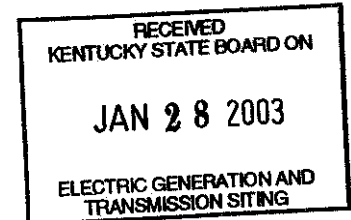


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**Review and Evaluation of:
A Site Assessment Report For
Kentucky Pioneer Energy
Case Number 2002-00312**



Report Date: January 28, 2003

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SECTION A. General Statement

This report documents the review of a Site Assessment Report (SAR) submitted to the Kentucky State Board on Electrical Generation and Transmission (Board). The SAR was submitted by Kentucky Pioneer Energy, LLC (KPE) to the Kentucky Public Service Commission (PSC), serving as staff to the Board. KPE has submitted the SAR to support its application for a certificate to construct a merchant electric generating facility in Clark County under SB 257 (the Act), passed by the General Assembly of the Commonwealth of Kentucky in 2002. The provisions of this Act are embodied in the Kentucky Revised Statutes (KRS) 278.

Provisions of the Act Establishing the SAR Review Process

The Act defines a class of merchant power plants and requires them to obtain construction certificates as a prerequisite to the commencement of actual construction activity. The Act created the Board and gave it the authority to grant or deny construction certificates requested by individual applicants. The Board is an arm of the PSC for administrative purposes.

The Act created the application process and, within the process, a series of steps for preparing and submitting this report:

- The applicant files for a construction certificate and pays the fees.
- The applicant submits required items, including an SAR.
- If it wishes, the Board may hire a consultant to review the SAR and provide recommendations about the adequacy of the information and proposed mitigation measures. The Board, at its discretion, may direct the consultant to prepare a separate SAR.
- The consultant must deliver the final report so the Board can meet its own statutory decision deadline — 90 days or 120 days from receipt of an administratively complete application, depending upon whether the Board will hold a hearing.
- To provide adequate time for public noticing, the SAR review is to be completed within 30 days of receipt of an administratively complete application.

Implementing the SAR Review Process

KPE's application was declared administratively complete on December 19, 2002, which initiated the SAR review process to occur under the Act. Through the PSC, the Board hired Jason Associates Corporation (Jason) as the consultant to conduct the SAR review, including a site visit, follow-up data collection, and preparation of this report.

Brief Project Description

Kentucky Pioneer Energy proposes to develop a 540-megawatt electric power generation facility at the East Kentucky Power Cooperative (EKPC) J.K. Smith site in Trapp, Clark County, Kentucky; where EKPC currently operates approximately 400 megawatts of combustion turbine-based power generation capacity. The facility would be located on a parcel leased from EKPC, jointly using existing buildings, roads, rail facilities and other infrastructure. KPE would lease approximately 300 acres wholly within the approximate 3,200-acre EKPC J.K. Smith property.

The project would be an Integrated Gasification Combined Cycle (IGCC) plant that would operate by converting a feedstock of coal and refused derived fuel (RDF) into a synthesis gas for combustion and ultimate electricity generation.

Partial funding for the project could come from the United States Department of Energy (DOE) in their support of the development of Clean Coal Technologies. Because this funding would come from the Federal government, the Department has prepared an environmental impact statement in accordance with the National Environmental Policy Act, as amended (NEPA). This NEPA document, *Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement* (DOE/EIS-0318), was included as an integral part of KPE's Site Assessment Report.

SAR Review Methodology

Jason proceeded in this sequence of tasks:

- Conducted a thorough review of the Kentucky Pioneer FEIS and SAR to obtain background information and geographic setting for the KPE project;
- Conducted a review of relevant evaluation criteria to identify potential issues and assessment approaches to serve as benchmarks for the adequacy review;
- Conducted the required site visit, including obtaining oral and written information supplied by the applicant, over the period of December 18-21, 2002;
- Identified additional information deemed useful for a thorough review, and submitted questions to the applicant via the Board;
- Compiled the results into this Final Report.

The Site Visit, included discussions with a representative of Global Energy, Mr. Dwight Lockwood, and Dr. John Rogness of the Kentucky Public Service Commission. The visit began at the Winchester offices of East Kentucky Power Cooperative in order to ensure access to the existing J.K. Smith Site.

Report Format

This report is structured to be responsive to KRS 278.708(3) and the specifications in the Jason contract. It begins with this general statement that introduces the review. Section B presents the executive summary. Section C offers detailed findings and conclusions of the study, and Section D presents detailed recommendations concerning mitigation measures and future Board actions.

SECTION B. Executive Summary

This report documents the evaluation of a Site Assessment Report (SAR) in compliance with Enrolled Act SB257, Section 5 which became law in 2002. The requirements of this law are embodied in a new section of KRS, Chapter 278.708. To carry out this law, the Kentucky Public Service Commission (PSC) staff serves as staff to the Kentucky State Board on Electrical Generation and Transmission Siting (Board). The PSC acknowledged the receipt of an administratively complete SAR from Kentucky Pioneer Energy, LLC (KPE), a subsidiary of Global Energy, LLC, on December 19, 2002. The PSC staff retained Jason Associates Corporation (Jason), a nationally recognized environmental consulting firm, to review the SAR for the PSC and the Board. Jason was directed by PSC staff to review the SAR for adequacy, visit the site and conduct supplemental research where necessary and to provide recommendations about proposed mitigation measures. This is the summary of Jason's final report, which encompasses the SAR review, summarizes information from the applicant, offers supplemental information and draws conclusions and recommendations related to mitigation.

Description of the Proposed Facility/Site Development Plan

The SAR provides a description of the KPE project in terms of surrounding land uses, legal boundaries, access control, facility location, access ways and internal roads and railways, utility service, setback requirements and noise levels. The summary of the presentation on noise levels is included on page B-3.

Summary information and conclusions regarding each of the descriptive elements that are required in this section are as follows:

Surrounding land use — The KPE plant site is proposed to be located on a parcel leased from East Kentucky Power Cooperative, which already contains five 80-megawatt peaking units at the J.K. Smith Site. The process area has been previously disturbed by EKPC during the initial site preparation for the abandoned construction of the J.K. Smith Power Station in the early 1980s. Preliminary grading and some foundations were completed in the area. The site was originally prepared for a power station that was never completed due to a decrease in the demand for electricity at that time. The DOE FEIS concluded that no effects on surrounding land uses are expected to occur from the construction and operation of the combined-cycle units.

Legal boundaries — The KPE facilities will be sited on approximately 300 acres within an existing rail loop on the J.K. Smith site that will be leased from EKPC. The lease generally identifies the rail loop, other areas, and certain buildings for joint and cooperative use. There are no other lands adjacent to the KPE leased property.

Access control and security — The KPE facilities will be wholly within the confines of the EKPC site. The current site has access control and is completely fenced with locked gates. It has been recommended that KPE fully define their access control and security plan after development of their detailed facility design.

Location of buildings, transmission lines, and other structures — The Applicant's SAR provides a conceptual layout of the project facilities within the 300-acre leased parcel. Additional transmission lines will be the responsibility of EKPC and will be approved under the Department of Agriculture's Rural Utility Service NEPA policies and procedures.

Access ways, internal roadways, and railways — The KPE facilities can be accessed solely from an access road that intersects Kentucky Highway 89 south of Trapp. Adequate internal roads exist from the original construction of EKPC's J.K. Smith Site. Rail access is currently available onsite with an existing tie into the CSX Transportation freight line rail segment that runs between Winchester and Typo, Kentucky.

Utilities — Construction and back-up general service power will be obtained from Clark Energy. Site load will normally be self-generated. Start-up power during operations will be obtained from Clark Energy Cooperative. Natural gas service will be required during startup and will be provided by a tie-in to existing Tenneco gas pipelines on the J.K. Smith Site. Water will be withdrawn from the Kentucky River under EKPC's Withdrawal Authority and KPE will replace the existing intake structure with a new structure that has adequate capacity.

Setback requirements — KRS 278.706(2)(e) provides that the setback requirements are not applicable to sites that currently contain a facility capable of generating 10 megawatts or more. The existing J.K. Smith site has the capability of producing approximately 400 megawatts. That being said, however, all areas within 2,000 feet of the proposed process location are owned by EKPC and therefore do not contain any residential neighborhoods, schools, hospitals, or nursing home facilities.

Compatibility with Scenic Surroundings

The DOE's Final EIS evaluated the potential impacts to the visual and aesthetic resources in the region of influence around the proposed facility. The facility, or at least the stack, will be able to be seen from the observation point at Pilot Knob State Nature Preserve and some surrounding areas. The incremental impacts that this causes are small due to the fact that the new stack would only be slightly taller than the five existing stacks at the J.K. Smith Site, which can also be seen from those locations.

Considering the topography and vegetation, coupled with the baseline setting of an existing power plant site, it can be concluded that the KPE project site will be compatible with its scenic surroundings. Visual effects from the cooling tower plumes and stack emissions are likely to be negligible. Selecting a color for the stack to best fit with the surrounding view according to typical background conditions would minimize the incremental impact from the various viewsheds in the area.

Potential Changes in Property Values for Adjacent Property Owners

The Final EIS prepared by DOE evaluated the impacts to the socioeconomics of the region. The region was defined as Clark, Fayette, and Madison Counties. In addition to property values of adjacent properties, the FEIS evaluated the regional impacts to employment, income, population, housing, and community services.

DOE acknowledged that appraisal methods used to estimate land values are based on objective characteristics of the property and any improvements. The impact that the presence of a nearby aboveground facility may have on the value of the land depends on many factors including size, existence of other facilities, current value of the land, its location, current land use, and emotional response. It was concluded that since the closest tract of land available for potential purchase is approximately 1 mile from the site that potential impacts to property values in the region were negligible. Furthermore, since the proposed KPE project will be sited on land that currently

contains power generation capabilities, the new project will not change the land use or aesthetic value of the property from its current state. As reported in the FEIS, the project would have positive impacts on the region from an employment and income perspective, both directly and indirectly.

Expected Noise from Construction and Operation

The key issues for noise impacts stem from construction activities, operation of the facilities, and project-related traffic and rail service. The Final EIS evaluated the noise impacts and concluded that the noise level estimated to occur beyond the EKPC property boundary are compatible with rural residential uses. Specific mitigation measures regarding noise abatement from the turbine and gasifier buildings have been established as part of the FEIS and included in the mitigation measures recommended in this report. With regard to traffic, the FEIS concludes that the small incremental increase in traffic volume would not have a significant impact on highway traffic noise conditions in the area.

Impacts on Land-based Transportation

KPE relied upon the transportation analyses prepared as part of the FEIS on this project. The FEIS presents the baseline conditions, methodology, and results of the analysis. The baseline condition was described as the primary access routes for roadways and rail lines and the current and recent daily traffic loads for all segments of the roads from Winchester and Richmond to Trapp and also locally around Trapp. With regard to rail access, the project site is located approximately one-half mile west of a freight rail line segment, owned and operated by CSX Transportation, Inc., that runs between Winchester and Typo, Kentucky and has been operating in the region for an extended period of time. Existing rail traffic data for the line averages over 13 freight trains per day. An approximately 3-mile long rail loop extends from the main freight line into the J.K. Smith Site. The project site also contains extensive rail yard capacity that is linked to the rail loop at several locations.

The analysis conservatively modeled traffic studies for the local highways and used appropriate assumptions for number of workers in construction and operations scenarios, persons per car, number of shifts, materials requiring truck delivery, etc. The existing data indicate that traffic on each road increases as one travels towards the centers of population. It also indicates that traffic on roads near the project site is relatively light. The analysis considered the established commuting patterns of heavier traffic flowing toward population centers in the morning and away from those centers in the evening. For the case of the project site, commuting workers will generally be traveling in the opposite direction of these established commuting patterns, therefore not compounding any existing traffic problems during the commuting periods.

The FEIS reported that significant traffic impacts could occur to the roads in Trapp during the 30-month construction period, especially to Kentucky Highway 89 at the intersection with the site access road. The lack of traffic control devices could lead to significant traffic congestion at this intersection at shift change. The two-lane access road would also be heavily congested prior to and after work shifts, as all vehicles must utilize this road. An additional potential issue of concern, especially as the construction shifts end, is the presence of school buses along Kentucky Highway 89. The safety of the children should not be an issue since the buses stop at the homes of each of the children and not at centralized locations, thus minimizing the amount of walking along the road. The frequent stops required by the school buses, however, combined with the large number of vehicles leaving the plant site would increase the incidences and duration of

congestion along Kentucky Highway 89. The FEIS has recommended mitigation measures for traffic congestion at the access road intersection.

The impact of additional rail shipments of materials to the site would be small and within the capacity of the existing rail line. At the site, the supply trains would travel off of the main rail line and onto the existing rail loop, where they would be unloaded. Since the trains would be completely off of the main line, no delays to mainline rail traffic would be expected during the unloading process.

Conclusion and Recommendations

Based upon the review of KPE’s Site Assessment Report (including the Final EIS prepared by the Department of Energy), Site Development Plan, and responses to the PSC Staff’s Data Request, Jason has concluded that KPE has met requirements set forth in KRS 278.708(3).

As part of their review, Jason assumed that the Applicant would implement the mitigation measures that were specified in the Department of Energy’s Final EIS. These mitigations, relevant to the required elements of the SAR, and additional recommendations from Jason’s review are included in Table B-1.

Table B-1. Summary of Recommended Mitigation Measures

<i>SAR Criteria</i>	<i>Source</i>	<i>Recommended Mitigation</i>
Description of Facilities	Jason Review	Fully define access control plan to meet industry standards.
Compatibility with Scenic Surroundings	FEIS	Implement dust control measures during construction.
Compatibility with Scenic Surroundings	Jason Review	Select natural background color for stack and facility.
Noise Impacts	FEIS	Design Turbine and Gasifier Buildings to meet established noise criteria and to minimize offsite noise impacts
Traffic Impacts	FEIS	Implement traffic control and highway changes at the intersection of the site access road and Highway KY-89.

These mitigation measures are discussed in Sections C and D of this report.

SECTION C. Findings and Conclusions

This section provides detailed review and evaluation of each element of the SAR as prescribed in KRS 278.708(3). It is organized into five subsections:

1. Description of Proposed Facility/Site Development Plan
2. Compatibility with Scenic Surroundings
3. Potential Changes in Property Values for Adjacent Property Owners
4. Expected Noise from Construction and Operation
5. Impacts on Land-based Transportation

For each of these topics, a consistent approach is applied. This approach includes providing the following information to the extent available or applicable:

- Generally accepted assessment criteria or methodology necessary to evaluate impacts of a project of this nature. For this project, this typically included information regarding the assessment of environmental impacts from the DOE Final EIS.
- Summarize what relevant information was included in the initial SAR
- Describe supplemental information about the Project, along with other information Jason was able to gather about the project and its impacts
- Conclusions about the Project impacts and recommended mitigation measures.

In their application, KPE has requested that the Board accept the NEPA document that was prepared by the Department of Energy in lieu of a Site Assessment Report. This request was made in accordance with SB 257, Section 4(2)(1). For the purposes of this evaluative report, Jason reviewed both the Kentucky Pioneer FEIS and the Site Assessment Report that was included in the KPE application, as well as the Site Development Plan that was provided in KPE's response to the data request.

C.1 Description of Proposed Facility/Site Development Plan

As required by KRS 278.708(3)(a), the SAR must contain a description of the proposed facility that shall include a proposed site development plan that describes:

1. Surrounding land uses for residential, commercial, agricultural and recreational purposes;
2. The legal boundaries of the proposed site;
3. Proposed access control to the site;
4. The location of facility buildings, transmission lines and other structures;
5. Location and use of access ways, internal roads and railways;
6. Existing or proposed utilities to service the facility;
7. Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), or (5); and
8. Evaluation of the noise levels expected to be produced by the facility.

In the initial submittal of the SAR with the application, KPE failed to include a Site Development Plan (SDP), as required in KRS 278.708(3)(a). In response to the data request, KPE prepared the Site Development Plan, which is now included in the case file¹. The SDP was included in this evaluation.

Each of these requirements is addressed individually below. These evaluations include the information from the applicant's SAR, relative information from the FEIS, additional information obtained by Jason, and an evaluation of the adequacy of the information to meet the requirements of the statutes.

C.1.1 Surrounding land uses. Section 10.3.1 of the SAR presents excerpts from the FEIS. Specifically referring to surrounding land use impacts, the FEIS makes the following statements and/or conclusions:

- The land use resources analysis considers a region of influence (ROI) that includes the 121-hectare (300-acre) project site, as well as the rest of the J.K. Smith Site and surrounding areas. Potential impacts to land use resources were qualitatively assessed by comparing potential land use changes to the existing land use patterns, plans, and policies.²
- The process area has been previously disturbed by EKPC during the initial site preparation for the abandoned construction of the J.K. Smith Power Station in the early 1980s. Preliminary grading and some foundations were completed in the area. The site was originally prepared for a power station that was never completed due to a decrease in the demand for electricity at that time. No effects on surrounding land uses are expected

¹ Kentucky Pioneer Energy, LLC. Response to Board Staff's First Data Request Dated January 13, 2003. January 21, 2003.

² U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement, DOE/EIS-0318, November 2002. p.4-2.

to occur from the construction and operation of the combined-cycle units. The Winchester- Clark County Planning Commission does not consider utility structures when determining zoning for an area. Therefore, the project area will remain zoned agricultural.³

During the Site Visit, Jason evaluated the surrounding land uses by visible inspection. While the KPE project area is completely surrounded by the EKPC site, the EKPC site appears to be completely surrounded by agricultural and forested lands. It would not be anticipated that this project would have an impact on any of these existing land uses.

C.1.2 Legal boundaries. Section 10.3.2 of the SAR refers to the FEIS (Section 4.2) and states, "...the proposed facility is a 300-acre parcel 'fully within' the host 3,120-acre parcel owned by EKPC. The facility legal boundaries are defined by the site-lease with EKPC. There are no 'public' property owners adjacent to the project site."

The Site Development Plan (SDP) states that there is no surveyed delineation of the KPE lease site. Rather, the lease generally identifies the rail loop, other areas, and certain buildings for joint and cooperative use.⁴ Figure C-1 provides an illustration of the site layout and relative locations of the KPE project and the EKPC site boundary.

C.1.3 Access control. In Section 10.3.3 of the SAR, KPE describes the access control by:

Public access to the facility is already limited by the existing fence, gates, and security guard for the J.K. Smith site owned by EKPC. The gate is at State Highway 89, at the back of a large vehicle turn-out area.

The FEIS did not specifically address access control or security for the KPE project.

During the site visit, the aspects of access control and security that currently exist on the EKPC include:

- A main gate at the intersection of the access road and KY 89 was electronically controlled and opened after telephone communication with personnel inside the facility.
- Fencing around the entire EKPC 3,120-acre site with padlocked gates at all points of entry.

³ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement, DOE/EIS-0318, November 2002. p.5-3.

⁴ Kentucky Pioneer Energy, LLC. Site Development Plan for the Integrated Gasification Combined Cycle Plant Located at J.K. Smith in Clark Co. Kentucky. January 2003. p.7.

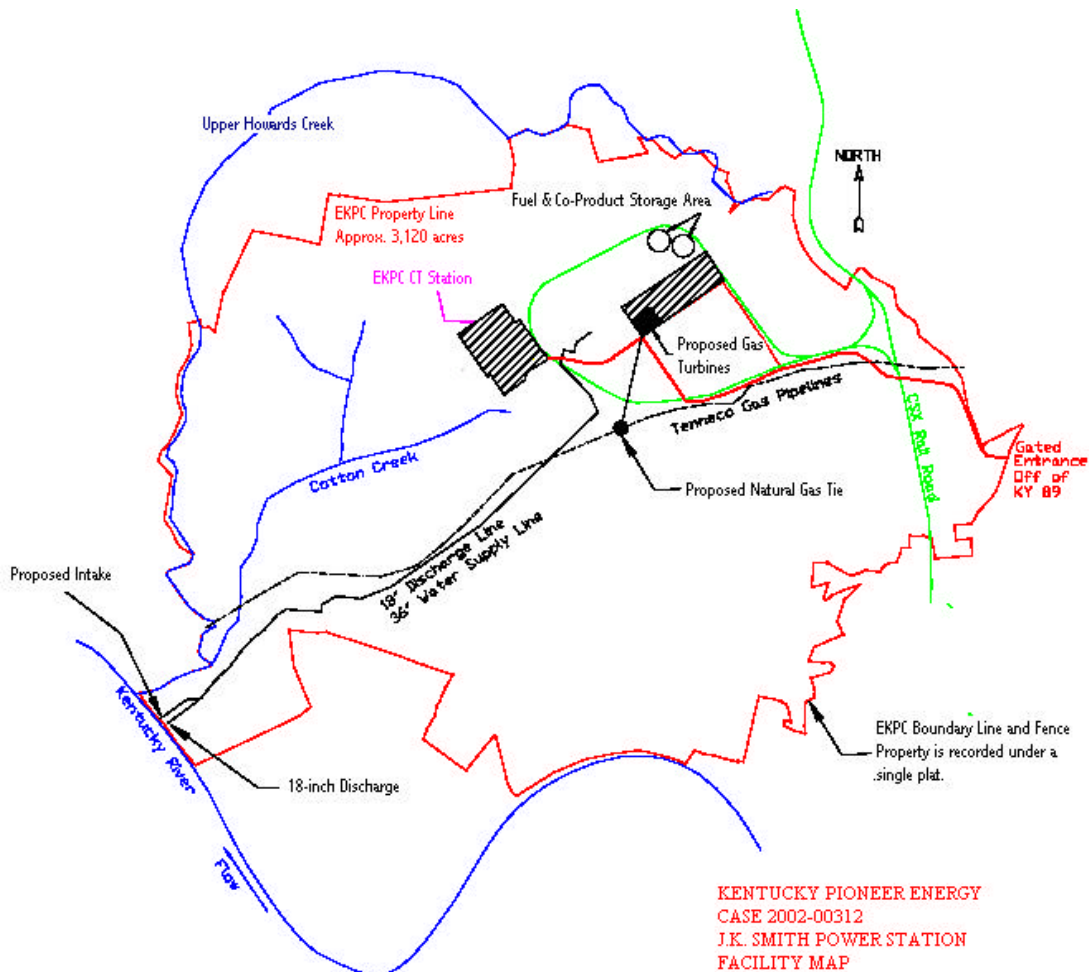


Figure C-1. Proposed Site Layout

C.1.4 Location of buildings, transmission lines and other structures. Section 10.3.4 of the KPE SAR states:

“KPE, as part of its lease arrangement with EKPC, will have joint use of existing buildings at the J.K. Smith site. Detailed KPE site layout plans for structures are not yet developed, though all will be within the parcel leased from EKPC.

A covered feedstock storage structure is planned and reflected in the air permit. An operations control and office building is planned, but its location within the parcel is undecided.

The gasification process and power generation facilities will be generally located within the 300-acre lease parcel, but specific layout plans have not yet been developed, except to support permitting.

Transmission lines are not included in the KPE scope for the project because they are the contractual responsibility of EKPC, who has contracted to receive 100% of the generated power. EKPC transmission lines are separately subject to PSC approval.”

The FEIS for the KPE project provides a rough conceptual sketch of tentative locations for the process area, the rail loop, and the covered coal and RDF storage area in relation to the existing J.K. Smith site, the site intake and discharge location on the Kentucky River, and the entire EKPC property boundaries. These were the locations assumed for evaluation of all the environmental impacts presented in the FEIS.

C.1.5 Location/use of access ways, internal roads and railways. Section 10.3.5 of the KPE SAR presents excerpts from the FEIS along with additional information about the internal road infrastructure. The FEIS describes the road and rail access:⁵

The primary access routes to the ROI [Region of Influence] are Interstates 64 and 75. Interstate 64 is the main east-west artery and passes through Clark and Fayette Counties and the town of Winchester. Interstate 75 is the main north-south artery and passes through Fayette and Madison Counties. Kentucky Highway 627, a two-lane road, is the major north-south access road through Clark County and intersects with Interstate 64 in Winchester. Winchester is the location of the major interchanges for access to the project site. The community of Trapp is typically reached by traveling south from Winchester on Kentucky Highway 89, a two-lane road, for approximately 20.8 kilometers (13 miles). Kentucky Highway 974, another two-lane road, is an alternate route to Trapp from Winchester; however, the road switches from high type paved road to intermediate type paved road approximately 10.4 kilometers (6.5 miles) from Winchester. Trapp can also be accessed by heading east on the two-lane Kentucky Highway 52 from Richmond, in Madison County, and then traveling north on Kentucky Highway 89. The lack of bridges across the Kentucky River near the project location restricts access to the site from other highways. Kentucky Highways 1028 and 3369 are the other main roads in the vicinity of Trapp. The project site is serviced by an approximately 1.6-kilometer (1-mile) long access road that extends west from Kentucky Highway 89. No traffic control devices are in place at the intersection of the access road and Kentucky Highway 89.

The project site is located approximately 0.8 kilometer (0.5 mile) west of a 198-kilometer (123-mile) freight rail line segment that runs between Winchester and Typo, Kentucky. The line segment, identified as number C-273, is owned and operated by CSX Transportation, Inc., of Jacksonville, Florida, and has been operating in the region for an extended period of time. An approximately 5-kilometer (3.1-mile) long rail loop extends from the main freight line into the J.K. Smith Site. The project site also contains extensive rail yard capacity that is linked to the rail loop at several locations.

With regard to internal roadways, EKPC earlier constructed a number of service roads, some currently unpaved, within their property. According to KPE's SAR, these existing roadways will provide ample access to the KPE facility area.

C.1.6 Existing or proposed utilities. Section 10.3.6 of the KPE SAR addresses utilities. Construction and back-up general service power will be obtained from Clark Energy. Site load will normally be self-generated. Start-up power during operations will be obtained from Clark Energy Cooperative. Clark Energy currently provides necessary electrical power to the EKPC J.K. Smith site.⁶

⁵ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. p. 4-37.

⁶ Kentucky Pioneer Energy, LLC. Response to Board Staff's First Data Request Dated January 13, 2003. January 21, 2003.

The site will have its own sanitary and process wastewater treating systems and discharge via a KPDES permit, to be issued by the Natural Resources and Environmental Protection Cabinet.

Water supply will be from EKPC, under its Withdrawal Authority. KPE will install a new water intake structure at the Kentucky River, to replace the existing one, which is of insufficient capacity. KPE has made application to the US Army Corps of Engineers (USACE-Louisville) for this permit.

Natural gas service will be required for startup of the facility. Natural gas pipelines from Tenneco currently traverse the site and are used by EKPC at their J.K. Smith site. KPE has stated that they expect to tie into an existing transmission line within the EKPC site boundary. Initial discussions regarding the tie-in have begun, but a specific tie-in location has not yet been identified. KPE provided a proposed tie-in location on their site layout provided earlier as Figure C-1.⁷

C.1.7 Compliance with applicable setback requirements. The Applicant discusses setback compliance in Section 10.3.7 of their SAR, which refers to Tab 5 of their application.

KRS 278.706(2)(e) provides that the setback requirements are not applicable to sites that currently contain a facility capable of generating 10 megawatts or more. The existing J.K. Smith site has the capability of producing approximately 400 megawatts.

That being said, however, all areas within 2,000 feet of the proposed stack location are owned by EKPC and therefore do not contain any residential neighborhoods, schools, hospitals, or nursing home facilities.

C.1.8 Evaluation of noise levels. The KPE SAR refers to the Final EIS for evaluation and description of the noise level expected at the site. The FEIS⁸ provides the following information:

Methodology used in the EIS

Because project-specific noise data are not available, noise impacts have been evaluated based on generalized equipment and industrial process noise considerations. General considerations of distance based noise attenuation have been used in evaluating off-site noise impacts. Noise from added train operations has been estimated using a passby event noise simulation model.

Noise impacts

Construction activities on the proposed Kentucky Pioneer IGCC Demonstration Project would last for about 30 months. Construction noise generally would be dominated by noise from heavy equipment and heavy trucks. Power tools and other noise sources would make limited contributions to overall construction noise until construction activity shifts to interior building finishing. A conservative estimate of construction site noise has been developed by assuming an average of about 20 heavy equipment items of various types operating in the same general area over a 10-hour workday. Hourly average noise levels during the active workday would average 90 to 92 dBA at 30.5 meters (100 feet) from the worksite. Distance attenuation and atmospheric absorption would reduce construction noise levels at greater distances. Estimated noise levels would be about 71 dBA at 305 meters (1,000 feet), 61 dBA at 62 meters (2,500 feet), 50 dBA at 1.6 kilometers (1 mile), and about 44 dBA at 2.4 kilometers (1.5 miles). Actual noise levels

⁷ Kentucky Pioneer Energy, LLC. Response to Board Staff's First Data Request Dated January 13, 2003. January 21, 2003.

⁸ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. pp. 5-30 through 5-32.

probably would be less than these estimates due to terrain and vegetation effects. There are very few residences within 1.6 kilometers (1 mile) of the project site, and nighttime construction activity is not anticipated. Construction noise levels would be similar to or less than background noise levels at locations beyond the EKPC property. KPE has indicated that the construction workforce will vary in size over the facility construction period, and may be as high as 1,000 for short periods of time. On average, construction activity at the Kentucky Pioneer IGCC Demonstration Project site probably would double current traffic volumes on the adjacent portions of Kentucky Highway 89. Because of the logarithmic nature of decibel units, a doubling of traffic volume would result in a 3 dBA increase in highway traffic noise levels. Additional truck traffic generated by construction activity would produce some additional noise level increases along affected highways.

The major noise sources associated with facility operations are expected to be the gas turbine units and the gasifier units. Other less significant noise sources would include material unloading facilities, conveyor systems, cooling tower operations, rail traffic to and from the facility, and vehicle traffic to and from the facility.

Noise levels inside the turbine buildings would be very high, about 155 dBA. The building enclosing the turbine units would provide a substantial reduction in noise levels at outside locations. Noise levels inside the gasifier building would be relatively high, about 95 dBA. The building enclosing the gasifiers would provide a substantial reduction in noise levels at outside locations. Studies conducted by KPE indicate that operational noise levels are expected to be 62.4 dBA at the perimeter of the project site, 56.5 dBA at the EKPC property boundary, 53.4 dBA at the closest structure outside the EKPC property, and 44.7 dBA in the community of Trapp. The noise levels beyond the EKPC property boundary are compatible with rural residential land uses.

RDF pellets and coal would be brought to the site by rail. The facility would require the equivalent of 25 rail cars per day each of RDF pellets and coal. Actual rail shipments would be done by unit trains, with an average of two RDF trains and two coal trains per week. On average, there would be about one train movement into or out of the site each day, although there might be two train movements on some days. The increased rail traffic required to bring RDF pellets and coal to the site would have only minor effects on noise levels along the affected rail lines. While individual train passbys may be heard over a distance of about 1.6 kilometers (1 mile), effects on ambient day-night average sound levels would be minor. In general, it takes a doubling of noise source activity to cause a 3 decibel (dB) increase in noise levels. One or two additional trains in one day would not be a large increase over existing mainline rail operations, and thus would not have much effect on existing noise levels along the mainline tracks. The incremental noise impacts of typical unit train operations delivering RDF pellets or coal to the project site are summarized in the FEIS.

Vehicle traffic to and from the site would be a minor addition to the noise environment of areas along Kentucky Highway 89. The facility is expected to employ a workforce of 120, distributed into multiple work shifts over a 7-day workweek. Resulting traffic volumes would be less than 80 vehicles at any shift change period. This small increment of additional traffic would not have a significant impact on highway traffic noise conditions in the area.

C.1.9 Conclusions and Recommendations

Based on our review of KPE's SAR and the Department of Energy's Final EIS, Jason has concluded that the applicant has generally complied with the legislative requirements for

describing the facility and site development plan. A couple of areas warrant future examination and discussion.

- The plan for access control and security provided by KPE has not yet been fully developed and should be enhanced as the project progresses. The plan should follow industry standards. It is expected that as the design and layout of the facility become more concrete, this plan and its implementation will follow. It is also expected that, because KPE's site is totally within that owned by EKPC, that KPE will rely on EKPC to provide some, if not all of the access control. The responsibilities of each party in this regard should become well defined and documented.
- With regard to the siting of the additional electrical transmission lines projected to be built by EKPC as a result of this new facility, KPE has stated that the exact route has not yet been determined. This was also the position of the Final EIS; however, the EIS did provide some generic information regarding general direction, typical construction methods, and identification of biologically sensitive areas between the site and the Spencer Road Terminal. The route of the transmission line will follow existing transmission line routing to the extent practicable.

The U.S. Department of Agriculture's Rural Utility Service (RUS) has approval authority for this capacity upgrade. Therefore, the RUS will evaluate the final routing of any transmission lines in accordance with their policies and procedures that implement the National Environmental policy Act (NEPA). Transmission lines of the category expected here (138 kvV) normally require an Environmental Report for the application to be approved (7 CFR 1794.22). Jason does not consider this a weakness or deficiency of KPE's SAR.

C.2 Compatibility with Scenic Surroundings

This section of the SAR review addresses the compatibility of the KPE project with the scenic surroundings. This component of the SAR is identified in KRS 278.708(3)(b).

C.2.1 Information Provided in the Applicant's SAR

The aesthetic and scenic resources of the region of influence were specifically addressed in the FEIS. The following information is drawn from the FEIS:⁹

Affected Environment

The project site is located on the edge of the Outer Bluegrass and Knobs Physiographic Regions. The Knobs Region is characterized by subconical hills while the Bluegrass Region is a central lowland. The project site and surrounding area is managed and owned by EKPC and is located 3.2 kilometers (2 miles) west of the community of Trapp, Kentucky. As discussed previously, additional areas within the 1,263-hectare (3,120-acre) J.K. Smith Site are being utilized by EKPC. Near the project site, EKPC owns and operates five gas turbines. The turbines are located on the J.K. Smith Site approximately 0.8 kilometers (0.5 miles) west of the proposed 121-hectare (300-acre) project site.

Visual Character of the Kentucky Pioneer Project Facility Site

The 121-hectare (300-acre) project site is located within the 1,263-hectare (3,120-acre) J.K. Smith Site that is accessed through a gated perimeter fence and access road. The project site has been previously disturbed. Preliminary grading, primary foundations, fire protection piping, and rail access infrastructure already exist on the site. Although many project facilities are visible from Kentucky Highway 89, all facilities are located approximately 0.8 kilometers (0.5 miles) from the highway.

Scenic Areas

There are 19 designated scenic byways located throughout the State of Kentucky. However, none of these scenic byways are located within Clark or Madison County. There are nine sections of river designated as Kentucky Wild Rivers, which cover approximately 182 kilometers (114 miles). These rivers are characterized by undisturbed shorelines and vistas. The Red River, which runs through the Daniel Boone National Forest, is the closest Kentucky Wild River to the project site. The Daniel Boone National Forest is 24 kilometers (15 miles) east of the project site. A 14.4-kilometer (9-mile) stretch of the Red River, located within the Daniel Boone National Forest, is also designated as a National Wild and Scenic River. The Red River joins the Kentucky River approximately 2.4 kilometers (1.5 miles) south-southeast of the project site.

Aesthetic and Scenic Impacts¹⁰

This section discusses the potential effects of the construction and operation of the Kentucky Pioneer IGCC Demonstration Project facility on aesthetic and scenic resources at the project site and surrounding areas.

Potential impacts to aesthetic and scenic resources include the construction of new structures and/or modifications to existing structures and the potential contribution of air pollutants that may

⁹ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. p. 4-9.

¹⁰ Ibid. pp. 5-11 and 5-12.

alter the view or quality of these resources. The impact analyses for the Proposed Action considered the effects of construction and operation of the Kentucky Pioneer IGCC Demonstration Project on those lands in which the plant is visible.

The proposed combined cycle units would not have any significant impacts on aesthetic and scenic resources. Since the combined cycle units would be built within the J.K. Smith Site, the units would not be visible from outside the site area. The units would most likely not be visible from the high observation position of the top of Pilot Knob State Nature Preserve located 12.8 kilometers (8 miles) east of the project site. The facility will have lighting as required for safety purposes to illuminate stairways and entrances. Lighting will be needed for downward illumination, thus impacts from night lighting should be minimal. In addition, there would be no visible plumes associated with the combined cycle units.

The proposed new facility stacks associated with the gasification island would be approximately 65 meters (213 feet) tall. The upper portions of the stacks would likely be visible from the city of Winchester located 13.4 kilometers (8.3 miles) from the site. In addition, the facility structures would be visible from the 222.5-meter (730-foot) high observation position on top of Pilot Knob State Nature Preserve located 12.8 kilometers (8 miles) east of the project site. The facility would also be visible from the community of Trapp located approximately 3.2 kilometers (2 miles) east of the project site. The facility stacks will have a strobe light to meet the Federal Aviation Administration lighting requirements. The facility will also have lighting as required for safety purposes to illuminate stairways and entrances. Lighting will be hooded for downward illumination, thus impacts from night lighting should be minimal. In addition, the proposed facility would not have any significant impacts on the aesthetic and scenic resources at the Daniel Boone National Forest or at the Red River.

There would be visible plumes associated with the cooling towers. The visibility of the plumes would be dependent upon the weather and wind patterns, and the location of the viewer within the general topography of the area. The plumes would most likely be visible from the community of Trapp, the Pilot Knob State Nature Preserve, and up to 12.8 kilometers (8 miles) from the J.K. Smith Site.

In the event of an uncontrollable pressure buildup within the gasification system, the synthesis gas (syngas) would be routed to an emergency flare. The emergency flare would release the pressure on the system by burning the excess syngas. Facility design has yet to be completed and the location of the emergency flare vent has not been indicated. For this analysis, the worst-case scenario would be to locate the flare vent at or near the top of the 65 meter (213 feet) tall gasification facility stacks. During an emergency flare release, the flare would be visible from the same distances as the facility stacks, as described earlier. The emergency flare would be an infrequent event of short duration and, as such, would not have a lasting effect on the aesthetics and scenic resources of the project site area. It is possible for emergency flares to occur at night, resulting in brief periods of additional lighting near the facility. The short duration of these events, however, should not have any significant impact to local residents other than brief periods of minor illumination.

Construction of the facility would produce dust that may affect visibility temporarily in the local construction areas. Dust control measures would be implemented to minimize impacts.

C.2.2 Supplemental Investigations, Research and Analysis

During the site visit, Jason personnel evaluated the impacts to the aesthetic and scenic resources described in the FEIS. In a few instances, there is disagreement with statements made in the FEIS; however, there is no disagreement with the lack of significance of the reported impacts.

The site visit occurred in mid December, thus the deciduous vegetation of the area was bare, thus allowing for the greatest visibility from surrounding properties, Pilot Knob State Nature Preserve, and Winchester. The site and surrounding areas were observed both in daylight and nighttime conditions. The following points were noted during the site visit:

- The proposed KPE project site is located in a relatively flat area east of the existing EKPC power generation facilities and is virtually surrounded by rolling terrain. This eliminates direct visibility for the majority of landowners in the area surrounding the EKPC property.
- Just east of the EKPC property, on top of a ridge between the property and Kentucky Highway 89, stands a water tank owned by the East Clark County Water District. The tank is approximately 12 feet in diameter and 100 feet tall. It is painted dark blue. The top of the tank is at an elevation of approximately 1,017 feet above sea level and can be seen from most of the surrounding area.¹¹
- The existing J.K. Smith stacks and combustion turbine facilities are light colored and are visible from some properties north of the EKPC property along KY Highway 974 approximately 3 miles from the project site. They were also visible from the observation position on top of Pilot Knob State Nature Preserve. We were unable to find any location in Winchester, KY that allowed a clear line of sight to the existing stack structures. The tops of the existing EKPC stacks are at 900 and 950 feet above sea level.¹² The top elevation of the proposed facility stack would be at approximately 1,000 feet.
- The western view from Pilot Knob State Nature Preserve was very scenic. In the distance, approximately 8 miles away, an observer can make out the existing stacks of the J.K. Smith site and the East Clark County water tower. One can also see the Tennessee Gas Pipeline Compressor Station No. 106 along close to the same sight line, less than 2 miles away. The incremental impact of the proposed facility to the viewshed from this location is insignificant.
- During a nighttime visit to the area surrounding the EKPC property, one can observe the existing industrial lighting of the J.K. Smith site. This was visible only from north of the site, as mentioned above. The additional facility lighting and potential stack lighting would be directed downward and is not anticipated to provide any additional significant impact to the night lighting of the area.

C.2.3 Conclusions and Recommendations

The topography and vegetation, coupled with the baseline setting of an existing power plant site renders the KPE project site, including the stack, compatible with its scenic surroundings. Visual effects from the cooling tower plumes and stack emissions are likely to be negligible. Selecting a color for the stack to best fit with the surrounding view according to typical background conditions would minimize the incremental impact from the various viewsheds in the area.

¹¹ Kentucky Infrastructure Authority. Water Resource Information System. East Kentucky Water District Tank KY-89.

¹² Kentucky Pioneer Energy, LLC. Response to Board Staff's First Data Request Dated January 13, 2003. January 21, 2003.

C.3 Potential Changes in Property Values for Adjacent Property Owners

The socioeconomic impacts associated with the proposed Kentucky Pioneer Energy project have been evaluated as part of the NEPA process in the Final EIS. The specific requirement to evaluate the potential change in property values for adjacent property owners is contained in KRS 278.708(3)(c).

C.3.1 Information Provided in the Applicant's SAR

The region of influence (ROI) considered in the Department of Energy's analysis was the 3-county region of Fayette, Clark, and Madison Counties. The factors that were considered in the analysis included employment, income, population, housing, and the availability of community services. The FEIS also included a discussion of the potential for impacts to land values in the region immediately surrounding the property site.

Specifically, the FEIS states that, "Appraisal methods used to estimate land values are based on objective characteristics of the property and any improvements. The impact that the presence of a nearby aboveground facility may have on the value of the land depends on many factors including size, existence of other facilities, current value of the land, its location, current land use, and emotional response. A potential purchaser of a property would make a decision to purchase based on the planned use (such as agricultural, future subdivision, or home) of the property in question. For this analysis, impacts to property values are estimated based on the factors that may affect a potential purchaser of the land."¹³

As discussed earlier, the facility would not be visible outside of the boundaries of the 1,263-hectare (3,120-acre) J.K. Smith Site, with the exception of areas directly north of the property near Kentucky Highway 974. Since the presence of an aboveground facility disrupts the visual aesthetics, a potential purchaser may decide not to purchase the property. However, each potential purchaser has a different goal and ability to purchase land. The presence of the facility may influence a potential purchaser of property located near the facility. The proposed facility would be located approximately 1.6 kilometers (1.0 miles) from the nearest tract available to a potential buyer, which is the nearest residence. The distance of the facility from nearby tracts of land should mitigate effects on potential buyers. Under the Proposed Action, the disruption to the viewshed caused by the gasifier stacks may result in negative impacts to property values for areas near the facility; however, there is no established method for determining the exact quantitative impacts to property values from an action because the value is based on numerous factors.¹⁴

C.3.2 Additional Socioeconomic Analysis

As mentioned above, the Department of Energy considered more than just property values when they prepared the socioeconomic impacts for the FEIS. The additional discussion is included here for a broader perspective.¹⁵

Construction Phase

¹³ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. pp. 5-4 and 5-5.

¹⁴ Ibid. p. 5-6.

¹⁵ Ibid. pp. 5-6 and 5-7.

Under the Proposed Action, the gasification technology facilities, two combined cycle units, fuel storage area, rail car loading and unloading areas, and all required associated support equipment would be constructed at project site. The Proposed Action would cost \$414 million and would take 30 months to construct. The project would employ an average construction work force of 600 people, which could expand to 1,000 during periods of peak construction activity. The creation of 600 new jobs in Clark County and the associated new income would indirectly create 690 new jobs throughout the ROI [region of influence] for the 30-month construction period. The expansion of the construction work force to 1,000 employees during periods of peak construction would add an additional 460 jobs to the ROI. The Proposed Action would result in approximately \$56.7 million in direct new income and \$53.2 million in indirect new income for the 30-month construction period. These figures would increase depending upon the duration of peak construction activity. Each month that the construction phase would require peak work forces, an additional \$1.3 million in direct income and \$1.2 million in indirect income would be generated.

The unemployment rate for the ROI is 2.1 percent, which is relatively low. Most economists feel that a healthy unemployment rate is closer to 4 or 5 percent. The low unemployment rate places a strain on companies seeking to hire employees for a permanent or temporary basis, as workers are not available to take new positions. However, the unemployment rate should not be an issue with regards to the construction of the facility. Construction, by its very nature, employs workers on a temporary basis, therefore, once the structure is completed, the worker must find a new job. According to the County Business Patterns for the ROI, 10,828 people were employed in the construction industry within the ROI in 1998. Of these, 1,677 were employed in the category of heavy construction, which includes industrial and utility facility construction. This establishes a labor pool within the ROI adequate to employ the 600 workers required during average construction periods.

Expansion to peak construction levels may put a strain on the local construction labor pool, as it is somewhat optimistic to assume that nearly half of all construction workers in the ROI would be employed on the same project. Therefore, peak periods of construction may require an influx of labor into the ROI for brief periods of time. As established in Section 4.3 [of the FEIS], Socioeconomics, the housing characteristics of the ROI indicate that existing housing capacity should adequately accommodate a temporary influx of workers and no significant impacts would be felt. Workers entering the ROI on a temporary basis would most likely seek residence in a rental unit. The ROI has a 9.5 percent vacancy rate, or over 5,000 vacant units available for occupancy. Existing community services, including schools, hospitals, and fire and police services, would not be significantly affected since most of the construction workers would come from within the ROI and any influx would be of short duration.

The indirect employment created by the project would put more of a strain on local resources, as these jobs would be more difficult to fill from the existing labor pool of the ROI. During periods of average construction activity, 690 jobs would be indirectly created. This number would increase to 1,150 during peak periods of construction. Peak periods would be temporary by nature and, therefore, the larger number of indirect jobs created by peak work forces would also be on a temporary basis. The large majority of the indirect jobs created would be in the retail and services industries.

According to the unemployment figures presented in Section 4.3 [of the FEIS], Socioeconomics, a total of 4,229 individuals were unemployed in the ROI in 2000. This figure represents active job seekers in the labor pool who are not currently employed. This

figure, however, does not capture the potential labor supply, which are individuals not currently seeking employment who would work should jobs become available. The Winchester Labor Market Area Statistics estimate that over 3,700 individuals fall into this category in the ROI. Another factor that would assist in mitigating the socioeconomic impacts of the creation of 2,150 total (1,000 direct and 1,150 indirect) jobs during periods of peak construction at the site is the future labor supply. This figure represents individuals who will become 18 years of age between 2001 and 2005. Assuming a constant rate over the 5-year period, 4,000 new individuals will be added to the labor supply each year in the ROI.

The addition of new individuals to the labor supply in coming years and the large number of individuals in the potential labor supply category will help fill the jobs created both directly and indirectly by the construction of the facility. All individuals already living within the ROI who gain employment from this project will not impact the existing community services and housing levels as they are already included in the descriptions established in Section 4.3 [of the FEIS], Socioeconomics. It is likely, however, that individuals would come from outside the ROI to fill some of the newly created jobs. Any influx is expected to be relatively small in size and should have little to no impact on existing community services. Minor impacts may include an increase in classroom sizes in area schools and the need for additional police or fire service employees. Additional tax revenue generated by the project would be enough to employ additional staff at the Clark County Sheriff's Office. All of the fire services in the ROI utilize volunteer companies. Additional volunteers would be adequate to handle any additional strain on fire resources. A new Clark County Fire Station is scheduled to be built near the J.K. Smith Site in the near future. Existing housing vacancy rates indicate that there is enough housing available in the ROI to accommodate any workers who move into the area.

The project location, 3.2 kilometers (2 miles) west of Trapp, Kentucky, is somewhat isolated. The population of Trapp is very small with approximately 100 people. At periods of peak construction, ten times as many people would be employed onsite than live in the closest community. The size and location of the project site would not be sufficient to meet the needs (i.e., food) of the large number of people employed during the construction phase. Winchester, with a population of 15,800, is the closest town to the project site of sufficient size to supply the needs of workers at the site. A combination of the following two significant impacts would occur: (1) increased traffic on local roads to and from Winchester; and (2) an influx of businesses to the community of Trapp. The first impact is addressed in Section 5.11 [of the FEIS], Traffic and Transportation. An increase in businesses in Trapp would benefit the community by bringing extra income to the area. Employment generated by these businesses is a specific example of indirect jobs associated with the project and the effects of the new employment are included in the indirect impact analysis. The extent of the impact is directly related to the amount of employment at the project site. During periods of peak construction, there would be greater demand for services at the project site, and thus, more businesses would operate in Trapp and more jobs would be created in the restaurants. During the operations phase of the project, less people would be employed onsite and, thus, there would be less demand for food services near the site.

Operations Phase

The completed facility is scheduled to be in service for 20 years. The Proposed Action would employ 120 workers onsite in Clark County. This would result in the indirect creation of 270 jobs in the ROI. The creation of 120 jobs at the facility would create approximately \$5.6 million and \$6.2 million in direct and indirect new income annually, respectively. All direct and indirect jobs created by the operation of the facility would be filled from the labor pool in

the ROI since all jobs associated with the construction phase of the project would cease to exist once construction has been completed and those previously employed individuals would be able to fill new jobs. All individuals who moved into the ROI to fill employment opportunities during the construction phase would most likely move out of the ROI once construction has ended, leaving community services and housing at similar levels prior to their arrival. These are adequate to meet the needs of all individuals employed directly or indirectly by the operation of the facility. Construction workers would likely find employment on other construction projects. Unemployment would likely rise slightly in the ROI with the shrinking of job opportunities during the operations phase. This is not a serious concern, however, since it would not cause a rise above 4 percent, which is an acceptable level in a healthy economy.

C.3.3 Conclusions and Recommendations

As mentioned previously, the proposed KPE project will be sited on land that currently contains power generation capabilities with five 80-megawatt combustion turbine peaking units. The new project will not change the land use or aesthetic value of the property from its current state. As reported in the FEIS, the project would have positive impacts on the region from an employment and income perspective, both directly and indirectly. The potential effects of the project on the region have been adequately addressed.

C.4 Expected Noise from Construction and Operation

This section evaluates the SAR studies and conclusions concerning peak and average noise levels associated with KPE's construction and operation. These requirements are identified in KRS 278.708(3)(d).

C.4.1 Information Provided in the Applicant's SAR

Kentucky Pioneer Energy (KPE) relied upon the noise analyses prepared as part of the FEIS on this project. The FEIS presents the baseline conditions and methodology and then describes the results of the analysis.

Methodology and Baseline Noise Conditions¹⁶

Noise Terminology. Sound is caused by vibrations that generate waves of air pressure fluctuations in the air. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second or Hertz. Different vibrational frequencies produce different tonal qualities for the resulting sound. In general, sound waves travel away from the noise source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source.

Sound level meters typically report measurements as a composite decibel (dB) value. Decibel scales are a logarithmic index based on ratios between a measured value and a reference value. In the field of atmospheric acoustics, dB scales are based on ratios of the actual pressure fluctuations generated by sound waves compared to a standard reference pressure value of 20 micropascals (4.18×10^{-7} pounds per square foot).

Modern sound level meters measure the actual air pressure fluctuations at a number of different frequency ranges, most often using octave or 1/3-octave intervals. The pressure measurements at each frequency interval are converted to a decibel index and adjusted for a selected frequency weighting system. The adjusted decibel values for the different octave or 1/3-octave bands are then combined into a composite sound pressure level for the appropriate decibel scale.

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hertz, and is least sensitive to sound frequencies below 400 Hertz or above 12,500 Hertz. Several different frequency weighting schemes have been developed, using different dB adjustment values for each octave or 1/3-octave interval. Some of these weighting schemes are intended to approximate the way the human ear responds to noise levels; others are designed to account for the response of building materials to airborne vibrations and sound. The most commonly used decibel weighting schemes are the A-weighted and C-weighted scales.

The "A-weighted" decibel scale (dBA) is normally used to approximate human hearing response to sound. The dBA scale significantly reduces the measured pressure level for low frequency sounds while slightly increasing the measured pressure level for some middle frequency sounds. The "C-weighted" decibel scale (dBC) is often used to characterize low frequency sounds capable

¹⁶ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. pp. 4-34 through 4-36.

of inducing vibrations in buildings or other structures. The dBC scale makes only minor reductions to the measured pressure level for low frequency components of a sound while making slightly greater reductions to high frequency components than does the dBA scale.

Common Noise Descriptors. Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (L_{eq}) are used to develop single-value descriptions of average noise exposure over various periods of time. Such average noise exposure ratings often include additional weighting factors for annoyance potential due to time of day or other considerations. The L_{eq} data used for these average noise exposure descriptors are generally based on dBA sound level measurements, although other weighting systems are used for special conditions (such as blasting noise).

Average noise exposure over a 24-hour period is often presented as a day-night average sound level (L_{dn}). L_{dn} values are calculated from hourly L_{eq} values, with the L_{eq} values for the nighttime period (10 p.m. to 7 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises. Unless specifically noted otherwise, L_{dn} values are assumed to be based on dBA measurements.

Working With Decibel Values. The nature of dB scales is such that individual dB ratings for different noise sources cannot be added directly to give the dB rating of the combination of these sources. Two noise sources producing equal dB ratings at a given location will produce a composite noise level 3 dB greater than either sound alone. When two noise sources differ by 10 dB, the composite noise level will be only 0.4 dB greater than the louder source alone. Most people have difficulty distinguishing the louder of two noise sources that differ by less than 1.5 to 2 dB. In general, a 10 dB increase in noise level is perceived as a doubling in loudness. A 2 dB increase represents a 15 percent increase in loudness, a 3 dB increase is a 23 percent increase in loudness, and a 5 dB increase is a 41 percent increase in loudness.

When distance is the only factor considered, sound levels from an isolated noise source will typically decrease by about 6 dB for every doubling of distance away from the noise source. When the noise source is essentially a continuous line (e.g., vehicle traffic on a highway), noise levels decrease by about 3 dB for every doubling of distance.

Guidelines for Interpreting Noise Levels. The Federal Noise Control Act of 1972 (Public Law 92-574) established a requirement that all federal agencies must administer their programs in a manner that promotes an environment free from noise that jeopardized public health or welfare. The EPA was given the responsibility for providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce. The federal Noise Control Act also directed that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations.

Although EPA was given major public information and federal agency coordination roles, each federal agency retains authority to adopt noise regulations pertaining to agency programs. EPA can require other federal agencies to justify their noise regulations in terms of the federal Noise Control Act policy requirements. The Occupational Safety and Health Administration (OSHA) retains primary authority for setting workplace noise exposure standards. Due to aviation safety

considerations, the Federal Aviation Administration retains primary jurisdiction over aircraft noise standards.

To coordinate with the requirements of the federal Noise Control Act, EPA has identified indoor and outdoor noise limits to protect public health and welfare (hearing damage, sleep disturbance, and communication disruption). Outdoor L_{dn} values of 55 dB and indoor L_{dn} values of 45 dB are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and health care areas. Noise level criteria to protect against hearing damage in commercial and industrial areas are identified as 24-hour L_{eq} values of 70 dB (both outdoors and indoors).

The U.S. Department of Housing and Urban Development has established guidelines for evaluating noise impacts on residential projects seeking financial support under various grant programs (44 Federal Register [FR] 135). Sites are generally considered acceptable for residential use if they are exposed to outdoor L_{dn} values of 65 dB or less. Sites are considered “normally unacceptable” if they are exposed to outdoor L_{dn} values of 65-75 dB. Sites are considered unacceptable if they are exposed to outdoor L_{dn} values above 75 dB.

Existing Noise Conditions. Studies conducted in 1979 for the J.K. Smith Power Station included ambient noise monitoring at several locations on or near the EKPC property. Locations that were not influenced by highway traffic had L_{dn} levels of 39 to 55 dBA. Locations along Kentucky Highway 89 had L_{dn} levels of 52 to 69 dBA. Average daytime noise levels were generally similar to or slightly higher than the L values. Average nighttime noise levels were typically much lower than daytime values, often being close to 30 dBA. The noise levels reported for the project vicinity during 1979 are typical of quiet rural areas. EKPC has constructed five 80-megawatt combustion turbine units near the Kentucky Pioneer IGCC Demonstration Project Site. Noise monitoring conducted by EKPC since 1992 confirms that the noise data collected in 1979 are still representative of ambient noise conditions. The measured noise level at the perimeter of the EKPC combustion turbine site was 39 dBA on July 30, 1999, with three turbine units in operation.

With regard to the results of the analysis, the FEIS reported:¹⁷

Methodology. Because project-specific noise data are not available, noise impacts have been evaluated based on generalized equipment and industrial process noise considerations. General considerations of distance based noise attenuation have been used in evaluating off-site noise impacts. Noise from added train operations has been estimated using a passby event noise simulation model. The closest portion of Kentucky Highway 89 is about 1.6 kilometers (1 mile) from the project site, and the community of Trapp is about 3.2 kilometers (2 miles) from the main facility site.

Noise impacts. Construction activities on the proposed Kentucky Pioneer IGCC Demonstration Project would last for about 30 months. Construction noise generally would be dominated by noise from heavy equipment and heavy trucks. Power tools and other noise sources would make limited contributions to overall construction noise until construction activity shifts to interior building finishing. A conservative estimate of construction site noise has been developed by assuming an average of about 20 heavy equipment items of various types operating in the same general area over a 10-hour workday. Hourly average noise levels during the active workday

¹⁷ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. pp. 5-31 and 5-32.

would average 90 to 92 dBA at 30.5 meters (100 feet) from the worksite. Distance attenuation and atmospheric absorption would reduce construction noise levels at greater distances. Estimated noise levels would be about 71 dBA at 305 meters (1,000 feet), 61 dBA at 62 meters (2,500 feet), 50 dBA at 1.6 kilometers (1 mile), and about 44 dBA at 2.4 kilometers (1.5 miles). Actual noise levels probably would be less than these estimates due to terrain and vegetation effects. There are very few residences within 1.6 kilometers (1 mile) of the project site, and nighttime construction activity is not anticipated. Construction noise levels would be similar to or less than background noise levels at locations beyond the EKPC property. KPE has indicated that the construction workforce will vary in size over the facility construction period, and may be as high as 1,000 for short periods of time. On average, construction activity at the Kentucky Pioneer IGCC Demonstration Project site probably would double current traffic volumes on the adjacent portions of Kentucky Highway 89. Because of the logarithmic nature of decibel units, a doubling of traffic volume would result in a 3 dBA increase in highway traffic noise levels. Additional truck traffic generated by construction activity would produce some additional noise level increases along affected highways.

The major noise sources associated with facility operations are expected to be the gas turbine units and the gasifier units. Other less significant noise sources would include material unloading facilities, conveyor systems, cooling tower operations, rail traffic to and from the facility, and vehicle traffic to and from the facility.

Noise levels inside the turbine buildings would be very high, about 155 dBA. The building enclosing the turbine units would provide a substantial reduction in noise levels at outside locations. Noise levels inside the gasifier building would be relatively high, about 95 dBA. The building enclosing the gasifiers would provide a substantial reduction in noise levels at outside locations. Studies conducted by KPE indicate that operational noise levels are expected to be 62.4 dBA at the perimeter of the project site, 56.5 dBA at the EKPC property boundary, 53.4 dBA at the closest structure outside the EKPC property, and 44.7 dBA in the community of Trapp. The noise levels beyond the EKPC property boundary are compatible with rural residential land uses.

RDF pellets and coal would be brought to the site by rail. The facility would require the equivalent of 25 rail cars per day each of RDF pellets and coal. Actual rail shipments would be done by unit trains, with an average of two RDF trains and two coal trains per week. On average, there would be about one train movement into or out of the site each day, although there might be two train movements on some days. The increased rail traffic required to bring RDF pellets and coal to the site would have only minor effects on noise levels along the affected rail lines. While individual train passbys may be heard over a distance of about 1.6 kilometers (1 mile), effects on ambient day-night average sound levels would be minor. In general, it takes a doubling of noise source activity to cause a 3 decibel (dB) increase in noise levels. One or two additional trains in one day would not be a large increase over existing mainline rail operations, and thus would not have much effect on existing noise levels along the mainline tracks. The incremental noise impacts of typical unit train operations delivering RDF pellets or coal to the project site are summarized in the FEIS.

Vehicle traffic to and from the site would be a minor addition to the noise environment of areas along Kentucky Highway 89. The facility is expected to employ a workforce of 120, distributed into multiple work shifts over a 7-day workweek. Resulting traffic volumes would be less than 80 vehicles at any shift change period. This small increment of additional traffic would not have a significant impact on highway traffic noise conditions in the area.

C.4.2 Conclusions and Recommendations

The topography and vegetation, coupled with the baseline setting of the EKPC property, will serve to substantially reduce noise impacts from the project site itself. Noise impacts from the pumps at the water intake structure are uncertain, but are unlikely to be considerable. Noise from the traffic will not be substantially negative compared to baseline conditions. The noise from the train operations will not be significantly increased over the current baseline conditions. The FEIS recommends certain mitigative measures to minimize the impacts from increased project related noise. These are discussed below.

Recommended mitigation. As noted in the FEIS, mitigation measures to minimize noise impacts would be implemented. Buildings housing the gas turbine units should be designed to ensure a substantial reduction in noise transmitted to the outside. A reduction of gas turbine noise to 95 dBA or less, adjacent to the outside of the building, should be considered a basic design requirement. In addition, the building housing the gasifiers should be designed to ensure a significant reduction in noise transmitted to the outside. A reduction of gasifier noise to 65 dBA or less, adjacent to the outside of the building, would be considered a basic design requirement.¹⁸

¹⁸ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. p. 5-55.

C.5 Impacts on Land-based Transportation

This portion of the SAR review examines the KPE impacts on roads and rail. This relates to traffic effects, such as congestion, safety, degradation of the roads or rail and fugitive dust. The specific requirement to evaluate these impacts is contained in KRS 278.708(3)(e).

C.5.1 Information Provided in the Applicant's SAR

KPE relied upon the transportation analyses prepared as part of the FEIS on this project. The FEIS presents the baseline conditions and methodology and then describes the results of the analysis.

Baseline Conditions¹⁹

Roadways. The primary access routes to the ROI are Interstates 64 and 75. Interstate 64 is the main east-west artery and passes through Clark and Fayette Counties and the town of Winchester. Interstate 75 is the main north-south artery and passes through Fayette and Madison Counties. Kentucky Highway 627, a two-lane road, is the major north-south access road through Clark County and intersects with Interstate 64 in Winchester. Winchester is the location of the major interchanges for access to the project site. The community of Trapp is typically reached by traveling south from Winchester on Kentucky Highway 89, a two-lane road, for approximately 20.8 kilometers (13 miles). Kentucky Highway 974, another two-lane road, is an alternate route to Trapp from Winchester; however, the road switches from high type paved road to intermediate type paved road approximately 10.4 kilometers (6.5 miles) from Winchester. Trapp can also be accessed by heading east on the two-lane Kentucky Highway 52 from Richmond, in Madison County, and then traveling north on Kentucky Highway 89. The lack of bridges across the Kentucky River near the project location restricts access to the site from other highways. Kentucky Highways 1028 and 3369 are the other main roads in the vicinity of Trapp. The project site is serviced by an approximately 1.6-kilometer (1-mile) long access road that extends west from Kentucky Highway 89. No traffic control devices are in place at the intersection of the access road and Kentucky Highway 89.

Current and recent daily traffic loads for roads from Winchester and Madison to Trapp are presented in Table C-1. All data were obtained from the Kentucky Transportation Cabinet's Traffic Counts searchable database computer program, which provides historic traffic count data for Interstates and Kentucky and County Highways throughout the state. The Actual Count data presented in the table are the average number of car trips per 24 hours for that particular road segment. The mileposts (MP) presented in the table are those established by the Kentucky Transportation Cabinet for the purposes of collecting traffic counts. The site access road intersects Kentucky Highway 89 between MP 2.9 and MP 4.8. Data are only presented to MP 9.7 for Kentucky Highway 974 because the highway turns to the north at that point while Red River Road continues southeast toward the community of Trapp. No traffic studies are available for Red River Road. Data for Kentucky Highway 52 is presented from the intersection with Interstate 75 to the intersection with Kentucky Highway 89 in Estill County. Capacity data for Kentucky Highways are unavailable, as no capacity studies have been completed.

¹⁹ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. pp. 4-37 and 4-38.

Table C-1. Existing Traffic Level for Main Roads Approaching and Located in Trapp, Kentucky.

Highway Number	Functional Class	City	County	Beginning MP	Ending MP	Actual Count	Year	Estimated Count, 2001
Winchester to Trapp								
89	Rural-Major Collector	Trapp	Clark	2.9	4.8	1,554	2000	1,520
89	Rural-Major Collector	N/A	Clark	4.8	9.2	2,252	2000	2,270
89	Rural-Major Collector	N/A	Clark	9.2	12.6	2,642	2000	2,690
89	Rural-Major Collector	N/A	Clark	12.6	13.7	3,730	2000	3,680
89	Rural-Major Collector	Winchester	Clark	13.7	14.9	3,880	1995	4,110
89	Urban-Minor Arterial	Winchester	Clark	14.9	15.4	6,743	1995	6,240
89	Urban-Minor Arterial	Winchester	Clark	15.4	16.0	10,192	1995	10,600
974	Urban-Minor Arterial	Winchester	Clark	0.0	0.2	4,163	1999	4,210
974	Urban-Minor Arterial	Winchester	Clark	0.2	0.4	2,226	1995	2,370
974	Urban-Minor Arterial	Winchester	Clark	0.4	1.0	2,516	1999	2,540
974	Rural-Major Collector	Winchester	Clark	1.0	3.1	1,745	1995	1,900
974	Rural-Major Collector	N/A	Clark	3.1	4.0	1,080	1999	1,110
974	Rural-Major Collector	N/A	Clark	4.0	6.5	630	1995	669
974	Rural-Major Collector	N/A	Clark	6.5	9.7	200	1999	211
Richmond to Trapp-								
52	Urban-Other Principal Arterial	N/A	Madison	8.3	10.5	8,023	1997	8,400
52	Urban-Other Principal Arterial	Richmond	Madison	10.5	10.8	13,189	1997	13,100
52	Urban-Other Principal Arterial	Richmond	Madison	10.8	10.9	15,907	2000	16,000
52	Urban-Minor Arterial	Richmond	Madison	10.9	11.2	18,390	1998	19,800
52	Urban-Minor Arterial	Richmond	Madison	11.2	11.4	29,090	1997	31,600
52	Urban-Minor Arterial	Richmond	Madison	11.4	11.9	21,281	1997	22,100
52	Urban-Minor Arterial	Richmond	Madison	11.9	12.2	5,493	1997	5,140
52	Urban-Minor Arterial	Richmond	Madison	12.2	13.0	6,636	2000	6,800
52	Urban-Minor Arterial	Richmond	Madison	13.0	13.9	18,023	2000	18,400
52	Rural-Major Collector	N/A	Madison	13.9	15.4	16,738	2000	17,100
52	Rural-Major Collector	N/A	Madison	15.4	17.8	13,209	2000	13,600
52	Rural-Major Collector	N/A	Madison	17.8	19.8	10,143	1998	10,800
52	Rural-Major Collector	N/A	Madison	19.8	22.9 ^a	8,022	1998	8,550
52	Rural-Major Collector	N/A	Estill	0.0 ^a	2.1	7,332	1998	7,930
52	Rural-Major Collector	N/A	Estill	2.1	3.7	9,427	1999	10,200
52	Rural-Major Collector	N/A	Estill	3.7	5.4	7,357	1999	8,240
52	Rural-Major Collector	N/A	Estill	5.4	5.9	11,434	1999	11,900
52	Rural-Major Collector	Irvine	Estill	5.9	6.7	10,711	1998	12,500
52	Rural-Major Collector	Irvine	Estill	6.7	11.3	18,284	1999	19,000
89	Rural-Major Collector	Irvine	Estill	11.3	11.4	19,734	1996	22,300
89	Rural-Major Collector	Irvine	Estill	11.4	11.5	13,905	1999	14,200
89	Rural-Major Collector	Irvine	Estill	11.5	11.6	13,132	1999	13,200
89	Rural-Major Collector	Irvine	Estill	11.6	11.8	16,277	1999	16,800
89	Rural-Major Collector	Irvine	Estill	11.8	11.9	7,059	1998	8,410
89	Rural-Major Collector	Irvine	Estill	11.9	13.0	13,209	1996	13,800
89	Rural-Major Collector	N/A	Estill	13.0	14.2	6,419	1997	6,470
89	Rural-Major Collector	N/A	Estill	14.2	17.9	4,498	1998	4,830
89	Rural-Major Collector	N/A	Estill	17.9	18.6	1,749	1999	1,870
89	Rural-Major Collector	N/A	Estill	18.6	22.5 ^b	1,269	2000	1,250
89	Rural-Major Collector	N/A	Clark	0.0 ^b	2.9	1,269	2000	1,250
Trapp								
1028	Rural-Local	N/A	Clark	0.0	1.7	182	1999	191
1028	Rural-Local	N/A	Clark	1.7	4.0	118	2000	112
3369	Rural-Minor Collector	N/A	Clark	0.0	1.3	440	1999	450
3369	Rural-Minor Collector	N/A	Clark	1.3	2.6	593	1995	611

Notes: The MPs on Highways 89 and 974 in Clark County run in opposite directions. Highway 89 terminates in Winchester while Highway 974 originates in Winchester. The site access road intersects Highway 89 between MP 2.9 and MP 4.8.

^aMP 0.0 on Highway 52 in Estill County is the same as MP 22.9 in Madison County (Estill/Madison County Border)

^bMP 0.0 on Highway 89 in Clark County is the same as MP 22.5 in Estill County (Clark/Estill County Border)

Railroads. The project site is located approximately 0.8 kilometer (0.5 mile) west of a 198-kilometer (123-mile) freight rail line segment that runs between Winchester and Typo, Kentucky. The line segment, identified as number C-273, is owned and operated by CSX Transportation, Inc., of Jacksonville, Florida, and has been operating in the region for an extended period of time. Existing rail traffic data for the line as reported in the Proposed Conrail Acquisition Final Environmental Impact Statement averages 13.1 freight trains per day. An approximately 5-kilometer (3.1-mile) long rail loop extends from the main freight line into the J.K. Smith Site. The project site also contains extensive rail yard capacity that is linked to the rail loop at several locations.

FEIS Transportation Analysis Results²⁰

Methodology

Impacts are analyzed in comparison to traffic data for the region of influence. As stated above, capacity studies have not been conducted for the specific highways analyzed. Based on capacity studies conducted on similar roads throughout the country, the capacity for all roads in this analysis is assumed to be 1,000 vehicle trips per hour. Recent and estimated road traffic data for routes most likely to be traveled to the project site from the main traffic arteries is presented in Table 1. For the purposes of presenting a worst-case bounding study, it is assumed that all vehicle trips occur during 12 daylight hours, half of the estimated counts are traveling in each direction. Half of the trips taken in each direction occur during one of two 2-hour commuting periods. The commuting periods are established as 7:30 a.m. to 9:30 a.m. for the morning commute, and 4:30 p.m. to 6:30 p.m. for the evening commute. For example, the year 2001 estimated count given for Kentucky Highway 89 between milepost (MP) 15.5 and MP 16.0 in Clark County is 10,600 vehicle trips per 24-hour period. Based on the assumptions made, all of these vehicle trips would occur during 12 hours of daylight and half of them, or 5,300, would be traveling each direction on the road. Half of these 5,300 vehicle trips, or 2,650 trips, would occur during the given commuting time for that direction. Established commuting patterns indicate that the morning commute vehicle trips would be toward the centers of population, such as Winchester, Richmond, and Lexington, while the evening commute vehicle trips would be away from them. During the morning commute on this section of road, 1,325 vehicle trips per hour would be made toward Winchester and during the evening commute, the same number would be made heading away from Winchester. During these periods, the established road capacity would be exceeded and traffic jams would be expected to occur. During the other 10 hours of daylight, the remaining 2,650 vehicle trips would occur in each direction on this section of the highway, resulting in an average of 265 vehicle trips per hour.

The existing data indicate that traffic on each road increases as one travels towards the centers of population. It also indicates that traffic on roads near the project site is relatively light. Based on year 2001 estimated vehicle trips and the methodology established in the previous paragraph, non-commute traffic on local roads in the community of Trapp ranges from 5 to 15 vehicle trips per hour in each direction.

For the purpose of this analysis, other assumptions are also made. To further the presentation of the potential worst-case scenario, it is assumed that all workers would drive themselves to work. A more likely scenario, however, is that some of the cars would have more than one occupant. The range of potential impacts reflects an estimated range of 1.0 to 1.2 occupants per vehicle. The

²⁰ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. pp. 5-30 through 5-32.

worst-case bounding analysis would be only 1.0 occupant, thus requiring more vehicle trips to transport all of the required workers to the site. The lower number represents the best-case scenario of 1.2 occupants per vehicle. KPE has indicated that 20 to 30 heavy-duty trucks per day will be entering and leaving the site during peak construction periods. Since durations of peak construction have not been indicated and to present a worst-case scenario for traffic impacts to the community and ROI, it is assumed that 30 trucks per day enter and leave the site throughout the construction of the facility. This would equate to an additional 60 vehicle trips per day on local roads or 8 vehicle trips per hour, assuming an 8-hour workday. KPE has indicated that it requires 2,268 metric tons (2,500 tons) per day each of RDF pellets and coal to operate the proposed gasification facility, as well as approximately 127 metric tons (140 tons) per day of limestone. For delivery purposes, a truck is assumed to haul 18 metric tons (20 tons) of coal per load and a railcar is assumed to haul 91 metric tons (100 tons) of coal per load. The coal has a greater density than the RDF and thus, the RDF requires a larger volume container to transport the equivalent mass of material. Each truck or railcar would have a fixed volume that it would be capable of transporting. The 44-56 mix of coal and RDF by volume indicates that 1.2 times as many trucks or railcars would be required to ship the 2,268 metric tons (2,500 tons) of RDF as would be required to ship a thermal equivalent amount of coal. Due to the comparatively small amount of limestone required for facility use, it is assumed that it has the same density as coal and would require the same number of trucks or railcars to transport equivalent amounts. This equates to 125 truckloads of coal, 150 truckloads of RDF, and 7 truckloads of limestone per day of plant operation, or a total of 282 truckloads per day delivered to the site. This is equivalent to 564 additional vehicle trips in and out of the site per day of operation. Since the plant would operate 24 hours a day, this averages to 23.5 truck trips in and out of the site per hour. The railcar equivalents to supply the plant would be 25 railcars of coal, 30 railcars of RDF pellets, and 1.4 railcars of limestone per day, or a total of 56.4 railcars per day of operation. Given the existing railroad infrastructure at the site, and that the amount of truck traffic required to supply the plant on a daily basis renders delivery by truck almost infeasible, KPE has indicated that all raw materials would be supplied to the proposed plant by rail. The remaining required raw material, petroleum coke, is only needed for the coldstart of a gasifier, which is a very infrequent event, and thus, this analysis assumes that petroleum coke deliveries are included in the established railcar traffic to the site.

Transportation Impacts

Construction of the facility is assumed to take 30 months and employ an average of 600 people, with peak employment rising to 1,000 people. During periods of average construction worker staffing, an additional 1,000 to 1,200 vehicle trips would occur in the ROI, 500 to 600 at the beginning of the shift and 500 to 600 at the end of the shift. This number would increase to as high as 2,000 vehicle trips per day during periods of peak construction, 833 to 1,000 at the beginning of the shift and 833 to 1,000 at the end of the shift. These vehicle trips would all occur within a relatively short timeframe as workers arrive for the beginning of their shift and depart at the end. In addition, 30 heavy-duty trucks would operate in and out of the site throughout the workday, adding approximately 8 vehicle trips per hour worked to local roads.

The site location is inherently beneficial to traffic approaching and leaving during regular work hours as it is not near a population center. The majority of the existing morning and evening traffic heads respectively toward and away from Winchester and Richmond along the routes being analyzed while traffic generated by the construction of the Proposed Action would be headed toward Trapp in the morning and away from Trapp in the evening. Thus, all traffic generated by the Proposed Action would move in opposite directions of existing heavy flows and would not compound any existing traffic problems during commuting periods. Another reason

that traffic generated by workers driving to and from the site should not impact existing traffic flows is that the typical construction shift begins and ends comparatively early in the day, around 7:00 a.m. and 3:00 p.m., respectively. Workers are already onsite and home when the respective commuting periods begin.

Significant traffic impacts would occur to the roads in Trapp, especially to Kentucky Highway 89 at the intersection with the site access road. The lack of traffic control devices could lead to significant traffic congestion at this intersection before and after shifts. The two-lane access road would also be heavily congested prior to and after work shifts, as all vehicles must utilize this road. Though the number of vehicle trips generated by the Proposed Action would not be high enough to exceed hourly capacities on any route to the project site, shorter-term capacities may be exceeded as all workers are traveling to and from the site during the same time period. Kentucky Highway 89 would be especially susceptible to this and it would result in periods of minor congestion along the route. Mitigation measures to alleviate any impacts are suggested in Section 5.18, Mitigation, of the EIS.

One potential issue of concern, especially as the construction shifts end, is the presence of school buses along Kentucky Highway 89. The Transportation Division of the Clark County School Board indicates that school buses operate along this road between 2:50 and 4:30p.m., which coincides with the end of construction work shifts. The Transportation Division indicates that approximately 30 bus stops lie within a 9.6-kilometer (6.0-mile) stretch of Kentucky Highway 89 north and south of the intersection with the plant access road. The safety of the children should not be an issue since the buses stop at the homes of each of the children and not at centralized locations, thus minimizing the amount of walking along the road. The frequent stops required by the school buses combined with the large number of vehicles leaving the plant site would increase the incidences and duration of congestion along Kentucky Highway 89.

The majority of the truck traffic generated by the construction of the facility would be to supply construction materials and to dispose of construction wastes. Truck trips would occur at the average rate of eight per hour, or one every 7.5 minutes, during the workday. The trucks disposing of construction wastes would travel to and from the nearest landfills accepting construction debris, which are located in Montgomery and Estill Counties. The routes to and from the landfills are lightly traveled, two-lane state highways. New truck traffic on these routes should have little to no impact on existing traffic. Trucks carrying construction supplies would most likely operate on the same routes established above. Since trucks would only operate during the workday, they should have little to no impact on existing traffic along these routes. Minor impacts, such as a slowing of average traffic speeds, may result as the trucks move through populated areas toward the construction site.

Large construction materials and supplies, such as the gasifier units and steel, would be delivered by rail to the project site. Rail transportation during construction would typically occur during construction shift hours. Specific impacts to rail traffic cannot be analyzed as existing rail traffic data are unavailable; however, they would most likely be relatively minor as deliveries to the site would be coordinated by CSX Transportation, Inc., the owner of the rail line, to accommodate and facilitate all rail traffic on the line. At the site, the supply trains would travel off of the main rail line and onto the existing rail loop, where they would be unloaded. Since the trains would be completely off of the main line, no delays to mainline rail traffic would be expected during the unloading process. All construction-related traffic and transportation impacts would only occur during the 30-month construction period and would cease once construction was completed and the operation phase of the facility began.

All trucks used for the construction and operation of the facility would haul a maximum of 18 metric tons (20 tons) of weight. Kentucky Highway 89 has a maximum allowable legal gross weight of 36 metric tons (40 tons) for trucks with five or more axles. According to the Kentucky Transportation Cabinet, any vehicle traveling on Kentucky Highway 89 below the weight indicated should not cause any damage to the roadway.

Operation of the proposed facilities would employ 120 workers. Approximately 200 to 240 vehicle trips would be generated by the operations workers, 100 to 120 at the beginning of shifts and 100 to 120 at the end of shifts. These trips would be spread throughout the day, based on shift start and end times, because facility operation would require staff onsite at all times. The small number of additional vehicle trips required at any given time should not present a significant impact to any of the routes approaching the site location. The lack of traffic control devices may cause minor temporary congestion at the intersection of Kentucky Highway 89 and the site access road as shifts begin and end. Temporary congestion may also be experienced along the site access road as shifts begin and end.

Raw material for the operation of the gasifier units would be supplied to the site by rail. As stated earlier, the facility would require 56.4 rail cars of raw material supplies per day to operate, 30 cars of RDF pellets, 25 cars of coal, and 1.4 cars of limestone. This equates to approximately 4 unit trains of 100 cars each per week to supply raw materials to the site. Eight train movements per week, or about one a day, would be required at the site. Each train movement incorporates either moving a unit train on or off of the main rail line. The addition of one train per day along rail line segment C-273, which is the equivalent of a 7.6 percent increase in traffic, would have little or no effect to traffic along the rail line segment, as deliveries to the site would be coordinated by CSX Transportation, Inc., the owner of the rail line, to accommodate and facilitate all rail traffic. The existing rail infrastructure, including the rail loop and yard capacity, at the project site is sufficient to remove the full unit train from the mainline for unloading of raw materials. All required rail movements onsite would be handled within existing capacity and would not impact the mainline. Therefore, rail traffic generated by the project is expected to have minor impacts to existing rail traffic on the mainline.

Any disruption to rail traffic, such as an accident on the line, may require raw materials to be supplied to the facility by truck instead of rail, though this scenario is extremely unlikely to occur. As stated earlier, the equivalent number of trucks required for daily delivery of raw material to the project site is 282. This would equate to 564 truck trips in and out of the site each day, or one truck trip every 2.5 minutes during a 24-hour period, and would result in adverse impacts to local traffic. Truck traffic would significantly impede existing traffic in the area and Kentucky Highway 89 would receive an essentially endless flow of trucks. The 282 trucks required to supply the plant each day would significantly affect other materials transport throughout the ROI as significantly fewer trucks would be available to ship other goods. Measures taken by KPE to avoid relying on trucks to supply raw materials to the site include the construction of materials storage facilities and the large rail yard capacity onsite. Storage facilities would house enough raw materials to supply the facility during any minor interruptions in rail service. The yard capacity at the site is sufficient to handle two unit trains, which could provide extra storage capacity during longer interruptions of rail service.

The facility would generate between 454 and 635 metric tons (500 and 700 tons) of frit per day. Should the frit prove to be marketable, the quantity generated would require the use of train transportation offsite. A maximum of seven railcars per day would be required to transport the

frit. Any solid wastes generated during construction and operation would be transported to local landfills in Montgomery and Estill Counties via trucks. This traffic would be minor since it is expected that limited amounts of waste would require disposal.

An Emergency Response Plan and Spill Prevention, Control, and Countermeasure Plan, which outline and document procedures for providing emergency response and cleanup for any project-related spills or accidents during materials and waste transport, have not yet been developed by KPE. These plans will be developed during the engineering and construction phases of the project and would adhere to local, state, and federal regulations.

C.5.2 Supplemental Investigations, Research and Analysis

During the site visit, particular attention was paid to the existing traffic conditions and what potential mitigation measures could be employed to minimize the impacts due to increased traffic from the proposed project. One of the particular items noted during the visit was the current road condition at the intersection of the site access road and Highway 89. Highway 89, normally a 2-lane highway in this area, is divided into 2 northbound and 2 southbound lanes immediately surrounding the access road. Those vehicles arriving at the site from the north (Winchester, Trapp) can use the rightmost lane, which begins approximately 150 yards from the access road, to slow down and turn right onto the access road. Those vehicles approaching from the south (Richmond, Palmer) can use the left hand lane, which starts approximately 80 yards from the access road, to make their left turn onto the access road, thereby allowing other traffic a passing lane.

One additional item of note was the large turnout area at the intersection of Highway 89 and the site access road. The entrance gate is at the rear of this turnout area. Depending on the security measures in place during the construction period to monitor vehicle movements in and out of the gate, this turnout area would provide some surge capacity for vehicles entering the site and exiting the highway.

C.5.3 Conclusions and Recommendations

The Final EIS adequately addresses the potential impacts on road and railway traffic. The Department of Energy has proposed potential mitigation measures for the mitigation of traffic congestion at the intersection of the site access road and Kentucky Highway 89. The FEIS specifically states:

The addition of turning lanes and a traffic signal would assist in regulating traffic flows at the intersection. Any changes to Kentucky Highway 89 should be made in conjunction with the 7th District of the Kentucky Transportation Cabinet. To facilitate traffic in and out of the project site, the access road should be widened to four lanes or directional controls should be implemented. Directional controls refer to having both lanes travel in the same direction during peak usage of the road. Appropriate warning signs should be put in place if this method is adopted.²¹

²¹ U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. p. 5-55.

SECTION D. Recommendations

In this Section, Jason presents recommendations concerning the proposed Kentucky Pioneer Energy project, including recommendations for further mitigation measures. This section also includes any specific recommendations on elements of the SAR that the Board might consider before arriving at a decision on KPE's pending application for a construction certificate.

Specific Mitigation Recommendations Related to SAR Elements

In the FEIS, the Department of Energy has committed to specific measures to reduce negative impacts and increase positive effects. Additionally, as a result of the Jason site visit, other recommendations have been made and discussed with the Applicant.

Specific mitigation measures recommended by the Department of Energy related to the elements of the SAR include²²:

1. Short-term visibility impacts from fugitive dust during construction activities would be minimized using standard dust control measures such as watering.
2. Buildings housing the gas turbine units should be designed to ensure a substantial reduction in noise transmitted to the outside. A reduction of gas turbine noise to 95 dBA or less, adjacent to the outside of the building, should be considered a basic design requirement. In addition, the building housing the gasifiers should be designed to ensure a significant reduction in noise transmitted to the outside. A reduction of gasifier noise to 65 dBA or less, adjacent to the outside of the building, would be considered a basic design requirement.
3. The addition of turning lanes and a traffic signal would assist in regulating traffic flows at the intersection. Any changes to Kentucky Highway 89 should be made in conjunction with the 7th District of the Kentucky Transportation Cabinet. To facilitate traffic in and out of the project site, the access road should be widened to four lanes or directional controls should be implemented. Directional controls refer to having both lanes travel in the same direction during peak usage of the road. Appropriate warning signs should be put in place if this method is adopted.

In addition to the mitigations specified in the Final EIS, based on the findings and conclusions presented earlier in this report, Jason recommends the Applicant also implement the following mitigation measures.

4. As the overall facility design and layout is more fully developed, KPE should fully develop their access control and security plan, consistent with industry standards.
5. With regard to potential visual impacts, consideration should be given to the final design color of the facility and stack configuration that would minimize impacts to the surrounding viewshed.

²² U.S. Department of Energy. Kentucky Pioneer Integrated Gasification Combined Cycle Demonstration Project Final Environmental Impact Statement. November 2002. pp. 5-54 and 5-55.