that penetrate the primary seal. From a research perspective, it would be advantageous to locate one monitoring well stratigraphically up-dip (or in the hydrodynamically favorable flow direction, if there is found to be another direction of potential flow of injected CO₂). The other monitoring well should then be located in a stratigraphic strike direction (or direction perpendicular to the horizontal direction between the injection wells and the first monitoring well) for directional permeability tests and lateral monitoring. Ideally, these wells should be located near the predicted four-year plume front relative to the primary injection well. In addition to monitoring wells that penetrate and sample the target injection reservoir(s), shallower monitoring wells shall be installed and used to demonstrate compliance with the required Underground Injection Control permit and, as appropriate, to meet the research and development objectives of the Project. Annual

reports shall include summary information on the sequestration activities, including monitoring results, the determined location and extent in the subsurface of the injected CO₂, and quantity of excess CO₂ sold or released.

The Alliance shall prepare an Emergency Response Plan for use in the unlikely event of leaks of the injected CO₂. The plan shall include generic responses to apparent slow leaks that could develop into more serious problems if no actions are taken. While it is perhaps not practical or necessary to prepare specific or detailed responses for all potential leakage modes, the plan shall delineate how to identify a leak that could present a hazard if unmitigated. Furthermore, the plan shall identify the responsible persons that would make decisions, develop specific response plans and take action. The plan should also identify resources and organizations that may help in making an appropriate response. The Emergency Response Plan shall address ruptures and large punctures of the CO₂ pipeline and rapid releases of fluids (i.e., blowouts) through failed injection wells or other wells or through other routes from the target reservoir, as described below in the section on "Human Health, Safety, and Accidents".

Although during each year of operations the goal is to inject a minimum of 1.1 million tons (1.0 MMT) of CO₂ into deep saline reservoirs, excess captured CO₂ could be sold for use by industry in enhanced oil recovery or other subsurface operations. Successful technology transfer to future power plant projects could result in increased oil and natural gas production.

A very low potential exists for adverse effects to the facilities from geologic hazards. Earthquakes of medium intensity are possible but not common at these sites. The Alliance shall monitor the sequestration site to detect and help operators prevent induced rock fracturing or reservoir leakage caused by over-pressurization of the formation.

The Alliance and DOE will develop a mutually acceptable plan for continued monitoring of the sequestered CO₂ after project completion by a responsible party for a period of time deemed sufficient to verify the sequestration's permanence.

Physiography and Soils

Soil disturbance at the power plant site will result in permanent removal or displacement of soils on up to 200 acres. At Mattoon or Tuscola, this would include prime farmland soils. At Tuscola, an additional 10 acres of soil disturbance may occur at the sequestration site. Soil disturbance in utility corridors is expected to be temporary and will vary greatly depending on the site selected, ranging from 26 to 744 acres with the higher end of the range associated with the Texas sites. Transportation corridors at the power plant site could require up to 15.9 acres of soil disturbance and is generally greater for the Illinois sites. To mitigate these impacts, the Project will employ best management practices, such as those commonly used for erosion control as well as spill prevention and response measures.

Groundwater

Some groundwater use could occur at Tuscola and Odessa, but the Jewett site's process water supply would rely exclusively on groundwater. Groundwater supplies appear more than adequate at each site to meet power plant consumption rates. Although no adverse impacts are expected to occur, impacts of water use are likely to be more significant for the Odessa site. Best management practices, such as water conservation (e.g., a zero liquid discharge system to recycle wastewater and cooling tower blowdown for use in the cooling tower, thereby reducing cooling tower makeup water requirements), spill prevention measures and a spill response plan, will be implemented to minimize the potential for environmental impacts to the fullest extent practicable.

The proposed CO₂ injection reservoirs are one mile deep or greater at each sequestration site, except for the Odessa site, where the injection zone is only 0.5 mile deep. Shale layers (and anhydrite layers at the Odessa site) appear sufficient to provide secure seals for the injected CO₂. Compared to the Illinois sites, the Texas sites have a greater number of existing wells that penetrate the seals, and therefore, these two sites may have a greater risk of CO₂ leakage along existing wells. Target formations are not underground sources of drinking water, and there are no sole-source aquifers above them. The Alliance shall monitor the sequestration site and ensure that underground sources of drinking water above the target formation are not impacted by the injected CO₂, as expected to be required by the Underground Injection Control permit. Annual reports shall include summary information on the groundwater monitoring activities and results, along with summary information on other monitoring activities addressed by the sequestration program.

The Alliance shall use reasonable efforts to locate and verify the integrity of abandoned wells penetrating the primary seal over the CO₂ plume footprint and properly seal any wells that were not adequately abandoned. This mitigation effort shall occur prior to the start of injection operations for at least the Area of Review defined in the Underground Injection Control Permit. During injection operations, the Alliance must make reasonable efforts to track the CO₂ plume front and to verify and plug, as appropriate, abandoned wells that present a risk of becoming a leakage path (i.e., if monitoring results obtained throughout the injection phase suggest that the actual area of plume spread would exceed the predicted plume footprint). This mitigation requirement shall be made a term and condition for future owners upon sale or donation of the injection facilities at the end of the Alliance's injection activities.

Surface Water

Surface water would be used directly for the Tuscola and Odessa sites, and these surface water resources can accommodate the demand. Mattoon proposes to use municipal wastewater treatment plant effluent, which otherwise would flow into two very small streams (Kickapoo and Cassell creeks) that drain away from Mattoon and Charleston. For both of these streams, the diversion of wastewater may result in more natural flow rates in the streams that now receive the wastewater, but downstream users would suffer a significant reduction in flow rates compared to current rates. Best management practices, such as water conservation (e.g., a zero liquid discharge system to recycle wastewater and cooling tower blowdown for reuse in the cooling tower, thereby reducing cooling tower

makeup water requirements), spill prevention measures and a spill response plan, will be implemented to minimize the potential for impacts. Annual reports shall include summary information on the releases of industrial wastewater from the Project and the effectiveness of the Project's water conservation program.

Wetlands and Floodplains

Power plant construction and operations will not affect floodplains since none of the proposed power plant sites include areas mapped as 100-yr floodplains. However, construction and operation of the power plant may impact small, low to moderate quality wetlands at two of the proposed sites, Mattoon and Jewett. The Project's layout will avoid wetlands located on the plant site to the maximum extent practicable.

While the region above the proposed sequestration reservoirs includes floodplains at some sites, tentatively selected well locations are not within 100-year floodplains. Above the proposed sequestration reservoirs at Jewett and Tuscola, there are both wetlands and floodplains. Within the region of influence above Tuscola's target reservoir, wetland areas may occupy up to five acres. Jewett's sequestration areas lay on both sides of the Trinity River, which has numerous wetlands (43 forested, scrub-shrub, and emergent wetlands) nearby and along its floodplains. About 25 percent of the region of influence above the Jewett target reservoirs is within a 100-year floodplain. Site characterization activities (e.g., geophysical surveys) and monitoring programs that might impact wetlands could require avoidance or mitigation measures. Unavoidable impacts to

wetlands would require mitigation in accordance with regulatory requirements. It is not anticipated that floodplains will be adversely affected.

Utility and transportation corridors include wetland areas at all four sites. While wetlands can be avoided to a great degree by locating structures outside of or routing around wetlands that are within the corridors, some wetland impacts may be unavoidable.

Unavoidable impacts to wetlands would require mitigation in accordance with regulatory requirements. Wetland areas have been identified within utility and transportation corridors in the following amounts: Mattoon, up to 29.2 acres; Tuscola, up to 4.2 acres; Jewett, over 90 acres; and Odessa, up to 23.9 acres. These numbers include wetlands from multiple corridor options, whereby some corridor options may have no wetlands. Some of the corridors cross areas within the 100-year floodplain, but potential impacts are not considered to be significant, especially in light of mitigation measures that will be required for anticipated wetland impacts.

Impacts to wetland resources shall be avoided to the fullest extent practicable. Clean Water Act section 404 permits will be obtained for jurisdictional water bodies and wetland alterations. As a permit condition, mitigation of wetland impacts could be in the form of direct replacement or other approved Federal or state mitigation requirements.

In compliance with floodplain and wetland environmental review requirements (10 CFR Part 1022, Executive Order 11988, and Executive Order 11990), the EIS contains the floodplain and wetland assessments along with the floodplain statement of findings, as

allowed under 10 CFR Part 1022.14(c). DOE assessed the potential impacts to wetland and floodplain resources based on field verification (wetland delineations) and National Wetland Inventory (NWI) mapping. The Mattoon and Tuscola sites included field verification for the power plant sites and other project components (e.g., utility corridors), allowing for a quantitative analysis using potential acreage (hectares) of impacts. The Jewett and Odessa sites included field verification for only the power plant sites and relied on NWI mapping for all other project components, allowing for a qualitative assessment limited to the identification of wetland types within the project component areas.

Biological Resources

Land disturbance at the power plant and injection sites will result in up to 210 acres of permanent habitat loss. At the Illinois sites, there would be a loss of row crops (generally corn or soybean) on prime farmland. At the Jewett site, this would be primarily a loss of a mixture of grasslands and post oak forests. At Odessa, it would be a loss of arid habitat dominated by mesquite-lotebush brush and mesquite-juniper brush.

Additionally, temporary disturbances to terrestrial and aquatic organisms will occur along utility corridors. These disturbances and resulting habitat impacts are expected to displace or at least temporarily disturb wildlife and other biological resources. Potentially affected utility corridor lengths at each site are: Mattoon, up to 35.3 miles, with 18.8 miles of new ROW occupied primarily by row crops; Tuscola, up to 31.9 miles, with 16.9 miles of new ROW occupied primarily by row crops; Jewett, up to 63 miles, with 13 miles of new

ROW occupied primarily by post oak forest and grasslands; Odessa, up to 128.5 miles with 68.7 miles of new ROW occupied primarily by non-arable brush lands. Best management practices will be employed to reduce adverse impacts.

The potential for impacts on threatened and endangered species has been reviewed in the EIS, and there are no known occurrences of threatened and endangered species at the proposed sites. A biological survey of the selected FutureGen site will be conducted as required before construction begins to verify that no threatened or endangered species are present in the areas (including utility corridors) that will be disturbed.

Cultural Resources

Construction and operation of the FutureGen Project are not anticipated to impact cultural resources at any of the proposed power plant sites; however, utility corridors have not been thoroughly investigated and could have construction-related impacts. Phase I surveys may be needed for certain corridor segments associated with the Mattoon and Tuscola sites. Jewett has 35 known cultural resource sites along its proposed CO₂ corridors and 33 recorded sites within the region of influence of the sequestration site. Phase I surveys and consultation with the Texas State Historic Preservation Officer would be required for the CO₂ pipeline corridors and sequestration site. Odessa would require Phase I surveys and consultation for all new CO₂ pipeline, water supply pipeline, and electricity transmission line corridors. Furthermore, the Odessa site could have invertebrate and vertebrate fossil resources in the path of the corridors. No impacts to unique or irreplaceable invertebrate fossils would be expected. Vertebrate fossils, in

comparison, are much less likely to be encountered. For the selected site, archaeological and paleontological surveys will be conducted, as required, to determine the location of cultural resources and the possible extent of impacts along utility corridor alignments after those alignments are identified.

Further consultation with the State Historic Preservation Officer for any unforeseen areas of construction or ground disturbance not included within the EIS will be completed before construction to determine the need for further cultural resource investigations and any appropriate mitigation measures.

Land Use

Depending on the site selected, the proposed power plant and related facilities will be located on 345 to 600 acres of land that will be acquired by the Alliance for the Project. (Note: the Alliance has purchased 420.5 acres at the Mattoon site.) Construction and operation activities are estimated to impact up to 200 acres of that land. Land at the selected power plant site will be converted from its current agricultural, ranch, industrial storage, or oil and gas production uses. At the Mattoon and Tuscola power plant sites, it is estimated that up to 200 acres of prime farmland would be converted to industrial uses. About 10 acres would be converted at the Tuscola sequestration site. At the Jewett power plant site, which is mostly reclaimed mine land, there may be a few acres of prime farmland converted. The Jewett power plant site is currently used for pasture and industrial storage. The Odessa power plant site is currently used for ranching and for oil and gas production.

There would be a direct impact to residential properties located adjacent to the proposed power plant sites: two residences adjacent to the Mattoon site, and three directly adjacent to the Tuscola site. Within one mile of the proposed power plant sites, there are: Mattoon, 20 residences; Tuscola, several dozen residences; Jewett, zero residences; and Odessa, three residences. The Odessa site is at the northern edge of Penwell, a mostly abandoned small oil town.

The Mattoon site has been established as an enterprise (business) zone. Tuscola's site is zoned for industrial uses and has two chemical plants immediately to the west. Jewett's site is unzoned and is partially located on reclaimed mine land with nearby active mine facilities and an existing large power plant adjacent to the proposed power plant site. Odessa's site is unzoned, with arid ranch land located to the north and east, a scrap yard and the abandoned town of Penwell to the south, and an oil and gas field to the west.

Except at Mattoon, where the injection well will be on the power plant site, construction and operations at the sequestration site are expected to impact up to an additional 10 acres of land, with current land uses being agricultural at the Tuscola sequestration site, ranching and state prison farmland at the Jewett sequestration site, and grazing land with scattered oil and gas activities on the Odessa sequestration site. Odessa's sequestration site is on land owned by the University of Texas and is ordinarily leased to others for oil and gas production and for ranching in an effort to generate income for the University.

Option contracts existed for the mineral rights to 444 acres at the Mattoon site; the Alliance has since exercised those options. Options for mineral rights at Tuscola, Jewett, and Odessa have expired.

For utility corridors, new ROWs would be needed in the following amounts: Mattoon, up to about 20 miles; Tuscola, up to about 17 miles; Jewett, between 10 and 13 miles; Odessa, approximately 71 miles. The exact amount of new ROW will be a function of the options selected at the site. Generally, current land uses will continue after installation of new utilities (e.g., CO₂ pipeline, water supply pipeline, electricity transmission line).

The Alliance could receive options to purchase some onsite and adjacent residential properties. The Alliance would consider exercising these options on a case-by-case basis to meet Project needs.

Aesthetics

At Mattoon, Tuscola and Odessa, the proposed power plant may be perceived as a major visual intrusion within a 1-mile radius of the site. However, at Odessa, the visual intrusion would be moderated due to the presence of other industrial facilities that are visible in the general area of Penwell. The Jewett site would have the least visual intrusion for neighbors and motorists driving through the area. For all sites, the sequestration facilities will present minimal visual intrusion.

Within the budgetary limits of the Project, it is highly desirable that the Project's facilities will be designed and constructed to be as aesthetically pleasing as practicable to the people in the surrounding communities and to the public in general. Therefore, the Alliance shall implement appropriate mitigations that may include: enclosing or shielding some of the more "industrial" components of the plant; designing and constructing buildings and other structures to have a pleasing and appropriate appearance for the general public; landscaping around the perimeter of the plant site to partially screen the plant from nearby residences and local motorists; selecting appropriate transmission towers to reduce their visual profile; and choosing an appropriate lighting design (e.g., luminaries with controlled candela distributions, well-shielded or hooded lighting, and directional lighting) to minimize light pollution.

Traffic and Transportation

Construction of the Project will create temporary, localized adverse traffic impacts due to the presence of additional truck traffic and commuting workers. Truck traffic impacts may be mitigated through the use of designated truck routes to the power plant site.

Continued use of these routes during operations would reduce operational impacts.

During plant operation, traffic near the power plant will be heavier, but traffic will not degrade to unstable conditions at any site. Installation of new traffic controls or changes in traffic signal timing may be needed at a few intersections.

For rail traffic at each site, connection of new side tracks will have minimal and temporary impacts. At Odessa, temporary impacts would occur to rail operations during

construction of a new underpass. During plant operation at any of the sites, rail traffic will increase by up to two trains per day along the rail line servicing the plant site. Each additional train trip across two at-grade crossings near the Mattoon site and across one at-grade crossing at the Tuscola site would delay traffic by an estimated 6 to 7 minutes, on average (for a 100-unit train traveling 10 miles per hour). Actuated gates and warning lights would be required at one at-grade crossing at the Tuscola site.

Noise and Vibration

The EIS estimates that during construction, noise would increase greatly at the nearest receptors: Mattoon, up to 41 decibels A-weighted (dBA) at the nearest two residences; Tuscola, up to 45.7 dBA at the nearest three residences; Jewett, less than 15 dBA at a nearby chapel; Odessa, less than 6 dBA at the nearest two residences in Penwell. An increase of 3 dBA or more (the criterion for a significant impact) above background levels could be experienced at greater distances and affect more people: Mattoon, one school and several dozen residences within 2.4 miles of the site boundary; Tuscola, numerous residences and much of downtown Tuscola within 1.5 miles; Jewett, no residences impacted; Odessa, as many as 12 churches, 5 schools and an undetermined number of residences affected by the pipeline construction noise but perhaps only 3 residences affected by construction at the power plant site. Additionally at all sites, noise increases would be experienced along the trucking routes and nearby roads leading construction traffic to the power plant site.

During routine plant operation, noise would increase for the nearest receptors: Mattoon, 6 to 9 dBA at the nearest two residences; Tuscola, up to 12 dBA at the nearest three residences; Jewett, less than 6 dBA at a nearby chapel; Odessa, less than 3 dBA at the nearest two residences. At greater distances, an increase of 3 dBA or more above background levels could be experienced: Mattoon, 12 residences within 1.5 miles of the site boundary; Tuscola, seven residences within 1 mile; Jewett, no residences impacted; Odessa, two residences near the power plant site. Plant startups will generate temporary noise that is greater at the nearest receptors: Mattoon, up to 21 dBA; Tuscola, up to 25 dBA; Jewett, less than 17 dBA; and Odessa, less than 4.1 dBA. Additionally, operational noise increases will be experienced along the trucking routes and nearby roads leading to the power plant site. Train noises along the rail delivery routes will increase from the movement of up to two additional trains per day. A special concern is that train rail car shakers could generate noise that would affect neighbors similar to the construction activities (described above), if unmitigated.

The Alliance will comply with all local noise ordinances and shall reduce operational noise impacts to nearby residences and sensitive receptors to the fullest extent practicable. The Alliance shall comply with applicable vibration standards to the extent practicable. To reduce noise impacts the Alliance may use some combination of sound enclosures, barrier walls, earthen berms, planted vegetation and landscaping, or dampening devices, with emphasis on facilities (e.g., rail-car unloading facilities) that would generate very high levels of noise disturbance at nearby residences. In addition, alternate site configurations shall be considered in an effort to position noise-producing

equipment away from or to shield residences and sensitive receptors. The design of coal-handling facilities shall be evaluated for opportunities to reduce noise impacts to adjacent residences and sensitive receptors.

Human Health, Safety, and Accidents

Adverse impacts to human health and safety, although unlikely, could result from various types of accidents or acts of sabotage and terrorism, ranging from small pipeline leaks to, in an extremely unlikely case, an explosion at the power plant. Two separate risk studies were completed to analyze these risks. The results of these assessments shall be used during the planning, design, construction, and operation of the FutureGen Project to help reduce risks.

The greatest risks to human health and safety are associated with catastrophic accidents or acts of sabotage or terrorism. Primarily, the concerns will be with sudden, unconstrained releases of carbon monoxide, SO₂ and H₂S, with SO₂ presenting the greatest risk for harm to people offsite. Exposure modeling of unmitigated catastrophic failure using worst-case atmospheric conditions indicates the following quantitative estimates of potential irreversible damage (e.g., permanent neurological damage) resulting from SO₂ exposure: Mattoon, estimated 143 people (based on release modeling of the FutureGen facility located in the center of the proposed site; the Riddle Elementary School was outside of the perimeter of irreversible adverse effects); Tuscola, estimated 115 people; Jewett, estimated 92 people; and Odessa, estimated 12 people. While much lower in terms of estimated number of individuals potentially exposed, if there is a

catastrophic failure of certain components, risks of life threatening impacts from H₂S exposure could be as high as 10 people (maximum number at Mattoon) offsite. These worst-case consequence analyses were made assuming no mitigations are used; therefore, these risks can be reduced with the appropriate measures, such as planning, design and engineering controls. While the probability of intentional acts like sabotage and terrorism cannot be easily predicted, the consequences could be similar to the accidents analyzed in the EIS.

Transport and storage of aqueous ammonia presents a risk of harm over a very long distance downwind, so three accident scenarios were analyzed under worst-case conditions of spill, wind, and temperatures. For example, downwind distances for adverse effects could exceed 15,500 ft for a tanker truck spill of large surface area during times of very hot weather with no wind turbulence.

The assessment of the risks associated with CO₂ sequestration revealed the fact that the greatest risks are associated with pipeline ruptures, where the small amount of H₂S present in the gas contributes the greatest health hazard. Primarily because of differences in the proximity of populations downwind of the pipeline corridors and differences in pipeline length, the risks of harm to people differ among the sites. The at-risk population would be essentially zero at Mattoon, which would not have an off-site CO₂ pipeline, and perhaps zero at Odessa due to the very sparse population present along the pipeline route. For the pipeline rupture scenario, up to seven people could experience adverse impacts for the Tuscola site and up to 52 people for the Jewett site. The chance of a pipeline

rupture is estimated as being less than one occurrence in 100 years (unlikely to extremely unlikely). Compared to pipeline ruptures, fewer people would be put at risk by pipeline punctures, wellhead failures, slow upward leakage around injection wells and slow upward leakage through other existing wells. Slow leaks through the injection wells or through other wells are extremely unlikely.

To reduce the potential for adverse impacts to the fullest extent practicable, the Project will be designed to provide safe egress from all confined areas, adequate ventilation, fire protection, pressure relief to safe locations, and real-time monitoring with an alarm system for hazardous chemicals. Safety training and evacuation policies for workers will be instituted to address accidents. The Alliance will abide by industry safety standards, best management practices, and Occupational Safety and Health Administration (OSHA) regulations, as part of their overarching “zero accidents” policy for the workplace.

In addition, the Alliance shall consider alternate operating and storage strategies that will minimize the risks for accidental releases of aqueous ammonia. These strategies shall consider reduced ammonia delivery, reduced on-site storage, and conducting transfer from the tanker truck to the pipeline leading to the tank within a secondary containment system. At a minimum, frequent inspections of the tanker truck and connecting pipe valves shall be required.

Due to the proximity of offsite people to the proposed power plant at all four sites, additional mitigation shall be considered to reduce risk associated with catastrophic

accidents, sabotage, or terrorism at the power plant. At the chosen site, DOE will require that the power plant's higher-risk components, such as the Claus unit, be located at the maximum distance that is reasonable from the populated areas, particularly the most populated nearby area, given various risk factors and other environmental and cost considerations.

DOE will require that additional risk studies concerning accident scenarios at the power plant be performed as the site-specific power plant design is prepared. To the extent practicable, the Alliance shall use facility placement and layout, design, and/or engineering controls to minimize or eliminate the risks of irreversible effects to onsite and offsite people from a release of toxic gases from the power plant in the event of an accident or act of sabotage or terrorism.

At all four sites, the CO₂ pipeline will be designed, constructed and operated in compliance with state and Federal regulations and guidance (e.g., Department of Transportation, Pipeline and Hazardous Material Safety Administration). DOE will require that additional studies concerning accident scenarios for the pipelines and wellheads be performed as the site-specific sequestration facility design is prepared. The CO₂ pipeline shall be designed with automatic emergency shut-off valves spaced at intervals of no more than 5-miles to reduce the quantity of gases that could be released in the event of a pipeline rupture. Automatic shut-off valves could be placed at closer intervals near populated areas to further reduce the quantity of gases that could be released in the unlikely event of a pipeline rupture or puncture. DOE will require

application of an automated system (e.g., a Supervisory Control and Data Acquisition system) for monitoring wellhead and pipeline pressure, temperature, and flow rate. This system shall be capable of automatically alerting the operator of possible leaks, in accordance with Federal regulations.

The Project's Emergency Response Plan shall include a section to address ruptures and large punctures of the CO₂ pipeline and rapid releases of fluids (i.e., blowouts) through failed injection wells (or other wells) or through other routes from the target reservoir. The plan shall outline sequestration facility shutdown procedures, public notice and protection procedures, and responsible persons that would make decisions. It shall also identify teams that would respond to incidents, employee protection plans, contacts for governmental authorities (e.g., Local Emergency Planning Committee), coordination with local authorities (including Memoranda of Understanding), and reporting requirements.

Socioeconomics

Construction of the FutureGen Project could decrease values of residential properties located within, and adjacent to, the proposed power plant site in Mattoon and Tuscola, Illinois. Furthermore, the facility would adversely impact residents living nearby in Mattoon and Tuscola through a potentially unobstructed view of the facility and increases in traffic, noise, and perhaps dust or vibrations.

To the fullest extent practicable and within the budgetary limits of the Project, the Alliance shall reduce the potential impacts to adjacent residences with appropriate

mitigations, such as enclosing or shielding some of the more “industrial” components of the plant, landscaping around the plant site’s perimeter to partially screen it from nearby residences and from motorists on the adjacent roads, selecting appropriate transmission towers to reduce the visual profile of the transmission towers, and lighting design (e.g., luminaries with controlled candela distributions, shielded or hooded lighting, and directional lighting) to minimize light pollution.

Environmental Justice

Construction and operation of the proposed facility are not anticipated to have any disproportionately high and adverse impacts to minority or low-income populations in the areas around the four alternative power plant and sequestration sites.

Environmentally Preferred Alternative

The Proposed Action is also the environmentally preferred alternative because it could encourage and hasten the deployment of carbon capture and sequestration practices at power plants across the U.S. and around the world in an effort to reduce greenhouse gas emissions that otherwise will occur with the continued combustion of fossil fuels, especially coal, in power plants. As a research and development project, the FutureGen Project will provide an opportunity to foster new technologies that need to be tested at a commercial scale, or near commercial scale, if carbon capture and sequestration is to be successfully refined and rapidly deployed. As a test project, FutureGen will establish a cost and design basis, and support the development of a regulatory program, that will

enable the planning, design and construction of other FutureGen-like power plants that will reduce greenhouse gas emissions per unit of energy produced.

As described in the summary of impacts for each affected resource area, there are differences in potential environmental impact among sites. These differences do not provide a clear basis for discrimination among the sites in terms of overall environmental preferability. The potential impacts for some resource areas, such as noise and risks to public health and safety in the unlikely event of a release of toxic gases from the plant site, are sensitive to distance to members of the public. Such impacts would be greater at the Illinois sites. On the other hand, the Texas sequestration sites have a greater number of existing wells that pose a potential risk of CO₂ leakage. As described in this ROD, DOE will require mitigation for these and other potential impacts.

Comments Received on the Final EIS

DOE received one comment from the general public on the Final EIS. This comment stated that the EIS insufficiently responded to some previous comments, especially in regard to the environmental impacts caused by the mining and use of coal. The commenter urged DOE to select the No-Action Alternative, at least until the EIS is revised to more adequately address coal mining and use. The commenter further expressed the opinion that taxpayer money should be directed to projects on sustainable energy technologies, such as wind and solar power.

Environmental impacts associated with coal mining, coal use, and renewable sources of energy have not been analyzed in detail in the Final EIS. DOE acknowledges the potential environmental impacts associated with coal mining activities and coal use, as well as with renewable resources. However, DOE considers the environmental impacts associated with coal mining to be outside the scope of the FutureGen Project EIS, because the agency's decision-making does not extend to any identified coal mines or to the techniques for mining coal that will fuel the Project. The Presidential Initiatives that established the purpose and need for the FutureGen Project specifically require that this project address the issue of CO₂ capture and sequestration at coal-fueled power plants that can produce electricity and hydrogen gas. DOE has no reasonable means in its decision-making role to impose mitigation requirements on the coal suppliers.

As expressed in the "Environmentally Preferred Alternative" section of this ROD, DOE believes that balancing all environmental and societal benefits, as weighed against the Project's potential harms and cumulative adverse impacts, favors the selection of the Proposed Action. DOE does administer and fund other programs focused on energy efficiency and sustainable energy sources, such as wind and solar. Renewable energy alternatives are outside the scope of this EIS because the Presidential Initiatives expressly mandated the use of coal as the energy source for this project. When choosing programs and projects to fund within its discretion, DOE adheres to its belief that funding should be allocated to a variety of programs and projects that represent all promising energy sources (including renewable energy alternatives) and conservation measures that might best ensure future energy security for our society.

The use of coal raises concerns, in particular, about increasing atmospheric concentrations of CO₂ and the resulting global climate change. This topic was covered briefly in the Draft EIS; however, additional information was provided in the Final EIS to more fully address this topic. See the revised Section 3.3.1, Cumulative Impacts of FutureGen Technology, in the Final EIS regarding potential impacts of widespread deployment of carbon capture and geologic sequestration.

The U.S. EPA was the only Federal government agency to comment on the Final EIS. Based on the results of additional site-characterization and site-specific design, EPA understands that DOE will re-examine the potential risks as more information becomes available. DOE has committed to preparing a Supplement Analysis to determine whether a Supplemental EIS would be required in accordance with 10 CFR 1021.314.

Furthermore, EPA's comment recognized the early nature of the design work and site investigations. DOE believes that the existing conceptual design work and site investigations provide sufficient basis for site selection. EPA noted that DOE is funding research for mitigation techniques to address the displacement of native fluids by the injected carbon dioxide. The DOE Carbon Sequestration Program encompasses research on this topic. Based on its review of the Final EIS, EPA did not object to implementation of the Proposed Action.

The Texas Historical Commission submitted a copy of DOE's distribution letter for the Final EIS with a stamp and signature of concurrence by the State Historic Preservation Officer.

Decision

After careful consideration of the proposed project's potential environmental impacts at each of the four alternative sites, along with consideration of program goals and objectives in accordance with its obligations under the National Environmental Policy Act, and subject to future technical, cost, business and environmental decision points, DOE has decided to provide financial assistance to the FutureGen Industrial Alliance, Inc. to implement the FutureGen Project. DOE reached an agreement with the Alliance to complete a preliminary design, a revised cost estimate and a funding plan pursuant to a new eight to ten month limited-scope cooperative agreement. Prior to the expiration of this cooperative agreement, DOE and the Alliance will make a mutual decision on whether to move forward into the subsequent phases. If DOE and the Alliance mutually decide to go forward, Federal financial assistance for the subsequent phases (i.e., detailed design, construction and operations) would occur under the terms of a new full-scope cooperative agreement to be negotiated sometime during early 2010.

Based on the information presented in the EIS, DOE finds all four alternative sites to be acceptable provided the Alliance implements the mitigation measures described in this ROD, best management practices common to the industry, and reasonable pollution prevention, recycling, and reuse measures. DOE has considered potential mitigation

opportunities for each of the four sites in the EIS and during development of this ROD. The cooperative agreement in effect during 2007 gave the Alliance the right to select the site after DOE issued a ROD. The Alliance announced their preference for the Mattoon site in December 2007. DOE acknowledges that the Alliance intends to formally select Mattoon after the issuance of this ROD. DOE will prepare a Mitigation Action Plan, as required by regulation 10 CFR Part 1021.331 to address the mitigations specified in this ROD as applied to the selected site.

In compliance with floodplain and wetland environmental review requirements (10 CFR Part 1022, Executive Order 11988, Executive Order 11990), the FutureGen Project EIS contains the floodplain and wetland assessments along with the floodplain statement of findings. The NEPA process fulfilled the requirements for public notice and review opportunities. A brief statement of steps to be taken by the Alliance to minimize potential harm to or within the floodplains and wetlands has been included in this ROD.

DOE's decision was made after careful review of the potential environmental impacts presented in the EIS and incorporates all practicable means to avoid or minimize environmental harm. Based on mutual agreement between DOE and the Alliance, the Alliance will conduct further characterization studies of the selected site (Mattoon) to confirm the acceptability of the site and to gather additional information that will support the site-specific design. Based on the results of this site characterization effort and site-specific preliminary design to be produced by the Alliance, DOE will complete a Supplement Analysis pursuant to DOE's NEPA regulations to determine whether a

Supplemental EIS must be prepared (10 CFR Part 1021.314). If DOE subsequently prepares a Supplemental EIS, DOE may issue a ROD at the conclusion of that process. Both the Supplement Analysis determination and a Supplemental ROD may contain mitigation requirements that supplement or change the requirements presented in this ROD and shall be binding on the Alliance, as if they were included in this ROD. Through this process of future site characterization and NEPA activities, DOE will reconsider the potential environmental impacts analyzed in this EIS and may require the Alliance to implement the avoidance and mitigation measures required by a Supplement Analysis determination or Supplemental ROD as a condition to continued financial assistance.

Issued in Washington, DC on this 14-th day of July 2009.



Victor K. Der

Acting Assistant Secretary

Office of Fossil Energy