

SUMMARY

The U.S. Department of Energy (DOE) has prepared this environmental impact statement (EIS) to evaluate the potential impacts of a power generation project proposed by Mississippi Power Company in Kemper County, east-central Mississippi. The proposed power plant would demonstrate an advanced integrated gasification combined-cycle (IGCC) power generation system at a commercial scale. The facility would convert Mississippi lignite mined by North American Coal Corporation (NACC) into a synthesis gas (syngas), which would fuel the plant's combustion turbine (CT) generating units. The new power plant would be capable of generating 582 megawatts (MW) (nominal capacity) of electricity while reducing emissions of carbon dioxide (CO₂), sulfur dioxide (SO₂), oxides of nitrogen (NO_x), mercury, and particulates compared to conventional lignite-fired power plants. New electrical power transmission lines and upgrades of some existing transmission lines, a natural gas supply pipeline, a reclaimed water supply pipeline, and a CO₂ pipeline would be constructed in connection with the power plant (the pipelines and transmission lines are sometimes referred to as *linear facilities*). NACC's proposed mine would be located on adjacent properties in Kemper County but would extend into Lauderdale County; it would supply lignite to the power plant over its planned 40-year life. Figure S-1 shows the locations of the project's principal components.

DOE is the lead federal agency responsible for the preparation of this EIS, while the U.S. Army Corps of Engineers (USACE) (Mobile District) is a cooperating agency. In compliance with the National Environmental Policy Act of 1969 (NEPA), as amended (Chapter 42, Part 4321, *et seq.*, United States Code [U.S.C.]), DOE is evaluating the environmental impacts associated with the proposed project as part of its decision on whether or not to provide financial assistance and a loan guarantee. USACE is evaluating the potential environmental impacts before deciding whether to issue permits under the Clean Water Act (CWA) for stream and wetland disturbances that would be associated with the proposed mine, power plant, electrical transmission lines, and pipelines.

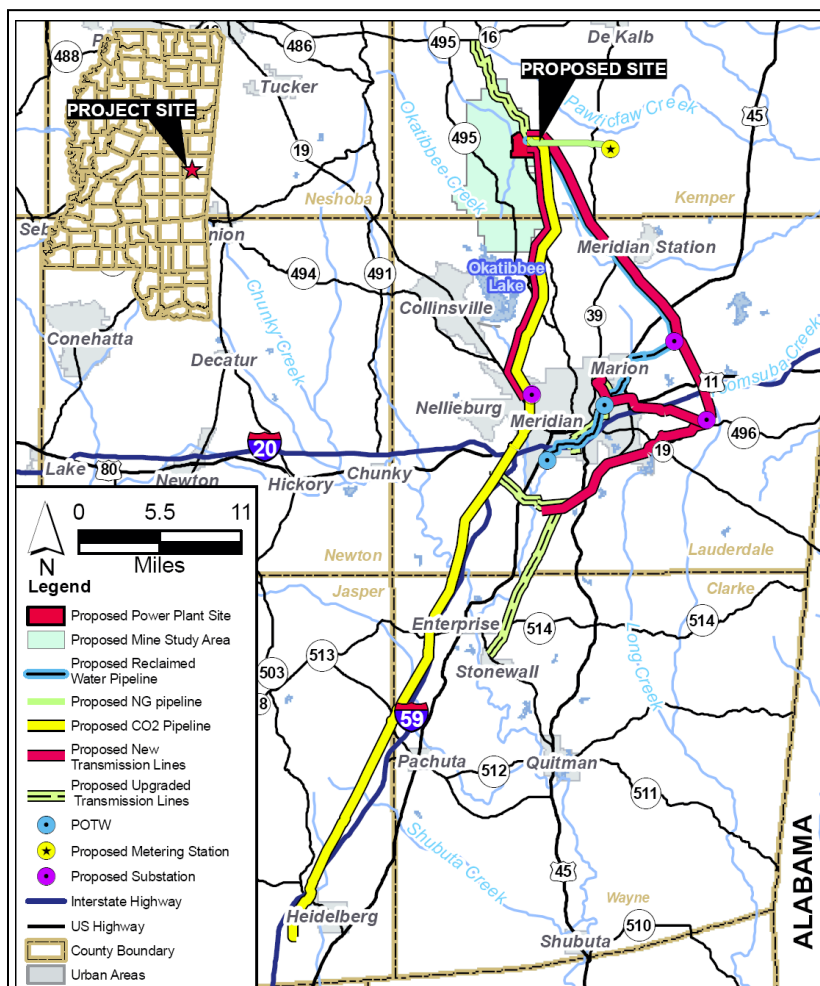


Figure S-1. Proposed Kemper County IGCC Project, NACC Mine, and Linear Facilities

Sources: US Census, 2000; MARIS, 2008; ECT, 2009.

PROPOSED AGENCY ACTIONS, PURPOSES AND NEEDS

DOE

DOE's proposed action has two components: first, to release funding for cost-shared financial assistance and, second, to issue a loan guarantee. DOE proposes to provide an additional \$270 million in cost-shared financial assistance under the Clean Coal Power Initiative (CCPI) program to the Kemper County IGCC Project. DOE's proposed action encompasses those activities that are eligible for this DOE cost-shared funding, including the construction of the onsite power plant components, such as the gasification island, the combined-cycle power generation unit, and the auxiliary facilities. DOE has already provided a portion of the original funding (\$24.4 million of an original \$294 million) to Southern Company for cost sharing in the preliminary design and definition of this project at a previous location. In addition to sharing in certain costs, DOE may issue a loan guarantee pursuant to the Energy Policy Act of 2005 (EPA05). The financial assistance would apply to the planning, design, permitting, equipment procurement, construction, startup, and 4.5-year demonstration of the power plant technology. The loan guarantee would apply to the planning, design, permitting, equipment procurement, construction, and startup of the power plant. If approved for DOE loan guarantee, a portion of the power plant's construction costs would be funded through the U.S. Treasury Department's Federal Financing Bank. The loan would then be guaranteed by DOE, resulting in interest expense savings for Mississippi Power. The U.S. Congress established the CCPI program to accelerate commercial deployment of advanced technologies for generating clean, reliable, and affordable electricity in the United States using abundant domestic reserves of coal. EPA05 established the Federal Loan Guarantee Program for eligible energy projects that employ innovative technologies (i.e., projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases" and "employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued").

The purpose and need of DOE's action under the CCPI program are to demonstrate the feasibility of this selected IGCC technology at a size that would be attractive to utilities for commercial operation, thereby satisfying the responsibility Congress imposed on DOE to demonstrate advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States. The lignite gasifier design is based on a technology that Southern Company, Kellogg Brown & Root LLC (successor in interest to Kellogg Brown & Root, Inc. [KBR]), and DOE have been developing since 1996 at a research facility near Wilsonville, Alabama. The proposed Transport Integrated Gasification (TRIGTM) IGCC technology appears most cost-effective when using low-heating value, high-moisture, or high-ash coals, including lignite. These coals constitute approximately one-half of the proven United States' and world's coal reserves. Successful demonstration of the TRIGTM technology would generate technical, environmental, and financial data from the design, construction, and operation of the facility to confirm that the technology can be implemented at a commercial scale.

The purpose and need of DOE's loan guarantee would be to comply with DOE's mandate under EPA05 by selecting eligible projects that meet the goals of EPA05, which are to encourage early commercial use in the United States of new or significantly improved energy technologies and reduce emissions of greenhouse gases. The Kemper County IGCC Project would include carbon capture systems sufficient to reduce CO₂ emissions from the power plant by up to 67 percent by removing carbon from the syngas downstream of the gasification process.

The project would then sell the captured CO₂ for beneficial use and geologic storage in existing enhanced oil recovery (EOR) operations in Mississippi.

USACE

USACE is considering whether to grant permits under the CWA for various stream and wetland impacts that would result from construction and operation of the power plant, mine, transmission lines, and pipelines. Therefore, the purpose of USACE's proposed action is to fulfill its Congressionally mandated responsibilities related to dredging and filling of wetlands and other waters of the United States under Section 404 of the CWA.

EIS SCOPING PROCESS

DOE announced the public scoping meeting in the Notice of Intent (NOI) in the *Federal Register* on September 22, 2008, and published notices in four newspapers in the Kemper County area between October 8 and October 12. An information packet including the NOI was delivered to 171 stakeholders including federal, state, and local agencies and environmental groups to announce the meeting and solicit comments on the proposed project. Postcards publicizing the meeting were mailed to 1,440 residents and businesses within a 3-mile radius of the proposed power plant site and all landowners having real property within the mine study area or within 200 feet (ft) of the centerline of the proposed linear facilities for which routes were planned at that time.

DOE held the public scoping meeting for the Kemper County IGCC Project EIS on October 14, 2008, at Kemper County High School in De Kalb, Mississippi (De Kalb is the Kemper County seat). Sixty-six individuals signed in with the registration/comment cards. Fifteen individuals spoke to present oral comments or ask questions. Comments were also submitted to DOE by e-mail, telephone, and regular mail. Overall, 245 individual comments were tabulated from the collective submissions.

During the scoping process, commenters expressed desires that alternatives to the proposed project be considered, including technology alternatives and conservation, and concerns were voiced about potential environmental, socioeconomic, and other impacts that could result from the project. A number of comments suggested that consideration be given to alternatives to coal-based technologies (e.g., solar energy). Among the potential effects of the proposed project, the public expressed the most concern about impacts on water and ecological resources, impacts due to greenhouse gas emissions (e.g., global climate change), and possible worsening of local traffic conditions. A number of respondents commented on favorable aspects of the project, including jobs and other positive economic impacts, as well as the use of Mississippi lignite as a way to increase energy independence.

Input obtained during the scoping process helped DOE to improve the list of issues to be analyzed and provided additional focus to the analysis of previously identified issues. Table S-1 lists the composite set of issues identified for consideration in the EIS (i.e., issues identified in the NOI and additional relevant issues identified during public scoping that expanded the scope of the assessment).

Table S-1. Issues Identified for Consideration in the EIS

<i>Issues identified in the NOI</i>			
Atmospheric resources	Visual impacts	Ecological resources	Community impacts
Water resources	Floodplains	Safety and health	Cultural resources
Infrastructure and land use	Wetlands	Construction	Cumulative effects
Solid wastes			
<i>Additional issues identified during public scoping that expanded the scope of the assessment</i>			
Impacts on Lake Okatibbee operations		Options for CO ₂ capture, transport, and beneficial use and geologic storage	

DOE'S AND USACE'S ALTERNATIVES TO PROPOSED ACTIONS

NEPA requires that federal agencies evaluate reasonable alternatives to their proposed actions. The purpose of and need for the proposed action determines the range of reasonable alternatives. In this case, the purpose of and need for DOE action is defined by the CCPI program (and enabling legislation, Public Law 107-63) and the Federal Loan Guarantee Program (and enabling legislation, EPLA05). Given these programmatic purposes and needs, reasonable alternatives available to DOE prior to the selections of this project under CCPI Round 2 and the Loan Guarantee Program would have been to select another project that applied to and met the eligibility requirements of the CCPI and loan guarantee programs. For these programs, other applications (and their potential environmental impacts) were considered during the evaluation and selection process. Given the selection of this project under both programs, DOE's decision is whether or not to provide financial assistance, a loan guarantee, or both. Therefore, this EIS analyzes in detail the project as proposed (proposed action), the proposed action as modified by the applicant or in response to conditions such as mitigation, and the no-action alternative.

Under the no-action alternative, DOE would neither provide further financial assistance under the cooperative agreement nor issue a loan guarantee for the project. In the absence of this assistance and loan guarantee, Mississippi Power could build the gasifiers, syngas cleanup systems, CT/heat recovery steam generators (HRSGs), and supporting infrastructure as proposed without DOE support. In this case, the proposed mine and linear facilities would remain unchanged. The environmental impacts of this option would be essentially the same as those resulting from the proposed action. This outcome is unlikely given the cost and financial risk associated with such a large-scale demonstration project. More likely, Mississippi Power would choose not to pursue the Kemper County IGCC Project. If this project does not go forward, the no-action alternative would not contribute to the goal of the CCPI program, which is to accelerate commercial deployment of advanced coal technologies that provide the United States with clean, reliable, and affordable energy. Similarly, the no-action alternative would not contribute to the loan guarantee program's goals of facilitating energy projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases" and "employ new or significantly improved technologies."

Under the proposed action alternative, DOE assessed the impacts of alternative water sources, alternative linear facility routes, and alternative levels of CO₂ capture. The first water source development alternative is that reclaimed effluent would provide for most of the power plant's water requirements. Nonpotable ground water from a deep aquifer would supplement the reclaimed water when needed. The second water source development alternative is that this ground water source would supply all of the power plant's needs. However, the use of rec-

lained water is currently considered to be preferable, barring unforeseen limitations on its availability, as the engineering issues, costs, and environmental impacts of ground water use would be greater.

Mississippi Power applied its route selection procedures to all proposed linear facilities. Their procedures considered various route selection factors, such as making use of (or paralleling) existing rights-of-way and avoiding developed and/or sensitive areas. Nonetheless, consistent with its procedures, Mississippi Power might, at some future date, revise, alter, or amend the precise final route for one or more of its linear facilities based on further engineering studies.

Mississippi Power has considered a range of alternative levels of CO₂ capture: 25, 50, and 67 percent and greater than 67 percent. After initially basing the design on 25-percent capture, Mississippi Power updated its designs to target 50- and then 67-percent capture. Mississippi Power determined that gas turbine design and operation at higher hydrogen contents of syngas has not evolved sufficiently to confidently design the plant for commercial operation at capture levels higher than 67 percent and that the plant would not be economically feasible. The proposed action is based on a capture rate of 67 percent. This higher capture rate would require more fuel input to achieve the same net power output relative to the 50-percent case. Air quality impacts would vary slightly between the 50- and 67-percent cases, and some other differences would result (e.g., there would be small variations in outputs of byproducts). Overall, the differences in operating characteristics and impacts for either 50- or 67-percent capture would not alter the conclusions regarding the ability to permit the facility or the levels of potential impacts.

This EIS also reviews the power plant site selection process that was conducted by Mississippi Power. Mississippi Power found that the only reasonable site is the Kemper County site, based on location of accessible lignite reserves near Mississippi Power's service territory, proximity to infrastructure, topography, environmental concerns, and available open space. This EIS does not analyze in detail the alternative power plant sites considered by Mississippi Power, because: (a) DOE's role is limited to making a final decision on whether to provide financial assistance and a loan guarantee for this project, as proposed by the applicant, and (b) DOE agrees with Mississippi Power's conclusion that other sites are not reasonable alternatives. The site selection process that Mississippi Power followed in selecting the proposed site is provided in this EIS.

With regard to alternative power generation technologies, DOE considered other coal-based technologies in evaluating the proposals received under the CCPI solicitation. Other non-coal-based technologies (e.g. solar, wind, natural gas) would not address DOE's purpose and need to demonstrate advanced coal-based power generation technologies.

Both DOE and USACE have responsibilities under Executive Orders 11998 (floodplain management) and 11990 (wetlands) to consider flood hazards and potential effects of floodplain activities for any action undertaken, avoid impacts to floodplains to the extent practicable, and avoid short- and long-term impacts to wetlands if a practicable alternative exists. Agencies must evaluate practicable alternatives that avoid actions in floodplains and/or wetlands, including alternate sites, alternate actions, and no action.

USACE would review and take action on the applicants' Section 404 permit applications after DOE has published its NEPA Record of Decision (ROD), which could include required mitigation for adverse effects to wetland and floodplains. USACE may undertake further NEPA review as necessary to fulfill its obligations under NEPA when considering the issuance of permits.

Under Section 404 of the CWA, USACE has two alternatives: issuance or denial of one or more dredge and fill permits, with mitigation requirements also considered. Permits would be needed to construct and operate

the proposed facilities, including the connected actions. Denial of any application would equate to DOE's no-action alternative. Issuance of permits would correspond to DOE's proposed action.

Under Executive Orders 11990 and 11998 and the CWA, USACE issuance of any permits would be limited to the least environmentally damaging practicable alternative selected for each permit application (e.g., IGCC facilities, linear facilities, mine, etc.). The selected alternative also would have to meet USACE's public interest test criteria and conform to USACE's mitigation regulations. USACE's impact minimization analyses would focus on alternative arrangements for plant structures and equipment and mine plans.

DESCRIPTION OF KEMPER COUNTY IGCC PROJECT AND DESIGN ALTERNATIVES

MISSISSIPPI POWER'S PROJECT PURPOSE AND NEED

Mississippi Power's load forecast identifies an additional generation need of between 318 and 601 MW of base load power beginning during the summer season of 2014. The Kemper County IGCC Project is intended to meet that generation need while demonstrating the proposed technology using local lignite as a fuel source. Beyond maintaining sufficient generation capacity to avoid shortages, the proposed project would also address several risks and strategic considerations identified in Mississippi Power's planning process. Foremost among these considerations, the project would enhance the fuel diversity and asset mix of Mississippi Power's generating fleet, thereby mitigating the supply and price volatility risks associated with the predominant use of any one fuel source. Specifically, the proposed IGCC technology would allow Mississippi Power to use an additional fuel source: lignite, the cost of which is both lower and less volatile than that of natural gas and higher-ranked coals. The long-term lignite supply agreement associated with the project would provide a lower and more stable fuel price over the life of the plant for Mississippi Power's customers.

The Kemper County IGCC Project would also enhance the geographic diversity of Mississippi Power's generating units. This is important in support of voltage regulation, security, and area protection. But as Mississippi Power's experience after Hurricane Katrina showed, it is also increasingly important to locate units away from the coastal area to mitigate damage from severe tropical weather events and ensure service to important regional and national energy infrastructure.

Finally, the proposed project would help Mississippi Power manage uncertainty associated with the imposition of standards to address climate change through reduction of greenhouse gas emissions (primarily CO₂). The impact of national standards on Mississippi Power's customers could be significant, depending on their timing and requirements. While planning for the climate change standards, utilities with an existing coal-based fleet are faced with options to either install costly CO₂ capture retrofits using technology still under development or retire existing coal-fueled power plants and build new ones. The proposed Kemper County IGCC Project would intend to capture up to approximately 67 percent of the CO₂ emissions. The CO₂ would be sold for beneficial use and geologic storage via EOR. Thus, this project would provide Mississippi Power with an important means of managing its compliance with future regulation of greenhouse gas emissions.

PROJECT DESCRIPTION

As shown in Figure S-1, the approximately 1,650-acre site of the proposed IGCC power plant is located in southwestern Kemper County. The mine and linear facilities would extend into several other counties. The pro-

posed power plant and mine would be located in a rural, sparsely populated area. Figure S-2 illustrates the rural nature of the proposed power plant site and mine study area. The electrical transmission lines and pipelines would also traverse mostly rural areas.

Overall, the IGCC plant can be divided into two major systems or components: lignite coal gasification and combined-cycle power generation. The gasification systems would consist primarily of lignite handling, gasification, and syngas processing and cleanup. There would be two lignite gasifiers, which would use TRIG™ IGCC technology. At full capacity, the gasifiers would convert an average of 13,800 tons per day (tpd) of lignite into syngas. The design lignite feed rate to each gasifier would be approximately 290 tons per hour (tph). Lignite would be supplied by an adjacent mine, as discussed subsequently.

Syngas would be the fuel for the combined-cycle power generating units. The principal combined-cycle components would include two CTs, two HRSGs, and a single steam turbine. In a combined-cycle unit, fuel gas is combusted in one or more CTs, and hot exhaust gas exiting the CTs is then used to heat water into steam to drive a steam turbine. The reuse of the CTs' exhaust heat to power a steam turbine constitutes the combined-cycle approach, which is a proven and reliable method for increasing the amount of electricity that can be generated from a given amount of fuel. The two CTs and steam generator for the Kemper County IGCC Project would generate a nominal 582 MW (net) of electricity when duct firing natural gas (for supplemental energy input) in the HRSG. The CTs would be capable of operating on natural gas as well as syngas.

The proposed project would reduce SO₂, NO_x, mercury, and particulate emissions by removing constituents from the syngas. The removal of nearly 100 percent of the fuel-bound nitrogen from the syngas prior to combustion in the gas CTs would result in appreciably lower NO_x emissions compared to conventional coal-fired power plants. The facility would be designed with carbon capture systems sufficient to reduce CO₂ emissions by approximately 67 percent by removing carbon from the syngas downstream of the gasification process. Annual average capture rates near 67 percent would be expected, and this design case provides the basis for the estimates of emissions, byproduct production rates, and impacts in this EIS. However, the EIS also provides data and addresses impacts for a range of CO₂ capture from 50 to 67 percent on an annual average basis. The CO₂ would be compressed and piped offsite where it would be sold for beneficial use and geologic storage via EOR. Table S-2 highlights key technological and environmental performance features of the Kemper County IGCC Project.

As mentioned in Table S-2, reclaimed water from Meridian's municipal system would provide the main supply required for cooling water makeup, steam cycle makeup, and other processes. The proposed power plant would also discharge no cooling or process water effluent from the site. Ash generated by the gasifiers would be stored onsite and would be evaluated for beneficial use at the adjacent mine or for placement in an onsite management unit (where it could be recovered for future sale or use). Commercial grade anhydrous ammonia and sulfuric acid (H₂SO₄) would be recovered as byproducts and marketed. Table S-3 summarizes key IGCC plant operating characteristics, including capacities, uses of raw materials, outputs, and discharges.

Construction of the proposed IGCC power plant would begin in 2010, continue for 3.5 years, and end in spring 2014. During the 3.5-year construction period, an average of approximately 500 construction workers would be on the site, with approximately 1,150 workers required during the peak construction period of the first half of 2012. Most construction would occur during daylight hours.

The IGCC plant operational workforce would consist of approximately 105 employees, of which 15 would provide support only during the startup and demonstration phases of the project, while 90 employees would be needed over the lifetime of the facilities (i.e., during commercial operation).

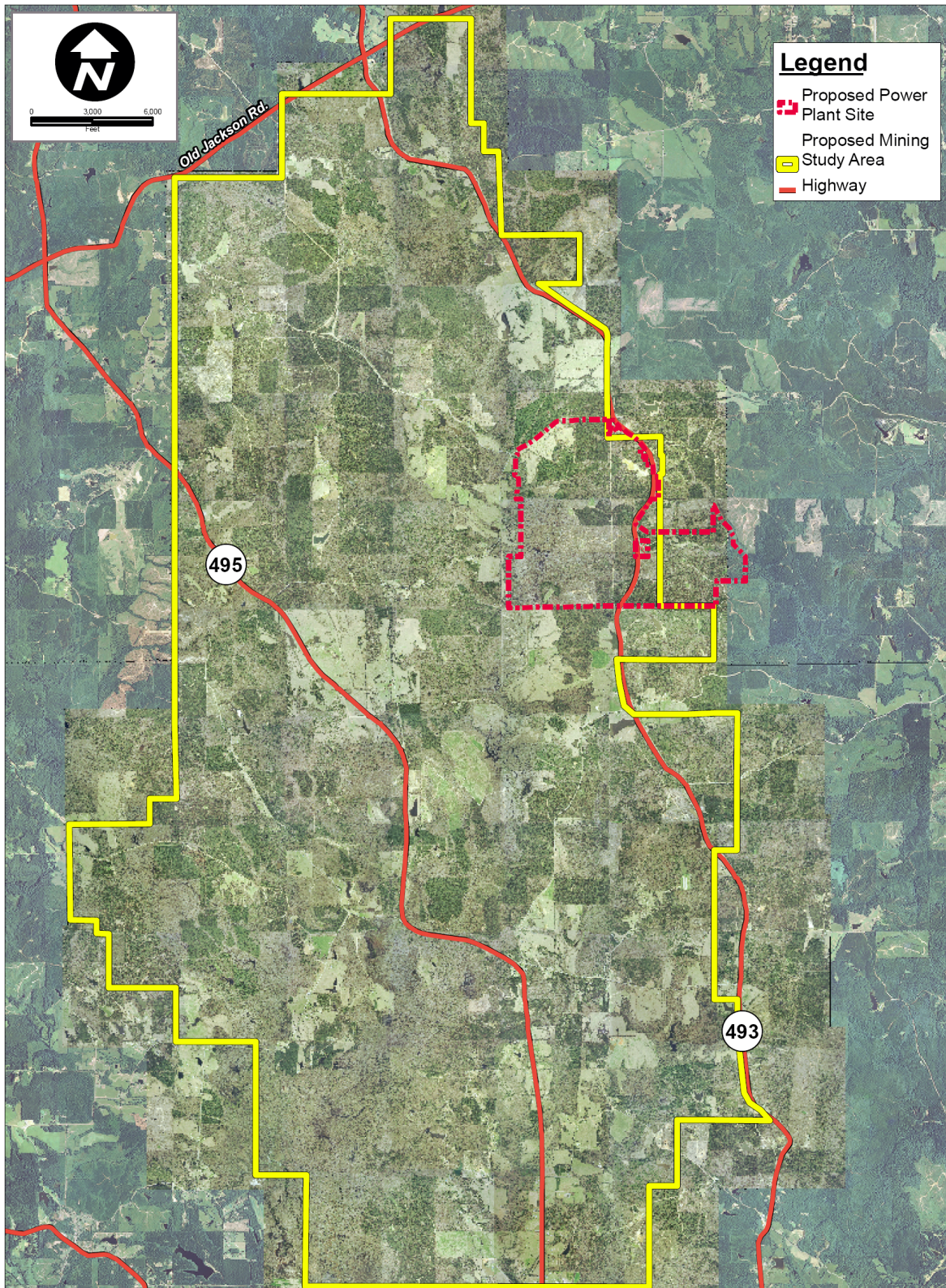


Figure S-2. 2008 Aerial Photograph of Power Plant Site and Mine Study Area

Sources: NACC, 2008. SCS, 2008. ECT, 2009.

Table S-2. Key Technology and Environmental Features of the Kemper County IGCC Project

TRIG™ Gasifiers	The TRIG™ gasifier technology is one of the most cost-effective when using low-quality coals, including lignite, which comprise half the proven United States and worldwide reserves. A key performance target for the proposed technology would be achieving gasifier availability of at least 80 percent.
Syngas cleanup	The syngas cleanup facilities would reduce CO ₂ , SO ₂ , NO _x , mercury, and particulate emissions as compared to conventional lignite-fired power plants. Filters would remove more than 99.9 percent of particulate emissions.
Sulfur removal and recovery	Up to 99 percent of the sulfur in the lignite would be removed from the syngas and converted to concentrated, commercial-grade sulfuric acid (H ₂ SO ₄). The H ₂ SO ₄ would be marketed for offsite use.
Mercury removal	A reactor containing alumina-based metal sulfide would remove more than 92 percent of the mercury from the syngas.
CO ₂ removal, recovery, and beneficial use	Through a water gas shift (WGS) reactor, approximately 90 percent of the carbon monoxide (CO) in the syngas would be converted to CO ₂ , and an acid gas removal process would remove up to approximately 67 percent of the CO ₂ . The dried CO ₂ would then be compressed to the pressure required to enter a pipeline, which would deliver it for beneficial use and geologic storage via EOR.
Ammonia recovery	Sour water from syngas production would be processed to produce ammonia, which would be concentrated to commercial grade (98.5 to 99.5 percent). The ammonia would be marketed for offsite use or recycled to the gasifier for destruction.
Use of reclaimed water	To provide makeup supply water to the cooling systems (replacing water lost through evaporation) and processes, reclaimed effluent from two publicly owned treatment works (POTWs) in Meridian, Mississippi, would be used. If inadequate supplies of makeup water were available from the POTWs, nonpotable ground water from onsite wells would supplement the treated water supply. No potable water would be used for cooling or processes.
Zero liquid discharge	During power plant operation, the proposed IGCC facilities would produce various process wastewaters, all of which would be discharged to treatment and/or reuse systems. No process wastewater streams or water treatment discharges would be released offsite.
Ash management	Gasification ash is expected to be nonhazardous and could have beneficial uses (e.g., road construction material, soil amendment, etc.). Project plans provide for onsite management and storage.

Table S-3. Principal Full Load Operating Characteristics of the Proposed Kemper County IGCC Project*

Operating Characteristics	Nominal Value/Range
Generating capacity (MW) (net)†	582
Capacity factor (%)‡	85
Power production (MWh/yr)	4.3×10^6
Coal consumption (tpy)§	4.2×10^6 to 4.3×10^6
Natural gas consumption (10^6 scf/yr)**	5,800
Fuel oil consumption (10^3 gal/yr)**	124
Water requirements	
Reclaimed water (MGD)	6.2 to 6.9
Nonpotable ground water (MGD)	0.0 to 0.7
Reclaimed gasifier water (MGD)	1.0
Potable ground water (MGD)	0.003
Air emissions (tpy)‡‡	
SO ₂ ◇	570 to 590
H ₂ SO ₄	55
NO _x ◇	1,800 to 1,900
PM ₁₀ ◇	450 to 470
CO◇	890 to 980
VOCs◇	130 to 150
CO ₂ emissions (tpy)◇ §§	1.8×10^6 to 2.6×10^6
Process wastewater (gpm)	0
Solid wastes (10^3 tpy)	
Filter cake††	3 to 15
Byproducts (10^3 tpy)	
CO ₂ ◇	2,500 to 3,500
Anhydrous ammonia◇	21 to 22
Gasification ash◇	550 to 560
H ₂ SO ₄ ◇	132 to 139

Note: MWh/yr = megawatt-hour per year.

*All values estimated based on stated capacity factors and average operating conditions using syngas and not meant to be representative of any specific time period.

◇Range estimates the characteristics expected when operating between 50- and 67-percent carbon capture on an annual basis.

†Generating capacity represents full load with duct burners firing.

‡Capacity factor is percentage of energy output during period of time compared to energy that would have been produced if equipment operated continuously at maximum power throughout entire period.

§Based on lignite coal from Liberty Fuels Mine in Mississippi with an average heating value.

**Assuming ten plant startups per year.

◇◇Assuming constant use of duct burners at stated capacity factor.

††Range includes process water supply cases with and without supplemental ground water from the Massive Sand aquifer.

‡‡Potential facilitywide emissions with IGCC operating on syngas at stated capacity factor.

§§Average CO₂ emissions from IGCC operating on syngas with continuous duct burner operation at stated capacity factor.

Continuous duct burner firing contributes approximately 0.3×10^6 tpy to the total CO₂ emission presented. Continuous duct burner firing CO₂ emissions presented to provide upper bound of potential operating conditions.

Source: SCS, 2009.

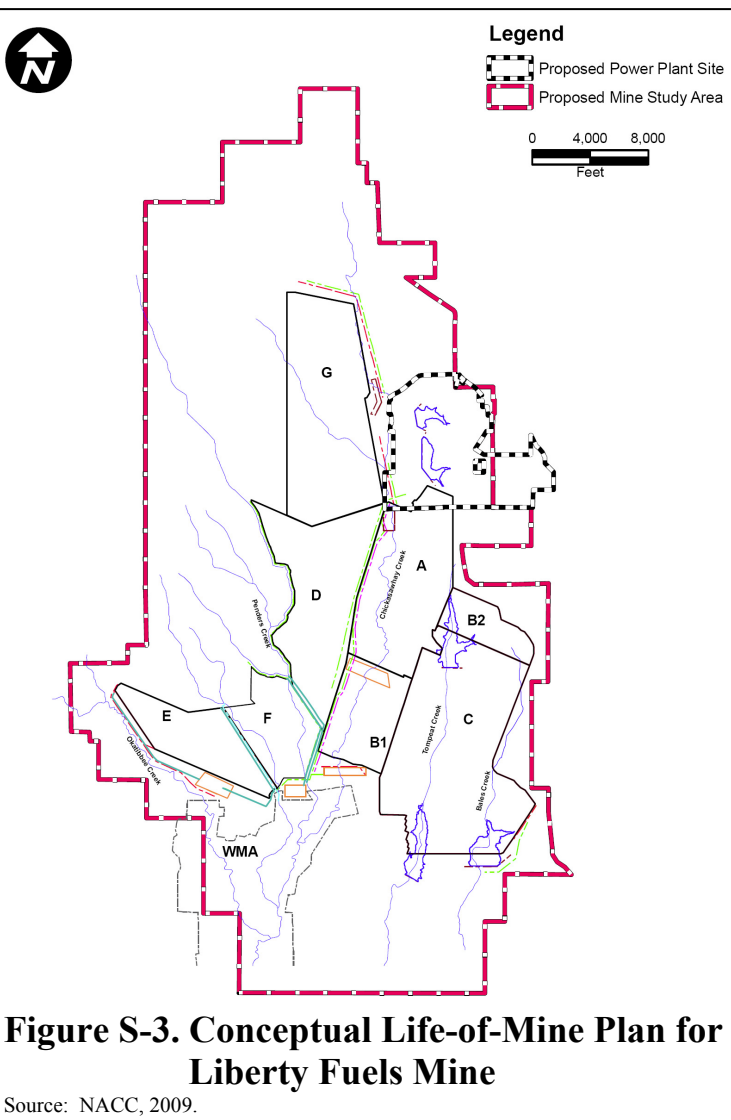
A reclaimed effluent supply pipeline, a natural gas pipeline, associated transmission lines (and substations), and a CO₂ pipeline would be constructed and operated as connected actions (shown in Figure S-1).

As a connected action, NACC would construct and operate an open-pit lignite mine. The proposed lignite mine (known as the Liberty Fuels Mine) would be located adjacent to the power plant site. Mining would occur on blocks of land within the approximately 31,000-acre study area for the proposed surface mine. The mine would be the primary source of feedstock for the IGCC project. Approximately 4.3 million tpy of lignite would be produced to fuel the IGCC facilities described for up to 40 years. Up to 12,275 acres would be disturbed over the life of the mine. Actual mining—the uncovering and extraction of lignite—would disturb between 175 and 375 acres per year and average 275 acres per year for up to 40 years, or a total of approximately 11,250 acres or

35.5 percent of the mine study area. After 3 to 5 years, approximately the same amount of acreage would be reclaimed each year as that newly disturbed. Up to 1,225 acres would be required for various mine support structures, including water diversions and water treatment (sedimentation) ponds.

NACC's preliminary conceptual mine plan includes eight blocks, shown in Figure S-3. The overall advancement of mining would proceed sequentially from mine block A during the initial years (generally coinciding with the project demonstration period) to mine block G representing the final years of mining; each block would be mined during a 5- to 6-year period. As the lignite reserves in one mining block were being recovered, the next mining block in sequence would be permitted and prepared for mining to provide an uninterrupted supply of lignite. Since reclamation activities would follow mining, the number of acres in a disturbed state at any given time would range between approximately 1,300 and 1,900 acres.

Following lignite removal, an average of approximately 275 acres per year of mined land would be graded to the approximate premining land surface elevations and planted with various



types of vegetative cover. Physical completion of land reclamation would occur approximately 3 years after lignite extraction.

Construction activities associated with the proposed Liberty Fuels Mine would commence in 2011 and continue through the first quarter of 2014, overlapping those of the IGCC power plant. The total mine construc-

tion workforce from 2011 through 2014 would vary from 45 to 155 people, depending upon the overlap between the various construction projects.

Operation of the surface lignite mine would commence in late 2013 with overburden removal in the initial mining area. Overburden removal to uncover the initial lignite to be extracted would occur during IGCC plant start-up. This would necessitate shipments of lignite for approximately 6 months, via truck, for use during start-up of the IGCC plant. These shipments would come from NACC's Red Hills Mine located in Choctaw County 70 miles northwest of the proposed site. The primary overburden removal machine would be a large, electrically powered walking dragline with an 80-cubic-yard bucket. Following overburden removal, the lignite would be loaded into trucks by large track-hoes, front-end loaders, or a continuous surface miner. Off-road trucks would then transport the lignite to the lignite handling facilities via mine haul roads constructed for the project. At the lignite handling facilities, the lignite would be crushed, sized, and conveyed to the silos that would supply the IGCC gasifiers.

The linear facilities would be the project's other connected actions:

- New 6-mile-long natural gas supply pipeline.
- 65 miles of new electrical transmission lines and 24 miles of existing lines that would require upgrading (also three new electrical substations).
- Approximately 9.5 miles of upgraded electrical distribution lines to support construction, and new electrical transmission lines of undetermined length (estimated at 10 miles) to provide power for mine operation.
- Approximately 29.5 miles of new pipeline to deliver reclaimed effluent from Meridian to the power plant site.
- New 61-mile-long pipeline to transport CO₂ for beneficial use in EOR.

As shown in Figure S-1, within much of the proposed new rights-of-way, two of the linear facilities would be co-located. Each of the new linear facilities would require permanent rights-of-way plus additional temporary rights-of-way for construction and new roads to provide access to the rights-of-way. Construction of the linear facilities would follow a schedule similar to those for the plant and mine facilities, beginning in 2011 and continuing through 2013. Construction would generally proceed from clearing to leveling and grading to trenching (pipelines) or excavating (transmission line structure foundations) to pipeline laying or transmission tower construction to right-of-way restoration, including revegetation.

PROJECT ALTERNATIVES

Several alternatives considered initially by project proponents have been dismissed by them from further consideration. These include alternative project size, alternative fuels, alternative plant layout on the site (the location of the plant footprint within the site boundaries), alternative mining methods, and options for CO₂ sequestration (e.g., injection in saline reservoirs versus sale of CO₂ for beneficial use in EOR operations).

This EIS presents alternative mine development plans. During the preparation of this EIS and as a result of preapplication consultations with USACE, the mine operator (NACC) responded to DOE and USACE comments and input by revising their mining plan. The mining plan as presently proposed is designed to be more protective of the project area hydrologic balance and reduce the impact on streams. This alternative would also re-

duce impacts to wetlands and floodplains. However, approximately 10.0 million tons of economically viable lignite reserves would remain in the ground, and long-term operational costs would increase as a result.

CHARACTERISTICS OF SITE AND AFFECTED AREAS

The setting for the proposed Kemper County IGCC Project, including its connected actions, is east-central Mississippi, centered near Meridian. With the exception of portions of the transmission lines, substations, and pipelines that would be built in and around Meridian, the project areas are rural and sparsely populated. Most of the rural areas are densely wooded (including pine plantations). The terrain of the project areas is gently to moderately rolling. Drainage of the project areas is provided by a number of creeks, streams, and small rivers. Table S-4 summarizes the area's existing conditions and characteristics.

ENVIRONMENTAL IMPACTS

Impacts on the existing environment arising from the proposed action alternative (i.e., DOE providing the funding and a loan guarantee and USACE issuing permits) would result from both construction and operation of the project facilities. Impacts under the no-action alternative assume that the project would not be built (as opposed to being built without DOE support). Thus, no impacts—positive or negative—would result, and the existing conditions would remain unaffected by the project. Table S-5 summarizes the key impacts by resource areas. Details of these and other impacts are presented in the full EIS.

MAJOR CONCLUSIONS, AREAS OF CONTROVERSY, AND OUTSTANDING ISSUES

If the Kemper County IGCC Project's TRIGTM air-blown gasifiers could be successfully demonstrated on Mississippi lignite, while the syngas cleanup system achieved approximately 67-percent CO₂ capture, an important advancement in the use of abundant coals, including lignite, would be the result. The purpose and need of DOE's Congressional mandate to demonstrate advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States would be met. Furthermore, by demonstrating this technology at a commercial and economical scale, the project would meet DOE's purpose and need under the loan guarantee program to encourage early commercial use in the United States of new or significantly improved energy technologies and reduce or eliminate emissions of greenhouse gases and other air pollutants.

As with any large industrial project development, the construction and operation of the power generation, transmission, and mining facilities would impact the surrounding environment. The IGCC power plant would constitute a relatively large increase in emissions of some air pollutants in Kemper County, which currently has comparatively low emissions as a result of its sparse population and low number of large commercial/industrial facilities. The area's air quality would be impacted as a result, although modeling studies predict that air quality would remain within NAAQS and comply with PSD regulations.

Table S-4. Summary of Existing Conditions of the Kemper County IGCC Project Area

Air quality	Based on ambient monitoring in Meridian, existing air quality is classified as <i>good to moderate</i> . From 2006 through 2008, air quality was classified as <i>unhealthy for sensitive groups</i> on a total of 7 days (0.7 percent of days). The area has few large industrial emissions sources.
Geology	Most of the project area lies in an outcrop of the Wilcox Group: sand and sandy clay sediments that are typically unconsolidated and thus readily subject to erosion. Some mining of sand and clay occurs. Lignite occurs in discrete seams, the shallowest one approximately 100 ft below land surface. The area is not near any active crustal plate boundaries or major faults. Probability of seismic activity is low.
Soils	Uplands in the project area range from gently sloping to steep, with well to excessively drained soils formed from the unconsolidated sands and clays of the Wilcox geologic group. Floodplains and terraces along streams are nearly level to gently sloping, with soils formed from alluvial sediments eroded from nearby uplands. Floodplain soils are often flooded and are poorly to somewhat poorly drained. Most soils of the project area are mostly very strongly acid to moderately acid. The area has some prime farmland soils, but these are dispersed, only minimally cultivated, and do not rate highly for conversion impact.
Surface water	Most project facilities, including the power plant site and mine study area, are within the Pascagoula River basin; a small portion of the plant site is in the Tombigbee River watershed. Water bodies of interest include Okatibbee and Chickasawhay Creeks, Okatibbee Lake, Sowashee Creek, and the Chunky River. In addition, numerous ephemeral and intermittent streams are found in the proposed lignite mine study area and linear facility corridors. Okatibbee Lake serves for flood control, recreation, and water supply. All of these surface waters are listed as impaired to some degree. The Chunky River is a designated Scenic River under Mississippi's Scenic Streams Stewardship Program Act.
Ground water	The Wilcox Group aquifers provide most ground water in the project area. The Lower Wilcox aquifer (several hundred feet below land surface) provides several area public water supply systems. The Massive Sand aquifer (more than 3,000 ft below land surface) contains nonpotable water (high salinity) in the project area.
Terrestrial ecology	No previously undisturbed vegetation communities remain within the project facilities areas. Much of the historic vegetation has been converted to agricultural use, especially pine plantation and pasture. The predominant remnant forested vegetation is second- or third-growth hardwood, pine, or pine/hardwood-dominated forests characterized by canopies/sub-canopies comprised of loblolly pine, shortleaf pine, and other southern yellow pine species with sweetgum, flowering dogwood, elm, red cedar, oaks, and hickories, among others. Pine-dominated communities are most conspicuous since much of the original forest cover has been cleared; mostly these communities are pine plantations. Hardwoods are dominant in some areas, particularly on moister soils and on steep slopes and ravines where pine cultivation is limited. Along waterways, floodplain forests dominated by a variety of hardwoods predominate. Intermixed with the forested lands are areas of pasture, hayfields, and minor cropland. Price's potato bean, federally listed as threatened, was not found during surveys. Surveys did not reveal areas potentially critical to migratory birds. Wildlife species observed are common in this region of Mississippi. No unusual wildlife observations were made.
Aquatic ecology	Habitat assessments conducted on Okatibbee Creek, Chickasawhay Creek, Penders Creek, Dry Creek, and Tompeat Creek resulted in habitat scores that ranged from 56 to 115 out of a total possible score of 200. Habitat impairments include low riparian vegetation width, low sinuosity due to channelization, poor bank stability, low pool abundance, and poor substrate availability. Fish collections revealed the presence of only eight fish species. Macroinvertebrate diversity was also low at most sampling stations.
Floodplains	Most of the small ephemeral and intermittent streams draining hilly topography are incised with narrow floodplains that are infrequently flooded or have no floodplain at all. Chickasawhay Creek, while incised, has a broad floodplain with associated wetlands in the mine study area, although it is not clear how often creek flood flows enter its floodplain. Okatibbee Creek also has a broad floodplain. The 100-year floodplain of Okatibbee Creek has been mapped by the Federal Emergency Management Agency (FEMA), but no other floodplains have been mapped by FEMA in Kemper County.

Table S-4. Summary of Existing Conditions of the Kemper County IGCC Project Area (Continued, Page 2 of 2)

Wetlands	Wetlands comprise 27 percent of the power plant site, 19 percent of the mine study area, and are encountered within the linear facility corridors. Many of these wetlands have been impacted by pine plantations. Many area wetlands have also been further degraded by silt runoff from the highly erodable, cutover upland slopes.
Land use	The proposed power plant site and mine study area are located in rural, sparsely populated areas, as are most of the proposed linear facility corridors. Roughly three quarters of the project areas are forested, and the second-largest land use is pasture.
Socioeconomics	Kemper County's population has remained steady at just more than 10,000 for decades and is currently projected to increase only slightly. Neighboring Lauderdale and Neshoba Counties have grown in population. Kemper County has higher than state average unemployment, and more than half of the employed residents work outside the county. The median household income in Kemper County is below that of Lauderdale and Neshoba Counties and the state as a whole. Area-wide community services (e.g., schools, hospitals) are adequate. Two Kemper County census tracts near the plant site and the county as a whole have higher percentages of minorities and populations below poverty level than in the United States and the state of Mississippi. Conversely, the three nearby census tracts in Lauderdale County have lower percentages of minorities and populations below poverty level than national and state averages. The Mississippi Band of Choctaw Indians has four reservations in the area, the closest approximately 13 miles northwest of the power plant site.
Transportation	The area roadways from the existing population centers (primarily Meridian and Philadelphia and, less so, De Kalb) to the proposed project site are currently operating at acceptable levels of service, with the exception of a segment on MS 493 from Bailey-Topton/Dogwood Lake Road/Briarwood School Road northeast to Center Hill Road. Only the roads in the vicinity of Meridian and Philadelphia are more than two lanes.
Waste management	Kemper County has one permitted municipal landfill, which is in the process of expanding. The nearest hazardous waste landfill is located in Emelle, Alabama.
Recreation	The principal recreation facilities in the area are Okatibbee Lake, Okatibbee Wildlife Management Area (WMA), and Kemper County Lake.
Aesthetics	The visual characteristics of the proposed power plant site, mine study area, and linear corridors are not unique to Kemper County, eastern Mississippi, or the state as a whole.
Cultural/historic resources	There are few places listed on the National Register of Historic Places near any of the proposed project areas. There are four listed places in southern Kemper County, none proximate to proposed facility locations; the two listed places closest to the power plant site are 5 miles away. Field studies conducted on project properties at the proposed mine study area and within proposed linear facility corridors identified some sites that would or might be eligible for listing.
Noise	Measured sound levels in the area of the proposed power plant site and mine study area are typical of a rural area having some human activity.
Human health/safety	Based on an analysis of health data and statistics and the lack of environmental stressors, Kemper County residents enjoy relatively good health compared to most other counties in Mississippi. There are relatively few health risks and minimal exposures in the county. The county has low air pollutant emissions, the area air quality index is good to moderate, and there are no current exceedances of National Ambient Air Quality Standards (NAAQS).

Table S-5. Summary of Potential Impacts of the Kemper County IGCC Project

No-Action	Proposed Action
Air Quality and Climate	
No new sources of air emissions affecting air quality. No change in existing conditions.	<p>Construction of the power plant would generate wind-blown fugitive dust, engine emissions, and other emissions that would result in localized air quality impacts. Projected emissions from power plant operations would include 590 tons per year (tpy) SO₂, 1,900 tpy NO_x, 470 tpy particulate matter (PM), 980 tpy CO, and lesser amounts of other pollutants. The impacts estimated from these emissions would potentially contribute to increase in pollutant concentrations ranging from approximately 2 to 12 percent of NAAQS and from 8 to 71 percent of Prevention of Significant Deterioration (PSD) Class II increments. Plant emissions would have insignificant impacts on the closest PSD Class I area, which is 225 km (140 miles) away from the power plant site. The power plant would also emit an estimated 1.8 million tpy of CO₂ annually, as well as small amounts of other pollutants (e.g., 55 tpy of H₂SO₄ mist and less than 0.1 tpy of mercury). In addition to CO₂, much smaller emissions of other GHGs (e.g., NO_x and methane) would be emitted for the operation of the IGCC plant and mine.</p> <p>Construction and operation of the lignite surface mine would generate wind-borne fugitive dust emissions from 1,500 to 2,000 acres cleared to facilitate mining; fugitive dust emissions from clearing, mining, and grading 275 acres per year for up to 40 years; fugitive dust emissions from off-road trucks and other vehicles traveling on internal, unpaved, mine roads; point source emissions of PM from transfer points at the coal preparation plant; and criteria and hazardous air pollutant emissions from combustion of gasoline and diesel fuel in construction and operating equipment. These emissions would have localized impacts.</p>
Geology and Soils	
No changes in existing conditions. No new land disturbance. The lignite resource would remain for future use. Natural CO ₂ deposits would continue to be used for EOR.	<p>Economically feasible recovery of the lignite resource would be accomplished and the lignite used for the generation of electricity. Up to 196 million tons would be mined and consumed over the 40-year project life. A portion of the available lignite resource would not be recovered in order to minimize disturbance of wetlands and floodplains. The deepest lignite seams would not be economical to mine and would be left in place.</p> <p>Soils on up to 12,275 acres would be disturbed or removed over the life of the project by construction or lignite extraction at the adjacent mine. These soils would be replaced with oxidized overburden as part of the land reclamation effort if approved by MDEQ and USACE.</p>
Surface Waters	
No changes in existing hydrologic conditions. No alterations of streams. Meridian sewage treatment plant effluent would continue discharge to Sowa-shee Creek.	<p>No new process wastewater discharges are proposed for the power plant site. Use of reclaimed effluent would reduce flow in Sowa-shee Creek but would also remove a source of pollutants that contribute to the creek's impaired status.</p> <p>Up to approximately 32 miles of perennial stream channels and 24 miles of intermittent stream channels would temporarily be removed by construction and lignite extraction at the adjacent mine; USACE stream avoidance and mitigation regulations and guidance would be applied to determine avoidance, minimization, and mitigation requirements during the USACE permitting process. All impacted streams would be restored during the reclamation process.</p> <p>Temporary diversions of Chickasawhay, Tompeat, and Bales Creeks would occur as are proposed. Flows of certain intermittent streams would be intercepted by diversion channels and routed around active mining areas. Upon completion of all mining and reclamation, the existing drainage patterns would be restored.</p> <p>Operation of the mine would require mining within streams and diversion of flow. Studies conducted at the Red Hills Mine show that diversion canals provided similar habitat and contained similar biological communities to undisturbed streams at that mine and at the Kemper County site. Given the existing marginal habitat quality and low diversity of biological communities in existing streams at the Kemper County site, surface water diversions would be able to maintain existing aquatic communities. Habitat and aquatic communities located a short distance downstream of the active mining areas would be affected by diversions that would result in increased or decreased flow to downstream reaches. While the total volume of water reaching Okatibbee Lake would not be appreciably altered, the timing and quality of flows reaching Okatibbee Lake would be different during the time period of mine-related activities and before reclamation is complete.</p>

Table S-5. Summary of Potential Impacts of the Kemper County IGCC Project (Continued, Page 2 of 6)

No-Action	Proposed Action
Ground Water	
No changes in existing conditions. No changes in aquifer levels.	<p>The power plant could use up to 1 MGD of saline ground water from the Massive Sand aquifer. No adverse impacts to other users of the Massive Sand or other aquifers would result from drawdowns caused by this use.</p> <p>Construction and operation of the lignite mine would require ongoing activities for mine pit water control. These operations would cause drawdown in the shallow Middle Wilcox aquifer and could adversely impact some local ground water wells (depending on site-specific drawdown experienced and the specific circumstances of a given well [e.g., well depth, pump setting, etc.]). It is possible that the amount of drawdown at a given well could cause adverse impacts to that water user via diminution of supply. At other wells, the drawdown effects might be insignificant. If an existing supply became unusable, alternative supplies would be provided by NACC, the mine operator, as required by the surface mining regulations.</p> <p>Postmining ground water quality could be impacted within the reclaimed mine area. Postmining ground water quality in the reclaimed mine area cannot be predicted with certainty, but based on histories of other similar mines, would likely have higher TDS than premining ground water. Therefore, development of shallow freshwater wells in mine spoil deposits might not be feasible. However, sufficient fresh water would be available from the Lower Wilcox aquifer and public water systems during and after mining.</p>
Terrestrial Ecology	
No change in existing conditions. Terrestrial ecological resources would remain in current conditions.	<p>Up to approximately 1,100 acres of terrestrial ecological resources would be altered due to construction of the power plant (including onsite mine-related facilities). Of this, approximately 443 acres are currently in agricultural production, mostly pine plantations and pasture/hay fields. Most wildlife located within the construction area would be mobile and relocate to suitable onsite or adjacent habitats; small, less mobile or burrowing animals might be lost. No federally listed plants or animals were observed on the site, nor are any known to occur there, although records exist for a few listed species in the surrounding region. Construction and operation of the facilities on the power plant site would not adversely affect either listed or migratory species.</p> <p>Lignite mine site preparation and construction activities would result in sequential vegetation removal from most of the mine facility construction areas. Approximately 1,455 acres would be affected during the initial construction phase. Thereafter, existing terrestrial resources would be cleared and reclaimed at an average rate of 275 acres per year. After mining, mine pits would be reclaimed and revegetated. As with the power plant site, mobile wildlife would likely relocate to adjacent, nonimpacted, or restored portions of the mine study area or to suitable offsite habitats. After reclamation, various wildlife species could return to reclaimed lands relatively quickly. Individuals of less mobile or burrowing species could be lost. No federally listed plants were observed in the mine study area, although Price's potato bean may occur in the region. It is unlikely that regional populations of listed or migratory species would be adversely affected by mining.</p> <p>The primary impact to terrestrial resources from linear facility construction or upgrades would result from vegetation clearing; smaller temporary impacts would be due to pipeline trenching. The only permanent impact would be due to any necessary pole placement or access road construction in or across wetlands. These impacts could be minimized by flexibility in final engineering design. Assuming that the entire width of each corridor would be cleared or otherwise altered, approximately 3,037 acres of terrestrial resources would be impacted. However, of this, approximately 1,485 acres have been cleared in the past and are currently pine plantations, pastures, hayfield, deer plots, existing transmission and gas pipeline corridors, roads, shrublands, or other development. For wildlife, existing forested and shrub-dominated communities would initially be cleared, resulting in a loss of forested habitats. Most wildlife would be mobile enough to relocate to offsite habitats during clearing and construction activities; most would return to utilize the herb- and shrub-dominated communities that would become dominant and maintained as such for the life of the project. Individuals of some less mobile species might be lost. Construction of the linear facilities would not be expected to adversely affect any endangered or threatened plant or wildlife populations, including migratory birds.</p>

Table S-5. Summary of Potential Impacts of the Kemper County IGCC Project (Continued, Page 3 of 6)

No-Action	Proposed Action
Aquatic Ecology	
Existing aquatic communities would not be affected by the project. The existing impaired habitats and low diversity aquatic communities would remain.	<p>The power plant would have direct impact on only one surface water body; the diversion of effluent currently discharged to Sowashee Creek to the power plant would reduce flows in the creek but also remove a source of pollutants. Biological communities downstream of POTWs are commonly suppressed or altered due to water quality changes. POTWs increase biological oxygen demand, increase fine particulate organic matter, increase ammonia concentrations, and add chlorine and chlorine byproducts to the stream environment. These changes cause shifts in the community composition of macroinvertebrates and fish from pollution-intolerant toward pollution-tolerant species. A reduction of effluent discharge would decrease these effects on the aquatic biology.</p> <p>If permitted by USACE and MDEQ, the lignite mine would displace mine site aquatic habitat during active mining and until habitat reclamation was completed. Diversion canals would temporarily replace the displaced aquatic habitat and would provide habitat similar to existing streams and support similar biological communities. Stream reclamation conducted in accordance with USACE and MDEQ guidelines and permit requirements would replace existing habitat impacted by the lignite mine.</p>
Floodplains	
No change in existing conditions. No alteration or loss of existing floodplains, floodplain storage, or flood conveyance capacity.	<p>The power plant construction and operation would not impact any floodplains.</p> <p>Flood storage capacity along Chickasawhay and Okatibbee Creeks would be reduced due to the construction of levees designed to protect the adjacent mining operations. Partially offsetting flood storage capacity would be created through the construction and operation of large sedimentation ponds designed to contain the runoff from the 10-year storm event. Construction and operation of the lignite mine would displace floodplain storage and conveyance capacity during active mining of the Chickasawhay Creek corridor; the entire 100-year-event discharge of Chickasawhay Creek would be diverted through a constructed channel. The levee along a portion of Okatibbee Creek, if permitted by USACE and MDEQ, would cause flood elevations to rise over a short upstream distance.</p>
Wetlands	
No change in existing conditions. Wetlands would remain in their current status.	<p>Approximately 133 acres of wetlands and streams would be lost or altered by construction activities associated with the power plant and mining-related facilities located on the power plant site. These impacts would require mitigation in accordance with USACE Section 404 permit requirements such that existing functional values of wetlands proposed to be impacted are replaced.</p> <p>Impacts to the 2,375 acres of wetlands that lie within the anticipated life-of-mine area would potentially occur over the 40-year life-of-mine. Any wetland impacts would require USACE CWA Section 404 permit issuance, which would require onsite mitigation (both on reclaimed mined lands and in adjoining upland areas not disturbed by mining), offsite mitigation, or a combination of both. Based on mitigation at other mine sites in the region, wetland functions would, after reclamation, be expected to return over time, as natural revegetation and succession and/or replanting occurs and wetland hydrology is restored.</p> <p>Within the linear facilities corridors, wetlands would be impacted primarily by conversion (partial clearing) of forested and some shrub-dominated wetlands for construction of linear facilities. Up to approximately 395 acres of wetlands and 58 acres of other waters (streams, ditches, ponds) could potentially be impacted by linear facilities construction. Most impacts would be conversion of forested and possibly shrub-dominated wetlands to shrub- and herbaceous-dominated wetland types. Construction practices in wetlands would retain the vegetative root mat in the right-of-ways not filled for access road or structure pad construction or in the pipeline trench excavation. Outside the areas where filling might be necessary for access roads, structure pads, or trenching for pipelines, herbaceous wetlands and other water resources (streams, ditches, and ponds) could potentially be avoided by construction during final engineering and design. All functional losses to wetlands would require mitigation as per USACE Section 404 permit requirements.</p>

Table S-5. Summary of Potential Impacts of the Kemper County IGCC Project (Continued, Page 4 of 6)

No-Action	Proposed Action
Land Use	
No changes in area land use. Sites and linear facility corridors would remain in current uses.	<p>Permanent IGCC power plant facilities (including transmission lines and pipelines) would alter almost 3,000 acres of land. The surface lignite mine would impact approximately 12,275 additional acres, although this land would not all be impacted simultaneously and would be reclaimed as mining progresses.</p> <p>The construction of the power plant would permanently convert the existing use of the power plant site (existing planted pine and hardwood forests) to an electrical power generating facility and mine support facilities, resulting in an approximately 0.24-percent loss of silviculture use in Kemper County. The development of the mine would temporarily change the existing land uses and would result in reduced silviculture until reclamation was complete. It is anticipated that a similar mix of land uses would exist after postmining reclamation as existed premining. Clearing of the transmission line and pipeline corridors and the substation sites would result in the permanent loss of the tree canopy and the current silvicultural use of the majority of the existing corridors and the substation sites.</p>
Socioeconomics	
No change in existing socioeconomic conditions. No potential for economic stimulus from proposed project. No change in existing conditions relative to community services.	Project development would result in positive direct and indirect effects through ad valorem taxes, sales tax proceeds from employee spending, and sales tax proceeds for purchases of equipment and services. Beyond the estimated combined construction payroll for the plant and mine of \$145 million, there would be an estimated additional indirect benefit of \$81.94 million and 186 additional jobs. The corresponding numbers for the operation of the plant and mine would be a \$25 million combined annual payroll (during demonstration), an indirect annual benefit of \$11.4 million, and 97 additional jobs. Project development would impact housing availability during construction, but sufficient housing would likely be available. Impacts that might still occur could be mitigated by use of per diem, for example, which would encourage the sharing of housing.
Environmental Justice	
No change in existing conditions relative to minority and low-income populations. No potential for adverse impacts or economic benefits from proposed project.	The power plant and surface mine would be located in Kemper County census tracts that have a higher percentage of minorities and a higher percentage of population below the poverty level than other census tracts within a 7-mile radius around the plant and in the state as a whole. Therefore, DOE has concluded that an environmental justice population exists, and consideration must be given to the potential for “disproportionately high and adverse” health or environmental effects, consistent with Executive Order 12898. The potential effects analyzed included health impacts from air emissions and accidental releases, displacement of landowners due to the development of the lignite mine, effects on ground water wells, transportation impacts, housing availability, aesthetics, and noise levels in sensitive areas. Based on an analysis of these potential effects, DOE has determined that construction and operation of the proposed facilities would not place high and adverse impacts and burdens on an environmental justice community, while exporting all of the benefits (e.g., jobs, direct and indirect economic benefits, etc.). For example, landowners would be compensated for use of their land through negotiated agreements with the mine owner. Air quality, water quality, and noise and health impacts would not exceed regulatory standards. Transportation, housing availability, and aesthetic impacts to the environmental justice population would be the same as for the general population. Conversely, construction and operation of the proposed facilities could have positive economic effects for the environmental justice population by creating employment and direct and indirect income in the area. Therefore, DOE has concluded that the potential effects in each resource area would not be expected to result in “disproportionately high and adverse” impacts to environmental justice populations.
Transportation	
No change in existing vehicular traffic. Level of service (LOS) conditions would remain the same.	The area roadways connecting to the existing population centers (primarily Meridian and Philadelphia and, less so, De Kalb) would be adequate to accommodate the anticipated traffic during construction and operation. Local roads in proximity to the proposed power plant location would experience impact in the form of degraded LOS during both construction and operation. Mitigation could take the form of carpooling or park and ride facilities. Heavy haul routes in proximity to the proposed plant location, specifically on Mississippi State Highway (MS) 493 from MS 16 south to the power plant site, would require evaluation by heavy haul carriers/providers for weight or other limitations. The initial coal hauling route from the Red Hills Mine to the proposed plant site would experience up to 80 trucks per day spread over a 16-hour day for a period of approximately 6 months.

Table S-5. Summary of Potential Impacts of the Kemper County IGCC Project (Continued, Page 5 of 6)

No-Action	Proposed Action
Waste Management	
No change in existing conditions. No increase in the risk of a hazardous waste release.	The existing Kemper County Solid Waste Landfill is undergoing expansion and has additional acreage within which to expand. There is no anticipated impact to the capacity of the landfill as a result of the proposed project. The landfill is currently undergoing expansion from 8.17 to 22.37 acres and has the ability to expand further within its 102-acre property.
Recreation	
No changes in use of recreational facilities.	Increases in construction and operation employment would equate to an increase in the combined populations of Kemper, Lauderdale, and Neshoba Counties of an estimated 1.1 percent (construction) and 0.4 percent (operation). The existing recreational facilities provide opportunities on a regional basis. These facilities would not be impacted by the relatively small population increases anticipated. The total volume of water reaching Okatibbee Lake would increase slightly, as would the levels of total dissolved solids in the lake; the change in lake water quality would neither result in changes in fish populations or species nor result in exceedances of state water quality standards. Localized increases in summer water temperatures would not be measurable in the lake. No other water flow or quality effects would occur. The recreational value of the lake would not be diminished.
Aesthetics and Visual	
No change in existing conditions. No change in viewsheds or aesthetic resources.	There are no unique views or scenic vistas in the area of the proposed power plant and surface mine sites and linear facilities corridors. There would be a change in the view to local residents and the traveling public along local roads where there would be lines of site to observe the taller plant structures and the transmission lines. The tallest stacks would likely require lighting per FAA requirements, and the lights would be noticeable from some vantage points in the area. The infrequent full operation of the emergency flares would result in a bluish purple flame that would be visible at night.
Cultural/Historic Resources	
All potentially impacted resources would remain in-place and unrecovered.	Construction of the proposed power plant could impact one onsite historic resource (house dating from approximately 1900). Mining could impact cultural resources, which have yet to be evaluated in terms of value. Mining of future mine blocks and construction of linear facilities would likely impact several sites that have been assessed as potentially eligible for listing. An effort would be made to avoid cultural resources when siting facilities. Evaluation and appropriate resource recovery would be guided by plans and protocols approved by the SHPO in consultation with Native American tribes. A project-specific programmatic agreement would be developed and followed.
Noise	
No new sources of noise would be built and operated. The existing sound environment would remain.	Power plant construction noise impacts would be temporary but noticeable at several nearby residences. With one exception, the highest levels experienced by residents would be no louder than maximum levels from passing vehicular traffic on MS 493. Steam blows that would be necessary over several days near the end of plant construction would potentially reach levels of annoyance to persons outdoors at the closest residences. Noise associated with power plant operation would result in an impact of 57 A-weighted decibels (dBA) (day-night sound level) at one adjacent residence, exceeding the U.S. Environmental Protection Agency residential guideline of 55 dBA but less than the Department of Housing and Urban Development residential guideline of 65 dBA. Mining would also result in localized noise impacts, primarily in the area surrounding the active mine block.

Table S-5. Summary of Potential Impacts of the Kemper County IGCC Project (Continued, Page 6 of 6)

No-Action	Proposed Action
Human Health/Safety	
No added health and safety risks. No increases in the probabilities of construction or operational health and safety risks.	<p>Construction of all of the proposed facilities would involve hazards typical of any large industrial construction project. Health and safety risks would accompany the construction efforts and could affect local residents as well as construction workers. Some injuries to construction workers would be likely, as indicated by industry statistics.</p> <p>Operations of the proposed industrial project facilities would entail risks, as well, given the nature of the facilities and based on industry statistics. The IGCC power plant would emit a maximum of 9.9 tpy of hazardous air pollutants (HAPs), including approximately 3 tpy of formaldehyde. Modeling studies to assess the potential impacts on health found that plant-emitted HAPs would not result in or contribute significantly to inhalation health risks. For instance, the total cancer risk was predicted to be less than one in a million (i.e., 3.5 in ten million). A cancer risk of one in a million is the level below which exposures are generally considered to be acceptable. The noncancer risks from the worst-case maximum exposure to the plant emissions would be far below levels considered to have adverse health effects, i.e., the total hazard quotient from exposure to all toxic emissions was much less than one (i.e., 0.0075). A hazard quotient below one is considered to have no adverse health effects. Similarly, predicted total deposition of emitted mercury was estimated to be less than 12 percent of that measured at a regional site.</p> <p>Additional health and safety risks would result from the handling, storage, and transport of hazardous materials, including ammonia and CO₂, especially as the result of an accidental release or intentional acts of sabotage or terrorism. A catastrophic (worst-case) rupture of an ammonia storage tank or tanker truck would potentially cause severe health effects up to 1.7 and 1.2 miles from the accident, respectively. A complete rupture of the CO₂ pipeline would potentially result in adverse health effects to exposed persons within 0.7 mile of the accident. Population along the pipeline corridor is sparse, and given the limited extent of the affected area (e.g., the plume width would only affect a small sector), it is unlikely that an accident would be result in injuries. All of these results were based on the worst-case accidental release scenarios.</p> <p>Based on estimates of employee and other facility-related vehicle-miles traveled, there would be the potential for fatalities during the operational life of the power plant and surface mine.</p>

The power plant's use of reclaimed effluent from two Meridian POTWs would remove a source of pollutants contributing to the impaired water quality of Sowashee Creek. At the same time, this manmade source of flow in the creek, which dominates total flow in the creek during natural low-flow conditions, would be removed. The result would be to return the creek to its more natural flow and quality characteristics.

The proposed facilities would provide permanent employment opportunities in a county where most residents currently travel out-of-county for work. The facilities would also offer opportunities for higher-paying industrial jobs and would add significantly to the economy of Kemper County and the surrounding area. However, local roads would experience large increases in traffic, especially during power plant and mine construction.

The acoustic environment of the area immediately surrounding the power plant site would change noticeably as a result of operation of the IGCC plant. For several of the closest residents along MS 493 east of the plant site, noise generated by the plant would alter the generally quiet environment that currently exists.

A few small ephemeral streams drain the hilly topography of the proposed power plant site. Portions of these drainages would be altered by construction of the power plant. The lignite mine study area contains several intermittent and perennial streams, the largest of which are Okatibbee and Chickasawhay Creeks. If permitted by USACE and MDEQ, construction and operation of the lignite mine as presented in this EIS would require the temporary diversion or channelization of some streams, including phased channelization of Chickasawhay Creek to allow mining within a portion of its existing valley. Mining would result in the temporary loss of aquatic habitat, and this loss would be somewhat offset by habitat provided in the diversion canals. USACE and MDEQ guidelines and permit conditions would require reclamation to replace the lost/impacted aquatic habitat functions associated with any streams permitted to be disturbed.

INCOMPLETE AND UNAVAILABLE INFORMATION

Several mining-related surface water and aquatic ecology issues have not been addressed quantitatively due to incomplete or unavailable information. More detail would be provided in future mine permit applications to MDEQ and USACE. Generally, the specifics surrounding proposed wetland mitigation and stream reclamation are presently unknown because reclamation and mitigation plans have not yet been developed. However, future permit applications would include detailed plans for mitigating wetland impacts and reclaiming streams. If permits are issued by USACE, wetland mitigation and stream restoration would be required in types and amounts determined by USACE to fully offset the functional values lost. Quantitative analysis is also not available with regard to potential impacts on downstream hydraulics, sediment transport, and channel stability resulting from diversion of Chickasawhay Creek and the related loss of floodplain storage and conveyance during mining operations. A qualitative assessment based on the best available information is provided.

Some issues associated with mining of future mine blocks would be considered in more detail during the permitting processes that would precede mining in those areas. While the area of the planned first mine block (i.e., the block that would be mined during the demonstration period) has been evaluated to a great extent, subsequent blocks have not received the same levels of characterization and evaluation. For example, the ecological resources and cultural/historical resources of future mine blocks would require further characterization. These further studies would occur closer in time to when mining would occur. It is possible that some areas currently identified for mine blocks would change in the future as mining progressed. For purposes of complying NEPA, a qualitative assessment using the best information available has been made in this EIS.

Similarly, corridors for several linear facilities have not been fully established and therefore have not been fully surveyed in the field. These include a portion of the planned corridor for the reclaimed effluent pipeline, the right-of-way for existing distribution lines needing upgrades to provide power for power plant and mine construction, and the new electrical transmission line to deliver power at a voltage required for mine facilities operation. Due to the lack of specific information on these routes or timely access to them, neither field studies to characterize the routes nor detailed assessments of impacts were possible. However, readily available information on area characteristics was assembled, and potential impacts were qualitatively assessed to the extent possible. The needs for access roads to support linear facilities construction have not been studied, so no assessment of potential impacts that would be associated with new or upgraded roads was possible for this EIS. Despite these limitations, the existing characteristics of the unsurveyed corridors and potential impacts within them because of project-related construction would likely be similar to those described in greater detail for the surveyed routes due to similar topographical, ecological, and land use characteristics.

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