# 1. INTRODUCTION AND BACKGROUND

## 1.1 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 at least 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 environmental impact statement (EIS) has been prepared by the U.S. Department of Energy (DOE) in compliance with the *National Environmental Policy Act* of 1969 (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.

## 1.2 Background

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 five 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 selected for further consideration the Kentucky Pioneer Integrated Gasification Combined Cycle (IGCC) Demonstration Project, which KPE will own and operate. The objective of the proposed Kentucky Pioneer IGCC Demonstration Project would be the demonstration of the first commercial fixed-bed co-fed BGL process in the United States. The project would demonstrate repowering and retrofit technologies by incorporating coal gasification technology into the IGCC process.

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 *Code of Federal Regulations* [CFR] 60) were established under the 1970 amendments to the *Clean Air Act* 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.

Under the CCT Program and NEPA, DOE is responsible for a comprehensive review of reasonable alternatives for siting the proposed project. However, in dealing with the applicant or industrial partner, the scope of alternatives is necessarily more restricted because DOE must focus on alternative ways to accomplish its purpose that reflects both the application before the Department and the functions DOE plays in the decision process. DOE's role is limited because the federal government is neither the owner nor operator of the proposed project. It is appropriate in such cases for DOE to give substantial consideration to the applicant's needs in establishing a project's reasonable alternatives.

The range of reasonable alternatives to be considered in the EIS for the proposed Kentucky Pioneer IGCC Demonstration Project is determined in accordance with the overall NEPA strategy. In a Cooperative Agreement with an applicant, the scope of alternatives is necessarily more restricted so that DOE can focus on alternative ways to accomplish the programmatic goals based on the specific application being considered for funding. 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 should DOE decide against providing cost-shared funding for the gasification technology demonstration, two No Action Alternatives are addressed. 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 essentially result in no effects to the existing environment. As shown previously, this 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 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, at the proposed project location. The changes in the environment resulting from the operation of the combined cycle turbines are presented in the appropriate sections of Chapter 5, Environmental Impacts, and are used as a basis to compare the impacts of the Proposed Action.

DOE does not plan to evaluate alternative sites for the proposed project due to DOE's limited role in providing cost-shared funding for the project and the applicant's intention to proceed with the construction of the natural gas-fired combined-cycle plant at the partially constructed J.K. Smith Site, even if DOE decides not to provide cost-shared funding.

## 1.3 The Proposed Kentucky Pioneer IGCC Demonstration Project

The Proposed Action is for DOE to provide financial assistance through a Cooperative Agreement with KPE, a subsidiary of Global Energy, Inc., for the design, construction and operation of the proposed project in Clark County, Kentucky. DOE's Cooperative Agreement with KPE was originally based on the construction and operation of a 400 megawatt (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 would 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 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 will be based on a combined cycle net power output of 540 MW instead of 400 MW (Global Energy 2000b).

Since the issuance of the Notice of Intent (NOI), the solid fuel source for this project has changed from fuel briquettes made from high-sulfur coal and municipal solid waste (MSW) to co-feeding coal and RDF pellets. RDF pellets are generated from refined MSW. During the pellet production process, large objects and contaminants are removed and the remaining waste is milled into a mulch and pressed into pellets. The process is described in greater detail in Section 3.2.2.2, Refuse Derived Fuel Pellet Production. RDF pellets would be procured from an existing RDF pellet manufacturer. The two fuel sources would be shipped by rail directly to on-site storage. At least 50 percent of the co-feed would consist of high-sulfur coal from the Kentucky region. KPE changed the solid fuel source due to the simplicity and cost effectiveness of co-feeding the two components (Global Energy 2000b).

The facility would demonstrate the following innovative technologies: (1) gasification of a blend of coal and RDF pellets using the BGL process; and (2) the utilization of a synthesis gas (syngas) product as a clean fuel in combined cycle turbine generator sets. The demonstration would operate for a minimum of the first year of the facility's 20-year commercial operation period. Data generated during the 1-year demonstration would be used to determine if the coal and RDF pellet co-feed would continue after the first year of operation.

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.

The proposed project would consist of the following major facility components: (1) RDF pellet and coal receipt and storage sheds; (2) gasification plant; (3) sulfur removal and recovery facility; (4) air separation plant; and (5) two combined cycle electric generation units. The production of syngas in the BGL process occurs in the gasification plant, sulfur removal and recovery facility, and air separation plant.

Under the Proposed Action, the two GE 7FA gas turbines would be fired with syngas. 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 gas produced by the gas turbine. This residual heat is then 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.

The project is located in Clark County, Kentucky. The project site is located on approximately 121 hectares (300 acres) within a 1,263-hectare (3,120-acre) tract owned by East Kentucky Power Cooperative (EKPC). The tract 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 Trapp community.

The proposed location was originally slated for a conventional coal-fired power plant in the early 1980s when demand for electricity was forecasted to significantly increase. The 121 hectares (300 acres)

were previously disturbed in the 1980s after the issuance of a Record of Decision (ROD) by the Rural Electrification Agency (REA) for the *Final Environmental Impact Statement J.K. Smith Power Station Units 1 and 2* (J.K. Smith EIS). When the demand for additional electricity failed to materialize, the construction on that project was halted. Preliminary grading, primary foundations, fire protection piping, and access infrastructure installation were completed in the project site area. KPE has stated that it intends to construct the combined cycle power unit (power island) at this site regardless of the outcome of the demonstration project application.

## 1.4 Relationship of the Environmental Impact Statement to Other *National Environmental Policy Act* Documents

The following discussion provides a brief summary of the NEPA documents issued to date that relate to the project or site area.

The *Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Environmental Impact Statement* will tier from the CCT PEIS that was issued by DOE in November 1989 (DOE/EIS-0146). The CCT PEIS evaluated two alternatives: (1) the No Action Alternative, which assumed the CCT Program would not continue, and that conventional coal fired technologies with flue gas desulfurization and nitrogen oxide controls that met NSPS would continue to be used; and (2) the Proposed Action, which assumed that the clean coal projects would be selected and funded. The CCT PEIS Proposed Action assumed that successfully demonstrated technologies would undergo widespread commercialization by the year 2010.

The J.K. Smith EIS was issued by REA in 1980. The EIS describes the environmental effects of the construction and operation of two 650 MW coal-fired steam electric generating units and the associated 345 kilovolt (kV), 161 kV, and 138 kV transmission lines. The U.S. Department of Agriculture's Rural Utility Service's ROD for the J.K. Smith EIS stated that there would be no significant impacts for project implementation. The J.K. Smith EIS was used as a source document to prepare Chapter 4, Affected Environment, of the Kentucky Pioneer IGCC Demonstration Project EIS. Where necessary, updated information was included and documented accordingly.

The following documents were also reviewed in preparation of this EIS:

- *Environmental Analysis, J.K. Smith Power Station Units 1 and 2, Clark County, Kentucky*. This document was prepared by REA in 1979 and revised in 1980 to analyze the impacts of the proposed J.K. Smith Power Station, and represents an initial step in assessing the potential environmental impacts associated with the conceptual design and in estimating quantitative design information for the J.K. Smith Power Station. The proposed generation station would have had two electric generating units each containing a coal-fired boiler and a steam driven turbine generator. A Finding of No Significant Impact (FONSI) was issued by REA with respect to the potential environmental impacts resulting from the proposed project.

- *Environmental Assessment, Combustion Turbine Generation Project.* This environmental assessment (EA) was prepared in June 1992 by East Kentucky Power Cooperative's (EKPC) to analyze the construction and operation of three simple cycle combustion turbine generating units at a site within EKPC service territory. Alternatives considered included the No Action Alternative, demand side options, purchased capacity from both utility and non-utility generators, and ownership participation in a coal-fired unit. In addition, alternative generation technologies and alternative sites were evaluated. The J.K. Smith Site and the Columbia Site were both evaluated as potential siting locations within the EKPC service area. A FONSI was issued by the REA with respect to the potential environmental impacts resulting from the proposed project.

# 1.5 Public Participation

To date, public participation for the EIS has consisted of the scoping process, which included a public comment period, during which one public scoping meeting was held; and the public comment process which included a public comment period, during which two public meetings were held.

## 1.5.1 Public Scoping Process

Upon publishing an NOI in the *Federal Register* (FR) announcing its intent to prepare an EIS for the Kentucky Pioneer IGCC Demonstration Project (65 FR 20142), 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 (see Appendix B). Publication of the NOI marked the beginning of the formal public scoping period for the Kentucky Pioneer IGCC Demonstration Project EIS. DOE held a public scoping meeting in Trapp, Kentucky, on May 4, 2000, to allow interested parties to present verbal and written comments. In addition, an informal session prior to the scoping meeting was held on May 4, 2000, from 4:00 p.m. to 6:00 p.m., at the Trapp Elementary School in Trapp, Kentucky. The formal scoping meeting was held from 7:00 p.m. to 9:00 p.m. following the informal session. 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 widely 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.

State agency representatives, members of interested groups, and private individuals attended the public scoping meeting and submitted comments on the scope of the EIS. The following attendees signed in at the meeting:

- Current DOE employees
- Contractor representatives
- Global Energy, Inc., representatives
- EKPC representatives
- Elementary school representatives (i.e. superintendent, principal)
- Media personnel
- Union members
- Community members

## 1.5.2 Summary of Issues/Concerns Raised During the Public Scoping Process

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. The following is a brief summary of comments presented by members of the public at the public scoping meeting of May 4, 2000. 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. Some commentors were concerned with the number of local and union representatives that would be hired during construction and plant operations. In addition, these commentors stated that union labor continues to be the most productive, competent, and skilled workforce worldwide. Issues related to socioeconomics can be found in Section 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 Section 4.3 and 5.3, Socioeconomics.

One commentor asked what consumer savings have been experienced from previous plants. To date, 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, visual 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, which is located one 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 whether 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 to know information about the logistics of integrating the garbage and integrating 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 on site 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.

### 1.5.3 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 (66 FR 57717). 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.

## 1.6 Content of this Environmental Impact Statement

By addressing the following issues, this EIS provides a comprehensive assessment of reasonably foreseeable consequences from the Proposed Action:

- potential effects on the Kentucky River
- effects of air emissions from the Kentucky Pioneer IGCC Demonstration Project
- potential effects on the public and workers during normal operations
- potential effects on members of the public, including minority and low-income populations, from normal operations and reasonably foreseeable accidents
- pollution prevention, waste minimization, and energy and water use reduction technologies to minimize environmental impacts
- potential socioeconomic impacts, including potential impacts associated with the number of workers needed for operations
- potential impacts on cultural and historic resources
- compliance with applicable federal, state, and local requirements
- potential cumulative impacts of all past, present, and reasonably foreseeable future operations in the local area
- potential irreversible and irretrievable commitment of resources
- potential environmental impacts associated with constructing and operating the Kentucky Pioneer IGCC Demonstration Project

# 1.7 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 other 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); and
- 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.

## 1.7.1 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 Leaching 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 nonhazardous 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 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 be primarily impacts associated with transportation and storage activities.

## 1.7.2 Water Resources

The Kentucky Pioneer IGCC Demonstration Project facility would withdraw approximately 15.1 million liters per day (4.0 million gallons per day) 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 million liters per day (0.4 million gallons per day) 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.