SUMMARY

The U.S. Department of Energy (DOE) prepared this environmental impact statement (EIS) on the proposed Kentucky Pioneer Integrated Gasification Combined Cycle (IGCC) Demonstration Project in compliance with the *National Environmental Policy Act* (NEPA).

The *National Environmental Policy Act* Process

NEPA is a federal law that serves as the basic national charter for protection of the environment. For major federal actions that may significantly affect the quality of the environment, NEPA requires federal agencies to prepare a detailed statement that includes the potential environmental impacts of the Proposed Action and reasonable alternatives. A fundamental objective of NEPA is to foster better decisionmaking by ensuring that high quality environmental information is available to public officials and members of the public before decisions are made and action taken.

Procedures for implementing NEPA and preparing EISs are contained in government-wide regulations issued by the Council on Environmental Quality (CEQ) (40 *Code of Federal Regulations* [CFR] Parts 1500-1508), and in DOE NEPA regulations (10 CFR Part 1021).

There are several steps that DOE follows in preparing an EIS. A Notice of Intent (NOI) is published in the *Federal Register* (FR) to notify the public that the Agency plans to prepare an EIS and seek comment on the scope of the EIS. DOE's NEPA implementing procedures require a minimum of a 30-day public scoping period and at least one public meeting be held. Following scoping, the Agency issues a Draft EIS for public review and comment. The public comment period on the Draft EIS must be at least 45 days in duration, and under DOE's NEPA implementing procedures, at least one public meeting on the Draft EIS must be held. DOE must consider all comments on the Draft EIS and address these comments in the Final EIS. No sooner than 30 days after the Final EIS is issued, the Agency may issue a Record of Decision (ROD) which DOE publishes in the FR.

INTRODUCTION

The abundance of coal in the United States makes it one of our Nation's most important strategic resources in building a secure energy future. With today's prices and technology, recoverable reserves located in the United States could supply the Nation's coal consumption for approximately 250 years at current usage rates. However, if coal is to reach its full potential as an environmentally acceptable source of energy, an expanded menu of advanced clean coal technologies must be developed to provide substantially improved options both for the consumer and private industry.

Before any technology can be seriously considered for commercialization, it must be demonstrated at a sufficiently large-scale to develop industry confidence in its technical and economic feasibility. The implementation of a federal technology demonstration program is the established means of accelerating the development of technology to meet national energy strategy and environmental policy goals, to reduce the risk to human health and the environment to an acceptable level, to accelerate commercialization, and to provide the incentives required for continued activity in research and development directed at providing solutions to long-range energy problems.

This EIS has been prepared by DOE in compliance with NEPA, as amended (42 United States Code [USC] 4321 et seq.), to evaluate the potential impacts associated with constructing and operating a project proposed by Kentucky Pioneer Energy, LLC (KPE), a subsidiary of Global Energy, Inc. The project has been selected for further consideration by DOE under the Clean Coal Technology (CCT) Program to demonstrate the first commercial scale application of a modified version of the British Gas Lurgi (BGL) gasification technology in the United States, with the goal of developing a cleaner method of utilizing coal for electricity generation.

The modification to the BGL technology that would be demonstrated by this project involves the fuel feed to the facility. This project would demonstrate the ability to run BGL gasification technology from a co-feed of coal and refuse derived fuel (RDF) pellets. The facility would also generate between 40 and 50 percent more capacity than other BGL facilities currently in operation. Though BGL technology is a proven means of generating electricity, this project would be the first commercial application of this particular modification to the process, along with the size of the output at which the facility would operate.

DOE's role in this project is to make a decision on whether or not to provide cost-shared funding to design, construct, and demonstrate the BGL technology proposed by KPE at the J.K. Smith Site in Clark County, Kentucky. This EIS will be used to assist DOE in the decision-making process.

BACKGROUND AND PROJECT HISTORY

Since the early 1970s, DOE and its predecessor agencies have pursued a broadly-based coal research and development program directed toward increasing the Nation's opportunities to use its most abundant fossil energy resource while improving environmental quality. This research and development program includes long-term projects that support the development of innovative concepts for a wide variety of coal technologies. The CCT Program was implemented to allow a number of advanced, more efficient, and environmentally responsible coal utilization and environmental control technologies to become available to the U.S. energy marketplace.

The CCT Program began in 1986 as a collaboration between federal and state governments and industry representatives to develop environmentally-friendly solutions for the utilization of the Nation's abundant coal resources. The Program's goal is to demonstrate innovative technologies emerging from global engineering laboratories at a scale large enough so that the industry could determine whether the new processes had commercial merit.

Originally, the CCT Program was a response to concerns over acid rain, which is formed by sulfur and nitrogen pollutants emitted by coal-burning power plants. President Reagan, through consultation with various agencies, commissioned the CCT Program as a cost-shared effort between the U.S. Government, state agencies, and the private sector. Industry-proposed projects were selected through a series of five national competitions aimed at attracting promising technologies that had not yet been proven commercially.

DOE issued the first solicitation (CCT-I) for CCT projects in 1986. This solicitation resulted in a broad range of projects being selected in the following four major product markets: environmental control devices; advanced electric power generation; coal processing for clean fuels; and industrial applications.

In 1987, the CCT Program became the centerpiece for satisfying the recommendations contained in the *Joint Report of the Special Envoys on Acid Rain*. A presidential initiative launched a 5-year, $5 billion U.S. Government/industry effort to curb precursors to acid rain formation. The second solicitation (CCT-II), issued in February 1988, provided for the demonstration of technologies that were capable of achieving significant reductions in sulfur dioxide (SO_2), nitrogen oxides (NO_x), or both, from existing power plants. These technologies were to be more cost-effective than current technologies and capable of commercial deployment in the 1990s. In May 1989, DOE issued a third solicitation (CCT-III) with essentially the same objective as the second, but additionally encouraged technologies that would produce clean fuels from run-of-mine coal.

The next two solicitations recognized emerging energy and environmental issues, such as global climate change and capping of SO_2 emissions, and thus focused on seeking highly efficient, economically competitive, and low-emission technologies. Specifically, the fourth solicitation (CCT-IV), released in January 1991, had as its objective the demonstration of energy-efficient, economically competitive technologies capable of retrofitting, repowering, or replacing existing facilities while achieving significant reductions in SO_2 and NO_x emissions. In July 1992, DOE issued the fifth and final solicitation (CCT-V) to provide for demonstration projects that significantly advanced the efficiency and environmental performance

of technologies applicable to new or existing facilities. As a result of these 5 solicitations, a total of 60 government/industry cost-shared projects were selected, of which 38, valued at more than $5.2 billion, have either been successfully completed or remain active in the CCT Program.

The Kentucky Pioneer IGCC Demonstration Project was selected for further consideration under the fifth solicitation (CCT-V) authorized under Public Law 102-154. The CCT Program relies on substantial funding from sources other than the federal government as the participant supports the majority of the project cost. The *Department of the Interior and Related Agencies Appropriations Act* of 1986, a section of Public Law 99-190, introduced and defined cost sharing for the program. The participant must agree to repay the government's financial contribution, with the basis for the repayment negotiated between the participant and the government, to ensure that taxpayers benefit from a successful project. Congress has directed that projects in the CCT Program should be industry projects assisted by the government and not government-directed demonstrations.

DOE developed an overall NEPA strategy for the CCT Program that includes consideration of both programmatic and project-specific environmental impacts during and after the selection process of the proposed project site. As part of the NEPA strategy, the EIS for the Kentucky Pioneer IGCC Demonstration Project tiers from the *Clean Coal Technology Programmatic Environmental Impact Statement* (CCT PEIS) that DOE issued in November 1989 (DOE/EIS-0146). The CCT PEIS evaluated two alternatives, the No Action Alternative, and the Proposed Action. The No Action Alternative assumed the CCT Program would not continue and that conventional coal-fired technologies with flue gas desulfurization and nitrogen oxide controls that met New Source Performance Standards (NSPS) would continue to be used. The NSPS (40 CFR 60) were established under the 1970 amendments to the *Clean Air Act* (CAA) to adopt emission standards for major new industrial facilities. The Proposed Action assumed that the clean coal projects would be selected and funded, and that successfully demonstrated technologies would undergo widespread commercialization by the year 2010.

PURPOSE AND NEED FOR AGENCY ACTION

The proposed Kentucky Pioneer IGCC Demonstration Project was selected as one of the candidate projects that would best further the objectives identified in the CCT Program. The purpose of this proposed project is to demonstrate and assess the reliability and maintainability of a utility scale IGCC system using high-sulfur bituminous coal and an RDF pellet blend in an oxygen-blown, fixed-bed, slagging gasifier to generate synthesis gas (syngas). The proposed project was also selected to demonstrate the combined removal of SO_x, NO_x, and particulate matter using BGL gasification technology. The project would be the first demonstration of the coal and RDF pellet co-feed gasification technology and the total facility output would be between 40 and 50 percent larger than other facilities utilizing BGL technology. As with other clean coal projects, an overall objective is to achieve emission levels lower than the limits established by the CAA while producing power more efficiently and at a lower cost than conventional coal utilization technologies. The co-feed aspect of the project would potentially demonstrate a means to extend the life of the Nation's coal reserves.

The proposed project could meet DOE's objective to generate technical, environmental and financial data from the design, construction, and operation of the facilities at a scale large enough to allow the power industry to assess the potential of BGL gasification technologies for commercial application. This data could demonstrate that IGCC power plants, based on this technology, could be built cost effectively, with thermal efficiencies that would significantly reduce electric power costs over more conventional technologies.

KPE is proposing to construct the Kentucky Pioneer IGCC Demonstration Project at East Kentucky Power Cooperative's (EKPC) existing J.K. Smith Site due to existing and projected electrical loads on the EKPC system. Electrical load forecasts outlined in EKPC's *1998 Power Requirements Study* indicate that the total energy requirements for EKPC's system are expected to increase by 3.0 percent per year through 2017. Net winter peak demand is expected to increase by over 1,600 megawatts (MW) or 3.3 percent per year and net summer peak demand is projected to increase by approximately 1,250 MW or 3.0 percent per

year. Peak demand is projected to increase from 2,031 MW in 1998 to 2,394 MW in 2003 and 3,478 MW in 2015. Based on this load growth, EKPC will need additional power supply resources of 625 MW in 2003. The Kentucky Pioneer IGCC Demonstration Project is intended to satisfy the majority of the projected electrical load growth on EKPC's existing system while demonstrating a CCT. This EIS will help DOE decide whether or not to provide $60 million in cost-shared funding for the Kentucky Pioneer IGCC Demonstration Project.

If enough data is generated, the proposed Kentucky Pioneer IGCC Demonstration Project could advance DOE's objective of demonstrating technical, economical, and environmental viability of commercial-scale operation of coal-based power generation technologies with a module that could be replicated for use by utilities and other industries in the early part of the 21st Century. This project represents an integration of the latest developing gasification and power generation technologies to provide industry and electric utilities with a major source of clean, dependable, and economical electricity.

DESCRIPTION OF THE PROPOSED ACTION

Kentucky Pioneer IGCC Demonstration Project Facility

The Kentucky Pioneer IGCC Demonstration Project facility would be located in Clark County, Kentucky, on a 121-hectare (300-acre) site within the 1,263-hectare (3,120-acre) J.K. Smith Site, owned by EKPC. The project site is 34 kilometers (21 miles) southeast of the city of Lexington, 13 kilometers (8 miles) southeast of the city of Winchester, and 1.6 kilometers (1 mile) west of the community of Trapp, Kentucky.

The 121-hectare (300-acre) project site was previously disturbed by preliminary construction activities in the mid-1980s when EKPC began construction of the J.K. Smith Power Station. EKPC had completed preliminary grading, primary foundations, fire protection piping, and rail spur access infrastructure installation before the project was canceled in the early 1990s when the projected demand for electricity in the area failed to materialize. The Kentucky Pioneer IGCC Demonstration Project would be built on the portion of the site that was previously cleared and graded.

The site is reached by Kentucky Highway 89 and accessed through a gated perimeter fence and access road. The access road is approximately 1.6 kilometers (1 mile) from Kentucky Highway 89 to the project site. Plant access by rail, which crosses the eastern side of the station, would be from a freight rail line owned by CSX Transportation, Inc. An existing railroad loop, approximately 5 kilometers (3.1 miles), will be utilized for raw material delivery and product transportation around the 121-hectare (300-acre) project site.

Transmission Capacity

To support the project, EKPC would construct a new 138-kilovolt (kV) electric transmission line. The proposed route for the line would extend northeasterly from the project site to the Spencer Road Terminal in Montgomery County, Kentucky, where it will interconnect with the existing local power grid. This transmission line would provide additional capacity adequate to accommodate the addition of the Kentucky Pioneer IGCC Demonstration Project and is consistent with the master plan for transmission outlets required for existing and future generation at EKPC's J.K. Smith Site. The proposed new transmission line would be approximately 27 kilometers (17 miles) in length; however, the exact route for the line has yet to be determined.

The U.S. Department of Agriculture's Rural Utility Service (RUS) has approval authority for the capacity upgrade of the transmission line. Under RUS NEPA policies and procedures, transmission lines of less than 230 kV and less than 40.2 kilometers (25 miles) may be categorically excluded from the requirement to prepare an EIS. Transmission lines in this category normally require an Environmental Report (ER) for the application to be approved (7 CFR 1794.22).

Kentucky Pioneer IGCC Demonstration Project Facility Description

For purposes of discussion of the proposed project facilities throughout this document, the facilities have been divided into two parts. The first part, referred to as the "power island," is comprised of the two combined cycle turbine units that would generate most of the electricity at the site. These units could run on a natural gas feed or a syngas feed generated from the RDF pellets and coal in gasifier units. The second part, or "gasification island," consists of the following major facility components: (1) RDF pellet and coal receipt and storage sheds; (2) gasification plant; (3) sulfur removal and recovery facility; and (4) air separation plant. The production of syngas in the BGL process occurs in the gasification plant and utilizes the sulfur removal and recovery facility and air separation plant.

The syngas firing process consists of the following four steps: (1) generation of syngas from RDF pellets and coal reacting with steam and oxygen in a high temperature reducing atmosphere; (2) removal of contaminants, including particulates and sulfur in the sulfur removal and recovery facility; (3) clean syngas combustion in a gas turbine generator to produce electricity; and (4) recovery of residual heat in the hot exhaust gas produced by the gas turbine. The residual heat is used to generate steam in a heat recovery steam generator that produces additional electricity in a steam turbine, which is the combined cycle aspect of the plant.

KPE will not begin detailed design of the proposed project, including layout and flowsheet information, until the project financing is finalized. KPE has provided rough general estimates of quantities of materials required for the construction of the gasification island facilities. The estimates are as follows: steel - 160,000 tons; concrete - 145,000 tons; pipe - 140,000 tons; and wire - 100,000 tons. Figure S-1 presents a conceptualized layout and process flow of the complete Kentucky Pioneer IGCC Demonstration Project facility and identifies the facilities belonging to each part of the project.

Fuel Source

The solid fuel source for the Kentucky Pioneer IGCC Demonstration Project would be high sulfur coal and RDF pellets. RDF pellets would be procured from an RDF pellet manufacturer. The two fuel sources would be shipped by rail directly to on-site storage. At a minimum, 50 percent of the feed would consist of high-sulfur coal from the Kentucky region during the 1-year demonstration period.

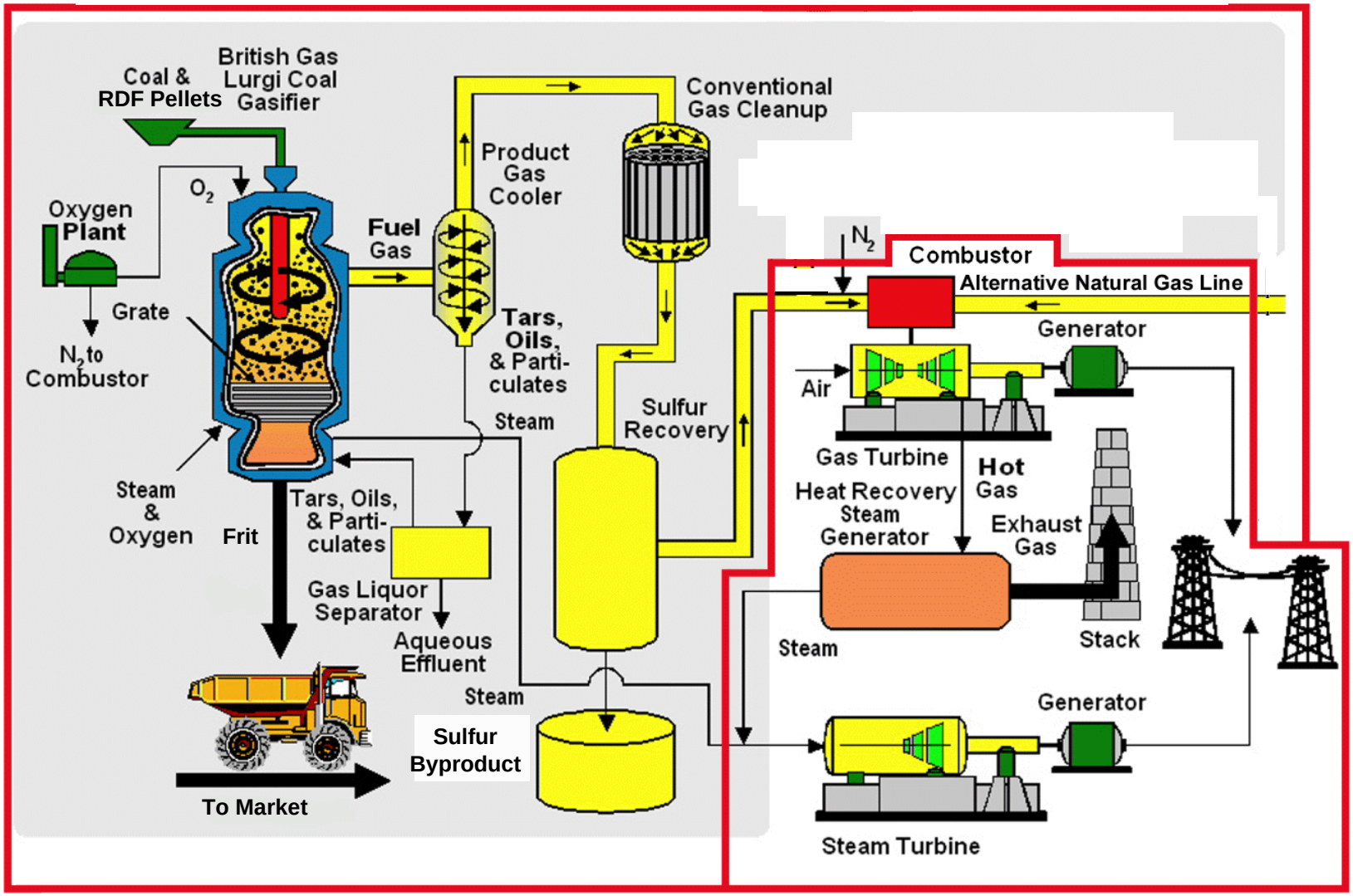
Coal

KPE intends to use high-sulfur coal for direct delivery to the project site. Western Kentucky coal is generally considered the high-sulfur coal region; however, Eastern Kentucky may also provide high-sulfur coal supplies. Project economics would determine the supplier and the type of coal supplied. The facility would require approximately 2,500 tons per day of coal, which equates to about 25 railcars per day. Compared to coal-fired electric generation technologies, this project would require less coal consumption to generate 540 megawatts (MW).

Refuse Derived Fuel Pellets

RDF is manufactured in a process that includes controlled steps for the processing of municipal solid waste (MSW) or common household waste. Initially, sorting of the MSW removes obvious large objects, also known as white goods (e.g. refrigerators). These continue on to the landfill and amount to 5 to 10 percent of the original weight of the MSW. Cans are then removed either magnetically, or for aluminum cans, by eddy current technology. Glass is removed by gravity. These are sent to recycling units and amount to a further 5 to 10 percent of the original weight. The intent of the process is to retain items with high thermal value, such as plastics and, to a lesser extent, paper. Processing methods vary, but most of the balance is then often tumbled in a long rotary drum that might be envisioned as a pressure cooker.

"Gasification Island" - BGL Process



"Power Island" - Combined Cycle Units

Figure S-1. Concept Layout and Process Flow of the Kentucky Pioneer IGCC Demonstration Project Facility.

With steam and air insertion rates used to control the temperature and moisture of the RDF product, a sterile "mulch type material" will result. Clumps of plastic are screened out for shredding or separate handling. The energy content of plastics is well suited for the gasification process. If shredded, the plastic component can be included in the RDF pellets. Otherwise, plastic material could be fed into the gasifier separately or simply recycled conventionally. Hammer mills and trundles are typically used to reduce the MSW to a small uniform size and homogeneous mixture. The sterile mulch is then formed into dense pellets by being forced through a mold at high pressures. The exact forming process is dependant upon handling considerations and the feed performance requirements of the gasification process. RDF pellets are stable and durable because they are made with relatively low moisture content. The process results in pellets with a relatively uniform size and shape and a generally uniform energy content. RDF pellets also have a relatively low ash content and good handling and storage life before use.

The RDF pellets would be procured from an existing manufacturer. RDF pellets vary in size and are typically extruded into a uniform dense shape that makes them well suited to transportation and storage. Typical sizes would be small cylinders in the 1.27 centimeter (0.5 inch) by 7.62 centimeter (3 inch) range, or 3.81 centimeter (1.5 inch) squares by 10.16 centimeter (4 inch) long blocks. The bulk density of RDF pellets is approximately 640 kilograms per cubic meter (40 pounds per cubic foot). By comparison, the bulk density of bituminous coal is approximately 801 kilograms per cubic meter (50 pounds per cubic foot) and a 50-50 mix of coal and RDF by weight would be equivalent to a 44-56 mix of coal and RDF by volume.

The Kentucky Natural Resources and Environmental Protection Cabinet has determined that the pellets to be used in this facility qualify as RDF. Different RDF pellet manufacturing processes may result in slightly different RDF pellet composition. This should not be an issue for this project; however, KPE intends to supply all RDF pellets for this project from the same manufacturer. In the event other suppliers are used, there may be a slight change in the composition of the vitreous frit from the gasifier unit but the resulting syngas makeup should remain the same. The Kentucky Division of Waste Management has determined that the RDF pellets are a recovered material and the use of the RDF pellets would classify the facility as a recovered material processing facility. No waste permit would be needed for the gasification process as long as KPE uses RDF that conforms to the statutory definition of RDF established in Kentucky Revised Statutes 224.01-010(23).

Synthesis Gas

Section 3.1 of this EIS details the production of syngas in the Kentucky Pioneer IGCC Demonstration Project facility. Gasification technology is known to produce a very consistent syngas product, regardless of the variability of the feed. Though the RDF pellet composition is expected to be relatively constant, slight variations in the composition would have no effect on the composition of the syngas produced. The resulting syngas is expected to be 55 percent carbon monoxide (CO), 30 percent hydrogen gas, 10 percent carbon dioxide, 5 percent methane and ethane, with a relatively small amount of sulfur in the form of hydrogen sulfide.

The facility is permitted as a Municipal Waste Cumbustor by the U.S. Environmental Protection Agency under guidelines established in 40 CFR 60. However, the facility does not actually combust any MSW, nor is MSW directly used as a feed. The RDF pellets are created from MSW, yet the pellet production process removes the large objects and the majority of the contaminants from the MSW. The RDF pellets are not directly combusted either. The actual combustion occurs using the syngas derived by the gasification in a reducing atmosphere of the RDF pellet and coal co-feed.

ALTERNATIVES ANALYZED

The EIS includes analysis of the No Action Alternative, as required under NEPA, and the Proposed Action. Since KPE has stated that the site would be used to construct a natural gas-fired combined-cycle plant (the "power island") should DOE decide against providing cost-shared funding for the gasification technology demonstration, two No Action Alternatives are addressed, as discussed below.

DOE's Cooperative Agreement with KPE was originally based on the construction and operation of a 400 MW IGCC power plant. The 400 MW output was based on the commercial availability of the new General Electric (GE) 7H gas turbine technology. This would have included one 270 MW gas turbine and one 130 MW steam turbine for the combined cycle configuration. However, the GE 7H will not be available in a timeframe that supports the Kentucky Pioneer IGCC Demonstration Project. Therefore, KPE decided to utilize the currently available GE 7FA technology. Two GE 7FA gas turbines produce approximately 400 MW in one simple cycle. With the addition of a steam turbine to the two GE 7FA gas turbines, the net power output of the combined cycle power unit would increase to 540 MW. Due to the equipment change since the issuance of the Cooperative Agreement, the analyses in this EIS are based on a combined cycle output of 540 MW instead of 400 MW.

As originally proposed, the project included a high temperature molten carbonate fuel cell. However, in July 2002, DOE decided to move the fuel cell demonstration portion of the Kentucky Pioneer IGCC Demonstration Project to Global Energy's Wabash River IGCC plant near West Terre Haute, Indiana. By utilizing an already existing commercial IGCC plant with experienced personnel, this re-siting would advance the projected fuel cell demonstration schedule by more than 1 year, thereby providing potential for the technology to enter the market at an earlier date. Accordingly, the fuel cell is no longer considered a part of the Proposed Action and subsequent discussion and analysis related to the fuel cell has been removed in this Final EIS. Without the fuel cell component, DOE's cost-share amount for the KPE project would be $60 million. The fuel cell demonstration has independent utility, and DOE will determine whether to proceed with the fuel cell demonstration separate from its decisionmaking regarding the Proposed Action. As appropriate, DOE will undertake separate NEPA analysis with regard to the re-siting of the fuel cell.

No Action Alternative 1

No Action Alternative 1 assumes that DOE decides against providing cost-shared funding for the project and that no plant is constructed as a result. This will result in no environmental impacts since no plant would be built. DOE believes that this scenario is unlikely to occur, but it is presented because it serves as an analytical baseline for comparison of the environmental effects of the project.

No Action Alternative 2

No Action Alternative 2 assumes that DOE decides against providing cost-shared funding for the project and KPE constructs a natural gas-fired combined-cycle plant, the power island portion of the overall project without the gasification component, at the proposed project location. This alternative includes all associated facilities required for the operation of the power island, including administrative offices, on-site utilities, steam-generating units, required air emissions control equipment, and wastewater treatment equipment. Siting for the foundation of the two combined cycle generator units would be within the entire 4.8-hectare (12-acre) plant site. All water for the plant would be supplied from existing EKPC intake structures at the J.K. Smith Site. The EKPC transmission line would be required to support this action and is included in this alternative.

Proposed Action/Preferred Alternative

The Proposed Action is DOE's preferred alternative. Under the Proposed Action, DOE would provide, through a Cooperative Agreement with KPE, financial assistance for the design, construction, and operation of the proposed Kentucky Pioneer IGCC Demonstration Project. All associated facilities for the power and gasification islands, including the transmission line, fuel storage, rail car unloading sites, and air emissions control equipment for the gasification technologies would also be constructed under the Proposed Action. The proposed project would be designed for at least 20 years of commercial operation, beginning with a 1-year CCT Program demonstration period. The proposed project would cost $414 million, of which DOE's share would be approximately $60 million, or 15 percent.

The proposed project includes the design, construction, and operation of BGL gasification technology and associated facilities to provide a fuel source for the two planned turbines. Under the Proposed Action, the turbines would be fired using the syngas product generated by the gasification technology. The Proposed Action would demonstrate the following innovative technologies: (1) gasification of RDF pellets and coal; and (2) use of a syngas product as a clean fuel in combined cycle turbine generator sets. This project would be the first commercial scale application of this modified co-feed version of the BGL gasification technology in the United States. The facility is expected to be operational for 20 years, with the first year committed to the demonstration of these technologies.

Fuel Source Considered But Eliminated

The following fuel source was considered in the process of identifying the Proposed Action, but was found not to be a reasonable option because it poses significant disadvantages relative to the Proposed Action and no compensating advantages.

Briquette Facility

The *Notice of Intent to Prepare an Environmental Impact Statement for the Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project, Trapp, KY* (NOI), published in the FR on April 14, 2000 (65 FR 20142), indicated that a fuel production facility would provide the project with fuel briquettes made from high sulfur coal and solid renewable fuels such as MSW. The briquette facility would have been built at an off-site location and the briquettes would have been rail shipped to on-site storage for use as a fuel source. Since the publication of the NOI, KPE has determined that using briquettes produced from a mixture of coal and MSW is not a practical alternative. Rather, KPE proposes co-feeding coal and RDF pellets.

In comparison with a briquette facility, co-feeding coal and RDF pellets would provide the following advantages to the Kentucky Pioneer IGCC Demonstration Project:

- RDF pellets reduce capital and operating costs.
- RDF pellets significantly reduce transportation costs.
- RDF pellets have undergone extensive processing and are generally more innocuous than raw MSW.

PUBLIC SCOPING PROCESS

Upon publishing an NOI announcing its intent to prepare an EIS for the Kentucky Pioneer IGCC Demonstration Project, DOE notified interested persons, including federal, state, and local government agencies, public interest groups, regulators, and members of the general public, and invited them to participate in the scoping process. DOE held a public scoping meeting in Trapp, Kentucky, on May 4, 2000, to allow interested parties to present verbal and written comments. The scoping period officially closed on May 31, 2000.

To encourage broad public participation, DOE notified stakeholders by mail prior to the public scoping meeting. In addition, press releases and public service announcements were submitted to selected newspapers. Informational handouts and factsheets were distributed at the scoping meeting and by request.

Thirty six individuals signed in at the scoping meeting, at which 5 participants provided a total of 19 verbal comments. Three individuals submitted eight written comments during the public comment period.

For purposes of tracking and analysis, all comments received were categorized and organized into a database. The categories of comments received are summarized below. As appropriate, DOE took comments provided at the scoping meeting into consideration in preparing the EIS.

Results of Public Scoping

The following is a brief summary of comments presented by members of the public at the May 4, 2000, public scoping meeting. The comments have been organized according to resource areas analyzed in this document.

Commentors asked many questions regarding the local market and economy throughout the term of the proposed project. Commentors were concerned with the number of local and union representatives that would be hired during construction and plant operations. In addition, the commentors stated that union labor continues to be the most productive, competent, and skilled workforce worldwide. Issues related to socioeconomics can be found in Sections 4.3 and 5.3, Socioeconomics.

One commentor stated that housing would be an issue associated with the project. In addition, another commentor wanted to know how many children would be entering into the local school district and into the surrounding community once the project construction commences. These issues are analyzed in Sections 4.3 and 5.3, Socioeconomics.

One commentor asked what consumer savings have been experienced from previous plants. This issue has not been addressed as part of this EIS because DOE believes that it is not within the scope.

One commentor stated that visual resources and land use impacts should be addressed in the EIS since the site is off the main highway. Land use impacts have been addressed in Section 5.2, Land Use. In addition, aesthetic and scenic resources impacts have been analyzed in Section 5.5, Aesthetic and Scenic Resources.

Commentors raised issues regarding air pollution emissions associated with the proposed project. In addition, one commentor indicated that air and water quality are very well regulated. Air and water resources have been analyzed in Section 5.7, Air Resources, and Section 5.8, Water Resources, and Water Quality.

Commentors stated that they believe noise will be an issue associated with the project. One commentor indicated that a significant noise problem may interfere with the running of the local school, located 1.6 kilometers (1 mile) away from the proposed project location. Noise impacts have been analyzed in Section 5.10, Noise.

Multiple comments were received regarding traffic and transportation issues. Commentors are concerned about the infrastructure of the community roads, the amount of traffic during working hours, and the provisions and regulations required to keep traffic under control in the surrounding area. Commentors also asked if the primary mode of transportation would be truck or rail transportation. One commentor believes that there is going to be a transportation processing problem before the briquettes arrive at the site. Impacts from traffic and transportation have been analyzed in Section 5.11, Traffic and Transportation.

One commentor stated that they believe environmental justice concerns should be addressed in the EIS. Environmental justice issues have been addressed in Section 5.19, Environmental Justice.

Commentors stated their concerns relating to the briquettes and the briquette facility location. Commentors inquired if the material would be coming from local sources to produce the briquettes. One commentor indicated that the briquettes should be manufactured close to the site. Another commentor asked how closely the 50 percent of MSW would be monitored. In addition, one commentor wanted information about the logistics of the garbage and the high-sulfur coal. One commentor asked if the source of the waste would be in Clark County or another location. In addition, the commentor asked if the solid waste would be picked up for free or would the local community have to dispose of it if the solid waste came from a local source. Another commentor asked if the waste generated at the facility would be landfilled in the area or away from the area. Finally, another commentor asked if the material generated onsite would be stockpiled

onsite or be transported to an off-site location. A discussion of the fuel sources is presented in Section 3.2, Fuel Source. Briquettes are no longer the proposed fuel source for this project.

One commentor stated that they hope the facility is built with justice and dignity of the taxpayers' money.

Public Comment Process on the Draft Environmental Impact Statement

On November 16, 2001, DOE published the Notice of Availability for the Kentucky Pioneer IGCC Demonstration Project Draft EIS in the FR. The original comment period for the Draft EIS would have ended on January 4, 2002; however, to accommodate requests from the public, the public comment period on the Draft EIS was extended to January 25, 2002. The total comment period was 71 days. Public meetings were held on December 10, 2001 in Lexington, Kentucky, and on December 11, 2001 in Trapp, Kentucky. In addition, the public was encouraged to provide comments via mail, electronic mail, fax, telephone, and through written and verbal comments submitted at the public meetings. A court reporter was present at the public meetings to provide a verbatim transcript of the proceedings and record any formal comments. DOE considered and responded to all of the comments received on the Draft EIS.

Appendix D of this EIS, the Comment Response Document, describes the public comment process in detail and provides copies of all comments received and DOE's response to each comment. Altogether, DOE received 38 comment documents containing 373 comments. Responses to these comments and corresponding changes to the Draft EIS helped to improve the quality and usefulness of the Final EIS. Among the topics or issues raised in the comments were concerns about:

- the applicability of and compliance with state and local solid waste statutes
- the detail of the facility and BGL process description
- the potential of the vitreous frit to be hazardous and related waste management issues
- the need for power in central Kentucky
- the impacts of the related transmission line
- impacts to the Kentucky River
- impacts of plant operation on air resources, including acid rain and greenhouse gases
- impacts of facility discharges on local drinking water
- impacts of air emissions from the facility
- the handling of materials and waste to reduce impacts from potential spills
- impacts to the aesthetic and scenic resources of the area
- impacts to Kentucky Highway 89 and local traffic levels
- cumulative impacts of the proposed project and other potential local developments

In addition to providing a response to each comment received, DOE revised the appropriate sections to provide any requested information that was newly available or to further explore areas of potential impact. Additional technical details not available at the time of issuance of the Draft EIS enabled further revisions and additions to the Final EIS. The revisions and additions are indicated by underscored text.

AFFECTED ENVIRONMENT

The project site is located on the edges of the Outer Bluegrass and Knobs Physiographic Region in Clark County, Kentucky. The Knobs Region is characterized by sub-conical hills while the Bluegrass is a central lowland. The 1,263-hectare (3,120-acre) J.K. Smith tract is located within the Kentucky River Basin. The site is a hilly highland bounded by the Upper Howard Creek on the north and west, the freight rail line on the east, and the Kentucky River on the south. The land at the site has been previously disturbed and graded during the initial phases of the discontinued J.K. Smith Power Station construction in the 1980s.

Extensive cultural resources investigations have been completed in the J.K. Smith Site area. Based on literature and records review of the 121-hectare (300-acre) project site, prehistoric resources were

identified. Details of the findings are presented in Section 4.4.3, Cultural Resources of the Proposed Facility Location.

Clark County, and thus the project site, is considered to be in attainment for all of the National Ambient Air Quality Standards. The U.S. Fish and Wildlife Service indicated that suitable habitat for one federally-listed species may occur within the potentially affected area at the project site. This species is the running buffalo clover (*Trifolium stoloniferum*) which is listed as endangered under the *Endangered Species Act*; however, no impacts to this or any federally-listed species would occur as a result of the Proposed Action.

POTENTIAL ENVIRONMENTAL IMPACTS OF CONCERN

The potential environmental impacts of the alternatives have been assessed for the Kentucky Pioneer IGCC Demonstration Project site and surrounding region and are identified in this section. Under No Action Alternative 1, DOE decides against providing cost-shared funding for the project and no plant is constructed as a result. This would result in essentially no effect to the existing environment since nothing would occur to cause a change. Existing conditions are described in Chapter 4, Affected Environment. Under No Action Alternative 1, none of the economic benefits associated with the project would be realized. This section presents a brief summary of the impacts on each resource area from No Action Alternative 2 and the Proposed Action. This data is also presented in Table S-1 at the end of the Summary. Detailed discussion of the impacts to the respective resources is presented in Chapter 5, Environmental Impacts.

Resource Impacts

Land Use

No Action Alternative 2 would disturb approximately 5 to 8 hectares (12 to 20 acres) of previously disturbed land for project construction activities. The foundation of the power island would occupy approximately 4.8 hectares (12 acres). The Proposed Action would disturb a maximum of an additional 2.8 hectares (7 acres) of previously disturbed land for storage and rail car loading and unloading facilities. No effects are expected on surrounding land uses or local land use plans and policies.

Socioeconomics

Under No Action Alternative 1, none of the economic benefits associated with No Action Alternative 2 and the Proposed Action would be realized.

No Action Alternative 2 would employ an average of 120 workers, with a maximum of 200, during construction. This would indirectly lead to the creation of another 138 to 230 jobs in the region of influence (ROI) depending on the duration of peak construction levels. The facility operation would require 24 employees for the 20-year life cycle of the plant. An additional 54 jobs would be created indirectly as a result. There would likely be no change to the level of community services provided in the ROI as a result.

The Proposed Action would employ an average of 600 workers, with a maximum of 1,000 during construction. This would indirectly lead to the creation of another 690 to 1,150 jobs in the ROI depending on the duration of peak construction levels. The 20-year demonstration and operation period would require 120 employees. An additional 270 jobs would be created indirectly as a result. Population may increase in the ROI to fill the available employment; however, there would likely be no impact to the level of community services provided in the ROI as a result. Property values for land tracts in the viewshed of the gasifier units may decrease due to the impact to the scenery.

Cultural Resources

The J.K. Smith Site has been previously disturbed and cultural resources were identified and excavated during the initial development of the discontinued J.K. Smith Power Station in the early 1980s. The Kentucky State Historic Preservation Officer (SHPO) has confirmed that the Section 106 Review process was completed for the Kentucky Pioneer IGCC Demonstration Project's Area of Potential Effect in December of 1980. The terms of the Memorandum of Agreement drawn up in conjunction with the Advisory Council on Historic Preservation for the J.K. Smith Station have been met under the Kentucky Pioneer IGCC Demonstration Project and further identification, evaluation, mitigation, and consultation activities are no longer required. In accordance with 36 CFR 800.4(d) of the Advisory Council's revised regulations, the SHPO finds that there is no effect on historic properties from No Action Alternative 2 or the Proposed Action.

Aesthetic and Scenic Resources

The combined-cycle units that would be constructed under No Action Alternative 2 and the Proposed Action would not be visible from outside the site area and would have no visible plumes associated with them. The gasifier facility stacks installed under the Proposed Action would be approximately 65 meters (213 feet) tall and would be visible from as far away as Winchester, located 13.3 kilometers (8.3 miles) northwest of the project site. Fugitive dust emissions may temporarily affect visibility during any construction at the site and would be mitigated with standard dust control measures. The visibility of the plumes associated with the Proposed Action would depend on weather and wind patterns; however, they would likely be visible from up to 12.8 kilometers (8 miles) from the facility location.

Geology

Minor impacts on the geologic resources, notably loss of prime farmland soils, are expected from the construction and operation of No Action Alternative 2 and the Proposed Action. However, the impacts are expected to be minor because the site has been previously graded and disturbed. The Proposed Action would have a slightly greater impact on geologic resources due to the additional support facilities required for operation. Disturbances associated with construction would be mitigated with runoff, erosion, and dust controls. Geologic hazards are not expected to have any effects on either No Action Alternative 2 or the Proposed Action.

Air Resources

Air emissions would be similar in quantity under No Action Alternative 2 and the Proposed Action. Increases would occur in annual air emissions of NO_x, CO, SO_x, particulate matter, and reactive organic gases. Under the Proposed Action, the highest emissions would be from NO_x (approximately 1,100 tons per year [TPY]), CO (approximately 800 TPY), and SO_x (approximately 500 TPY). The Proposed Action would also result in increases in hazardous air pollutant emissions of 9.07 TPY for all hazardous pollutants combined. More than half of this figure is attributable to the increase in nickel emissions; however, the overall increase is very low and should present little risk to human health and the environment. Pollutant emissions would be well within applicable standards; however, annual average emissions for NO_x and particulate matter would approach the Prevention of Significant Deterioration (PSD) Rule for Significant Impact Level Limits. The levels of particulate matter would also approach the 24-hour PSD limits.

Water Resources

No Action Alternative 2 would require 3.8 million liters per day (MLD) (1 million gallons per day [MGD]) of surface water from the Kentucky River for facility operations and would generate less than 1.5 MLD (0.4 MGD) of wastewater. The Proposed Action would require 15.1 MLD (4 MGD) of surface water from the Kentucky River for facility operations and would generate 1.5 MLD (0.4 MGD) of wastewater. Treated wastewater would be discharged into the Kentucky River. The remaining 13.6 MLD (3.6 MGD) would be used during the operation of the gasifier, turbine condensers, and fuel gas saturation process, as

well as for other miscellaneous uses. It is expected that no significant impacts would occur to water levels as the amount of the intake required for the Proposed Action represents approximately 0.1 percent of the average calculated daily flow and 4 percent of the low-flow conditions of the Kentucky River near the site. Coal and RDF pellets would be unloaded, stored, and conveyed in enclosed structures with concrete floors and would not impact water resources. No use of or discharge to groundwater resources is expected to occur during construction and operation of either facility.

Ecological Resources

The construction of the facilities for No Action Alternative 2 would result in the loss of approximately 4.8 hectares (12 acres) of old-field vegetation and habitat while the Proposed Action would result in a loss of 7.6 hectares (19 acres). No federal- or state-listed protected, sensitive, rare, or unique species have been identified at the project site location and suitable habitat for the federally-endangered running buffalo clover is not present. Therefore, there would be no impacts to any federal- or state-listed protected or endangered species from either No Action Alternative 2 or the Proposed Action. The thermal plume would likely not have an impact on aquatic organisms in the Kentucky River.

Noise

The construction and operation of both No Action Alternative 2 and the Proposed Action would result in minor noise increases over existing background noise levels beyond the borders of the J.K. Smith Site. Vehicle and rail traffic associated with both alternatives would cause minor noise increases of less than 2 decibels over background noise levels in the nearby community of Trapp, Kentucky.

Traffic and Transportation

Under No Action Alternative 2, approximately 100 to 200 vehicle trips, depending on the level of construction activity, would be made per shift change during facility construction. An additional 40 to 60 heavy-duty truck trips per day would be made to and from the project site and rail cars would move heavy equipment to and from the site as needed. Approximately 48 vehicle trips per day would be made during facility operation, all utilizing Kentucky Highway 89. No rail cars are expected to be required for facility operation under No Action Alternative 2. Since the existing traffic near the project site is light, this would result in little impact to local traffic.

Under the Proposed Action, approximately 500 to 1,000 vehicle trips, depending on the level of construction activity, would be made per shift change during facility construction. An additional 40 to 60 heavy-duty truck trips per day would be made to and from the project site and rail cars would move heavy equipment to and from the site as needed. Traffic congestion may be heavy during afternoons, when school buses operate along Kentucky Highway 89. Approximately 160 to 240 vehicle trips per day would be made during facility operation, all utilizing Kentucky Highway 89. This would have a greater impact on local traffic than No Action Alternative 2 and mitigation measures would likely be required to ease the impact. KPE would be responsible for repairing any damage to local roads due to excessive use or overweight vehicles. Approximately one unit train (100 rail cars) would move in or out of the site each day during operation. Existing rail infrastructure onsite is sufficient to accommodate a full unit train, thus removing it from the mainline track. KPE would design and implement an Emergency Response Plan and a Spill Prevention, Control, and Countermeasure Plan that would detail response and clean-up measures for any accidents resulting from fuel or waste transportation. Recommended mitigation measures for all associated traffic impacts include the installation of turning lanes or a traffic signal at the intersection of Kentucky Highway 89 and the facility service road.

Occupational and Public Health and Safety

Typical worker impacts present in the construction industry would be associated with facility construction under both No Action Alternative 2 and the Proposed Action. All noise and health impacts would be mitigated using typical industry safety measures. The Proposed Action would present a small

increase in cancer risks to workers and the public due to hazardous air pollutant emissions associated with operation of the combustion turbines of the power island component. The estimated cumulative lifetime cancer risk, assuming continuous exposure for a 70-year period at the location of maximum annual average exposure which is within the J.K. Smith Site, is 5.0E-05 (i.e., 50 per one million individuals) or a 0.005 percent increase in cancer risk per person. This cumulative lifetime cancer risk is a very conservative estimate due to assumptions and extrapolation procedures used in the analysis.

Waste Management

Facility construction and operation would generate small quantities of hazardous and nonhazardous wastes and wastewater under No Action Alternative 2. The construction of the Proposed Action would generate proportionately more wastes than No Action Alternative 2, as it would take four times as long to build. Operation of the Proposed Action would generate more wastewater and hazardous wastes than No Action Alternative 2. All wastewater would be treated before release into the Kentucky River. The gasifiers would generate vitrified frit and elemental sulfur, which DOE expects would be marketable. Typical industry practices would be used to minimize the wastes produced during construction and operation of either facility. Hazardous wastes would be disposed of in approved hazardous waste landfills outside of Kentucky.

MAJOR CONCLUSIONS/CUMULATIVE IMPACTS

No Action Alternative 1 would have no impact on any of the resource areas in the vicinity of the project site; however, the need for expanded electric power capacity in the region would not be supplied and beneficial socioeconomic impacts (jobs and revenue) would not be created. The primary impacts from No Action Alternative 2 and the Proposed Action would be to land use, socioeconomics, visual and aesthetic resources, air resources, and traffic and transportation. The impacts from the Proposed Action generally would be small, and would be relatively greater to socioeconomics (beneficial), visual and aesthetic resources, air resources, and traffic and transportation in comparison to No Action Alternative 2. Unavoidable adverse impacts from No Action Alternative 2 and the Proposed Action would occur to aesthetic and scenic resources (the presence of a new facility and additional transmission line), water resources (withdrawals from the Kentucky River), ecological resources (habitat removal), and traffic and transportation (increase in local vehicle trips taken). No environmental justice impacts are expected under any of the three alternatives.

The incremental impacts of the construction and operation of the Kentucky Pioneer IGCC Demonstration Project facility were added to the impacts of other past, present, and reasonably foreseeable future actions in the vicinity of the project site location. Reasonably foreseeable future actions include the unrelated expansion of EKPC's peak generation capacity at a site adjacent to the proposed project site and the expansion of the electric transmission grid throughout the region. The proposed project site would use a small percentage of the J.K. Smith Site's available land, approximately 121 hectares (300 acres) of previously disturbed land. The process area would occupy only 4.8 hectares (12 acres) within the 121-hectare (300-acre) project site. Taken together, cultural resources and geology and soils cumulative impacts would be negligible. Cumulative impacts would occur to land use, visual and aesthetic resources, and ecological resources as more land is used for development; and the entire J.K. Smith Site would appear more like an industrial setting. Cumulative impacts would also occur to air and water resources and noise as more facilities in the area would emit more air and water pollutants and generate more noise during operation. Additional construction and facility operation in the area would also generate more jobs and increase traffic levels.

Regulatory Issues

The proposed facility would be the first commercial-scale demonstration of a co-fed BGL gasifier in the United States. The gasifier units used would also be between 40 and 50 percent larger than existing gasifier units, allowing for greater electrical output from the facility. Because of the size and innovative nature of the technology to be demonstrated, there are two outstanding issues remaining to be resolved. They can be summarized into two main categories as follows:

- the potential of the vitrified frit to be hazardous under the *Resource Conservation and Recovery Act* (RCRA)
- the use of water in the facility and competing demands for water

This section will detail the status of each of these issues and steps that have been taken to resolve any controversy.

Vitrified Frit

The vitrified frit is a glassy, silica-like matrix material produced as a byproduct of the gasification process. Because frit has not been produced by the gasification of co-fed coal and RDF as proposed by this project, no data is available to determine the potential for the frit to leach and be classified as hazardous waste, which under state law is defined at Kentucky Revised Statutes 224.01-010 (31b). The state procedures for identifying hazardous waste are detailed in Title 401, Kentucky Administrative Regulations, Chapters 31 and 32. The first batch of frit would be subjected to Toxicity Characteristic Leachate Procedure testing to determine if it is a hazardous waste under RCRA and applicable Kentucky laws and regulations.

The frit from gasifiers operating on a 100 percent coal feed has consistently proven to be non-hazardous under RCRA, and the process has been shown to produce a relatively consistent frit regardless of the type of coal used in the fuel feed. KPE is proposing to sell the frit as a marketable product, but this will only be possible if the frit is deemed nonhazardous. Should the frit be determined to be hazardous under RCRA, KPE would bear all financial costs associated with the handling and disposal of the material. Therefore, if the frit is found to be hazardous, it would be necessary for KPE to review the gasification process and adjust the operation in order to alter the qualities of the frit. Ultimately, if process adjustments failed to produce a nonhazardous frit, KPE could decide to use 100 percent coal feed as a means to achieve a nonhazardous frit material. Impacts associated with use of a 100 percent coal feed would be expected to be essentially the same as the impacts examined under the Proposed Action (the 50-50 co-feed), except for those impacts directly attributable to the RDF, which would primarily be impacts associated with transportation and storage activities.

Water Resources

The Kentucky Pioneer IGCC Demonstration Project facility would withdraw approximately 15.1 MLD (4.0 MGD) of water from the Kentucky River. This is equivalent to 0.1 percent of the daily average flow and 4 percent of the 7-day low flow with a statistical recurrence interval of 10 years. Of this amount, 1.5 MLD (0.4 MGD) would be returned to the Kentucky River as treated wastewater. KPE would not be required to obtain a permit for the withdrawal because they would use the existing EKPC pipeline. EKPC's existing water permit would require modification for the additional withdrawals.

The large amount of water removed and associated discharges back into the river have raised a number of concerns about competing uses of the water. The main concern is that the city of Lexington uses the Kentucky River as its source of drinking water and during low-flow conditions, adequate supply of water for the city may not be available due to the withdrawals required by the plant. KPE has indicated that it would work with the Kentucky Department of Environmental Protection, Division of Water, during low-flow conditions and would cease plant operations and withdrawals from the river if required.

Table S-1. Comparison of Alternatives

Discipline	No Action Alternative 1	No Action Alternative 2 (Power Island)	Proposed Action (Power and Gasification Islands)
Land Use	No new land disturbance would occur at the project site location. Mitigation: None anticipated.	Disturb approximately 121 hectares (300 acres) of previously disturbed land for project construction activities. The process area will occupy approximately 4.8 hectares (12 acres). No effects on surrounding land uses or local land use plans or policies are expected. Mitigation: None anticipated.	Disturb approximately 121 hectares (300 acres) of previously disturbed land for project construction activities. The process area and storage facilities will occupy approximately 7.6 hectares (19 acres). No effects on surrounding land uses or local land use plans or policies are expected. Mitigation: None anticipated.
Socioecomonics	No increase in new employment or workers would be expected. The employment and population in the ROI would remain the same. Mitigation: None anticipated.	Construction would generate approximately 120 jobs during the 6-month construction phase with peak employment reaching 200 workers. Additional indirect employment of 138 to 230 jobs would be created based on the duration of peak construction levels. The 20-year operation period would require 24 workers and indirectly create an additional 54 jobs. There would likely be no change to the level of community services provided in the ROI. Mitigation: None anticipated.	Construction would generate approximately 600 jobs during the 30-month construction phase with peak employment reaching 1,000 workers. Additional indirect employment of 690 to 1,150 jobs would be created based on the duration of peak construction levels. The 20-year operation period would require 120 workers and indirectly create an additional 270 jobs. Population may increase in the ROI, but no impact is expected in the level of community services provided. <u>In areas near the plant, property values may decline slightly.</u> Mitigation: None anticipated.
Cultural Resources	No impacts to cultural resources would occur at the project site location. Mitigation: None anticipated.	<u>The Section 106 Review process for the Area of Potential Effect has been completed. Kentucky SHPO finds that there is no effect on historic properties.</u> Mitigation: If resources are encountered during construction, procedures planned by KPE would be followed upon discovery. Should any discoveries occur, the SHPO would be notified and construction in the area would cease until a qualified archaeologist could evaluate the findings and SHPO concurrence was obtained.	<u>The Section 106 Review process for the Area of Potential Effect has been completed. Kentucky SHPO finds that there is no effect on historic properties.</u> Mitigation: If resources are encountered during construction, procedures planned by KPE would be followed upon discovery. Should any discoveries occur, the SHPO would be notified and construction in the area would cease until a qualified archaeologist could evaluate the findings and SHPO concurrence was obtained.

Discipline	No Action Alternative 1	No Action Alternative 2 (Power Island)	Proposed Action (Power and Gasification Islands)
Aesthetic and Scenic Resources	The existing project site location visual setting would not change, nor would area scenic resources be affected. Mitigation: None anticipated.	The combined cycle units would not be visible from outside of the site area. No visible plumes are associated with the combined cycle units. Fugitive dust during construction may temporarily affect visibility. Mitigation: Standard dust control measures would be implemented. Additional mitigation is not anticipated.	The combined cycle units would not be visible from outside of the site area. No visible plumes are associated with the combined cycle units. Fugitive dust during construction may temporarily affect visibility. The gasifier facility stacks and plumes would likely be visible from the City of Winchester, the community of Trapp, and the Pilot Knob State Nature Preservation. Fugitive dust during construction may affect visibility temporarily. Mitigation: Standard dust control measures would be implemented. Additional mitigation is not anticipated.
Geology	No impacts to geology or geologic resources would occur at the project site location. Mitigation: None anticipated.	Minor impacts on the geology and geologic resources due to disturbances associated with construction, parking, and construction laydown areas are expected, however, the site has been previously graded. Mitigation: Runoff and erosion controls, dust controls, and reuse of stockpiled soil.	Minor impacts on the geology and geologic resources due to disturbances associated with construction, parking, and construction laydown areas are expected, however, the site has been previously graded. Slightly greater impacts to prime farmland soils than No Action Alternative 2 are expected from the construction of additional support facilities. Mitigation: Runoff and erosion controls, dust controls, and reuse of stockpiled soil.

Discipline	No Action Alternative 1	No Action Alternative 2 (Power Island)	Proposed Action (Power and Gasification Islands)
Air Resources	No impacts to air resources would occur at the project site location. Mitigation: None anticipated.	Increases in annual air emissions of NO_x, SO_x, PM_{10}, and reactive organic gases (ROG) would result from the facility. The highest emissions would be in the form of NO_X (approximately 1,100 TPY), CO (approximately 800 TPY), and SO_X (approximately 500 TPY). The facility would also emit approximately 2.1 million TPY of CO_2. Pollutant emissions and levels would be well within applicable standards. No significant air quality impacts are expected from facility operation. Mitigation: Emission control equipment would be included in facility design.	Increases in annual air emissions of NO_x, SO_x, PM_{10}, and ROG would result from the facility. The highest emissions would be in the form of NO_X (approximately 1,100 TPY), CO (approximately 800 TPY), and SO_X (approximately 500 TPY). An increase in PM_{10} emissions of approximately 15 percent over No Action Alternative 2 would occur. NO_x and PM_{10} would approach PSD Significant Impact level thresholds for annual average levels. PM_{10} would also approach the 24-hour threshold. Hazardous air pollutant emissions would increase by 9.07 TPY. The facility would also emit approximately 2.1 million TPY of CO_2. Pollutant emissions and levels would be well within applicable standards. No significant air quality impacts are expected from facility operation. Mitigation: Emission control equipment would be included in facility design.

Discipline	No Action Alternative 1	No Action Alternative 2 (Power Island)	Proposed Action (Power and Gasification Islands)
Water Resources	No impacts to water resources would occur at the project site location. No activities would occur that could potentially affect wetlands and surface waters. Mitigation: None anticipated.	The facility would require 3.8 MLD (1 MGD) of surface water from the Kentucky River. Project operations would generate less than 1.5 MLD (0.4 MGD) of wastewater. Treated wastewater would be discharged to the Kentucky River in compliance with the site-specific Kentucky Pollutant Discharge Elimination System (KPDES) permit, resulting in negligible impacts. During 7-day low-flow conditions, the facility would withdraw 1 percent of the flow of the Kentucky River. No use of or discharge into groundwater resources during construction or operation would occur. Mitigation: None anticipated beyond project design, including permit requirements, and administrative controls.	The facility would require a total of 15.1 MLD (4 MGD) of surface water from the Kentucky River. Project operations would generate 1.5 MLD (0.4 MGD) of process wastewater. Treated wastewater would be discharged to the Kentucky River in compliance with the site-specific KPDES permit, resulting in negligible impacts. The other 13.6 MLD (3.6 MGD) of surface water is used in the operation of the gasifier, turbine condenser, and fuel gas saturation process, as well as other miscellaneous uses. During 7-day low-flow conditions, the facility would withdraw 4 percent of the flow of the Kentucky River. In order to minimize potential conflicts over water availability during low flow conditions, the State of Kentucky limits permitted users to no more than 10 percent of the lowest average monthly flow. This requirement applies to EKPC's existing permit, which would likely be modified to incorporate the additional withdrawals associated with the Proposed Action. No use of or discharge into groundwater resources during construction or operation would occur. Mitigation: None anticipated beyond project design, including permit requirements, and administrative controls. Although not a condition of the permit, during extremely low-flow conditions for the Kentucky River, KPE has stated that it would work with the Division of Water and cease plant operations if requested.

Discipline	No Action Alternative 1	No Action Alternative 2 (Power Island)	Proposed Action (Power and Gasification Islands)
Ecological Resources	There is no potential to affect federally-listed plant and animal species, or species identified by other federal and/or state agencies at the project site location. Mitigation: None anticipated.	Since no federal- or state-listed protected, sensitive, rare, or unique species have been identified at the project site location, no impacts would be expected. In addition, the proposed site location does not contain suitable habitat for the federally endangered running buffalo clover. Approximately 4.8 hectares (12 acres) of old-field vegetation and habitat would be lost from construction of the proposed facility. Mitigation: Post-construction mitigation landscaping consisting of a control program for non-native invasive plants should be adopted.	Since no federal- or state-listed protected, sensitive, rare, or unique species have been identified at the project site location, no impacts would be expected. In addition, the proposed site location does not contain suitable habitat for the federally endangered running buffalo clover. Approximately 7.6 hectares (19 acres) of old-field vegetation and habitat would be lost from construction of the proposed facility and support structures. Mitigation: Post-construction mitigation landscaping consisting of a control program for non-native invasive plants should be adopted. Due to the height of the emissions stacks, the Federal Aviation Administration will require stack lighting. To minimize bird strike mortality, the USFWS has developed a set of voluntary recommendations for tower siting, construction, operation, and decommissioning. The gasifier stacks lighting system would be designed in consideration of USFWS recommendations.
Noise	No noise impacts would occur since no construction activities would be taking place. Mitigation: None anticipated.	Short-term minor increase in noise during construction and operation. Vehicle traffic would cause minor noise increases over background levels in the community of Trapp. Mitigation: None anticipated.	Short-term minor increase in noise during construction and operation. Vehicle and rail traffic would cause minor noise increases over background levels in the community of Trapp. Mitigation: None anticipated.

Discipline	No Action Alternative 1	No Action Alternative 2 (Power Island)	Proposed Action (Power and Gasification Islands)
Traffic and Transportation	No adverse traffic or transportation impacts. Mitigation: None anticipated.	Increase in road traffic from construction and operation of facility. Depending on the level of construction activity occurring on-site, 100 to 200 vehicle trips per shift change would occur. Approximately 40 to 60 heavy duty truck trips per day would be made to and from the project site. Railcars would move heavy equipment to the site during construction as needed. Approximately 48 vehicle trips per day would be made during operation, all utilizing Kentucky Highway 89. No railcars would be required for operation. Mitigation: KPE should install turning lanes or traffic control devices (i.e., stop lights) at the intersection of Kentucky Highway 89 and the facility service road.	Increase in traffic associated with construction. Approximately 500 to 1,000 vehicle trips per shift change, depending on the level of construction occurring, and 40-60 heavy-duty truck trips per day would be made to and from the project site. Traffic congestion may be heavy at times during afternoons when school buses operate on Kentucky Highway 89. Railcars would move heavy equipment to the site during construction as needed. Approximately 160 to 240 additional vehicle trips throughout each day would be made all utilizing Kentucky Highway 89 during operation. Approximately one unit train (100 rail cars) movement would be made in or out of site per day during facility operation. Existing rail infrastructure onsite is sufficient to accommodate a full unit train. Mitigation: Worker transportation options such as car pooling should be considered. KPE should Install turning lanes or traffic control devices (i.e., stop lights) at the intersection of Kentucky Highway 89 and the facility service road. Implementation of directional controls for the service road should also be considered. KPE agrees to repair roads damaged by facility truck traffic.
Occupational and Public Health and Safety	No occupational and public health and safety impacts. Mitigation: None anticipated.	Typical worker impacts present in the construction industry would be associated with facility construction. No significant occupational or public health and safety impacts are expected during facility operation. All noise and health impacts would be mitigated using typical industry safety measures. Mitigation: Typical industry safety measures would be implemented.	Typical worker impacts present in the construction industry would be associated with facility construction. No significant occupational or public health and safety impacts are expected during facility operation. All noise and health impacts would be mitigated using typical industry safety measures. Mitigation: Typical industry safety measures would be implemented.

Discipline	No Action Alternative 1	No Action Alternative 2 (Power Island)	Proposed Action (Power and Gasification Islands)
Waste Management	No change to existing facility services within the J.K. Smith Site. Mitigation: None anticipated.	Facility construction and operation would generate small quantities of hazardous and nonhazardous wastes and wastewater. Mitigation: Typical industry measures would be implemented to minimize waste generation. Hazardous wastes would be disposed in approved hazardous waste landfills outside of Kentucky.	Facility construction would generate small quantities of hazardous and nonhazardous wastes and wastewater over the 30-month construction period. Operation would generate larger quantities of wastewater and hazardous wastes than No Action Alternative 2. The gasifiers would produce large quantities of vitrified frit and elemental sulfur, which KPE expects would be marketable. Mitigation: Typical industry measures would be implemented to minimize waste generation. Hazardous wastes would be disposed in approved hazardous waste landfills outside of Kentucky. Should the vitrified frit be shown to be hazardous, it would also be disposed in approved hazardous waste landfills.

Note: MGD = million gallons per day; TPY = tons per year; MLD = million liters per day; USFWS= U.S. Fish and Wildlife Service.