

**MITIGATION ACTION PLAN**

**KEMPER COUNTY IGCC PROJECT**

**KEMPER COUNTY, MISSISSIPPI**

**U.S. Department of Energy**

**National Energy Technology Laboratory**

**September 2010**

## INTRODUCTION

The Department of Energy (DOE) issued a Final Environmental Impact Statement (EIS) for the Kemper County IGCC Project (Project) (DOE/EIS-0409) in May 2010 and a Record of Decision (ROD) in August 2010 (75 FR 51248). The ROD identified commitments to mitigate potential adverse impacts associated with the project. This Mitigation Action Plan (MAP) describes the monitoring and mitigation actions the recipient must implement during the design, construction, and demonstration of the Project. DOE prepared this MAP in accordance with 10 CFR § 1021.331.

## PURPOSE

Section 1021.331 of the DOE regulations implementing NEPA (10 CFR Part 1021) provides that:

(a) Following completion of each EIS and its associated Record of Decision (ROD), DOE shall prepare a Mitigation Action Plan that addresses mitigation commitments expressed in the ROD. The Mitigation Action Plan shall explain how the corresponding mitigation measures, designed to mitigate adverse environmental impacts associated with the course of action directed by the ROD, will be planned and implemented. The Mitigation Action Plan shall be prepared before DOE takes any action directed by the ROD that is the subject of a mitigation commitment.

....

(c) Each Mitigation Action Plan shall be as complete as possible, commensurate with the information available regarding the course of action . . . directed by the ROD . . . DOE may revise the Plan as more specific and detailed information becomes available.

(d) DOE shall make copies of the Mitigation Action Plan[] available for inspection in the appropriate DOE public reading room(s) or other appropriate location(s) for a reasonable time. Copies of the Mitigation Action Plan[] shall also be available upon written request.

Accordingly, the MAP has four major purposes:

- to specify the environmental impacts subject to mitigation as indicated in the FEIS and the ROD,
- to describe the mitigating measures to be performed,
- to identify the party accountable for the mitigating measures, and
- to identify the parties implementing the mitigating measures set out in the MAP.

In addition to the mitigation measures identified in the MAP, all parties must comply with applicable federal, state, and local environmental laws, orders, and regulations. For purposes of the MAP, these compliance activities are not considered to be mitigation measures subject to DOE control and hence are not addressed in detail in this document. DOE will review the final project design to ensure its consistency with the impacts and mitigation measures in the FEIS, ROD, and MAP.

## **BACKGROUND**

Public Law 107-63, enacted in November 2001, first provided funding for the Clean Coal Power Initiative (CCPI). The CCPI is the current multiyear federal program to accelerate the commercial readiness of advanced multipollutant emissions control, combustion, gasification, and efficiency improvement technologies to retrofit or repower existing coal-based power plants and to deploy in new coal-based generating facilities. The CCPI encompasses a broad spectrum of commercial-scale demonstrations that target today's most pressing environmental challenges, including reducing mercury and greenhouse gas (GHG) emissions by boosting the efficiency at which coal is converted to electricity or other energy forms. The CCPI is closely linked with DOE's research and development activities directed toward creating ultraclean, fossil fuel-based energy complexes in the 21st century. When integrated with other DOE initiatives, the CCPI will help the nation successfully commercialize advanced power systems that will produce electricity at greater efficiencies, produce almost no emissions, create clean fuels, and employ carbon dioxide (CO<sub>2</sub>) management capabilities.

The purpose of DOE's action under the CCPI program is to demonstrate the feasibility of this selected IGCC technology at a size that would be attractive to utilities for commercial operation. The proposed IGCC facility would be owned and operated by Mississippi Power Company at a site in Kemper County, Mississippi. The gasifier design is based on a technology that Southern Company (Mississippi Power's parent company), Kellogg Brown & Root LLC, DOE, and other industrial proponents have been developing since 1996 at the Power Systems Development Facility (PSDF) near Wilsonville, Alabama.

A successful demonstration 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 cost-shared financial assistance from DOE would reduce the cost and financial risk in demonstrating the technology at the level of maturity needed for decisions on commercialization.

## **PROJECT DESCRIPTION**

The Kemper County IGCC Project power plant would be located on an approximately 1,650 acre site in southwestern Kemper County. The mine and linear facilities (e.g., pipelines) would extend into several other counties. The power plant site and mine area are rural and sparsely populated. The electrical transmission lines and pipelines would also traverse mostly rural areas. Mississippi Power plans to acquire additional properties adjacent to the proposed power plant site for use as buffer areas. Approximately 1,400 acres of land immediately north and east of the site have been acquired, optioned, or identified for acquisition. None of the planned buffer land would be used

during project construction or for permanent project facilities, although some of the linear facilities may cross this additional buffer land.

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 delivery, gasification, and syngas (i.e., synthesis gas from the gasification of solid fuel) processing and cleanup. There would be two lignite gasifiers. At full capacity, the gasifiers would convert an average of 13,800 tpd of lignite into syngas. The design lignite feed rate to each gasifier would be approximately 290 tons per hour. Lignite would be supplied by an adjacent mine. Syngas would be the fuel for the combined-cycle power generating units. The principal combined-cycle components would include two combustion turbines (CTs), two heat recovery steam generators (HRSG), 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 turbine for the Kemper County IGCC Project would generate a nominal 582 megawatts (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. Construction of the proposed IGCC power plant would begin in 2010, continue for 3.5 years, and end in spring 2014. The demonstration of the Project would end 54 months after completion of construction.

The Kemper County IGCC Project's connected actions consist of construction and operation of a reclaimed effluent supply pipeline, a natural gas pipeline, associated transmission lines (and substations), CO<sub>2</sub> pipelines, and a lignite mine. The 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 tons per year of lignite would be produced to fuel the IGCC facilities 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 135 and 340 acres per year.

## **ROLES AND RESPONSIBILITIES**

The IGCC power plant would be owned and operated by Mississippi Power Company, a subsidiary of Southern Company. Southern Company Services (SCS), also a subsidiary of Southern Company, has lead responsibility for the design, engineering and construction activities for the power plant and its ancillary facilities. Mississippi Power would own, through its subsidiary or directly, the mine. North American Coal Corporation (NACC) would construct and operate the mine and mining facilities under a management fee arrangement.

DOE entered into a cooperative agreement with SCS to provide funding for the Project under CCPI. The cooperative agreement states:

If DOE approves in the ROD the proposed action subject to specific conditions, limitations, mitigation requirements, and/or monitoring requirements, the

Recipient agrees to: a) abide by the conditions, limitations, mitigation requirements, and/or monitoring requirements specified in the ROD; b) negotiate changes to the project schedule, costs, and/or scope as necessary to effect the requirements or conditions in the ROD; c) allow DOE's authorized representatives the right to visit the site and facilities at reasonable times and upon reasonable notice to verify compliance with any conditions and requirements in the ROD; and d) submit data or otherwise meet specified reporting requirements that may be in the ROD.

As the recipient named in the cooperative agreement, SCS is the party responsible for the commitments described in this MAP directly or through its affiliates and contractors. DOE will ensure that these commitments are met through management of the cooperative agreement.

### **MITIGATION PERIOD AND MANAGEMENT**

The conditions of the ROD and the MAP extend through the end of the demonstration of the Project. The following Table lists the resource areas, monitoring requirements, mitigation commitments, and reporting requirements. Items in the Table highlighted in bold type are those requirements specifically identified in the ROD. The Table also identifies the parties that will implement each of the monitoring and mitigation commitments; SCS is responsible for ensuring the performance of these parties. Where the Table requires quarterly reporting, such reports for each calendar quarter will be due by the end of the following quarter. Annual reports for the previous calendar year will be due by April 1<sup>st</sup> of the following year. Any final reports required in the Table shall be due 6 months after completion of the demonstration of the Project. Upon the end of the demonstration, no further quarterly or annual reports shall be due. Any partial quarter or calendar year not addressed in a separate report shall be covered in the final report. Reports shall include a summary of compliance with the relevant mitigation commitments. All reporting will be performed by SCS. Monitoring, mitigation, and reporting commitments in the Table will be removed from the MAP if equivalent mitigation requirements are otherwise established by permit, license, or law (e.g., as part of a permit issued under Section 404 of the CWA). Once such an external requirement covering the substance addressed by a mitigation condition becomes effective, SCS shall, with cooperation from the implementing party, notify DOE of that requirement in writing. Unless DOE determines within 60 days of such notification that the mitigation requirements established by permit, license, or law would not appropriately address the commitment specified in this MAP, then the corresponding monitoring, mitigation and reporting commitments will no longer apply.

**Monitoring, Mitigation and Reporting Requirements for  
Kemper County IGCC Project and Connected Actions**

<b>RESOURCE AREA</b>	<b>MONITORING</b>	<b>MITIGATION</b>	<b>IMPLEMENTING PARTY</b>	<b>REPORTING</b>
<b>Air Quality – Diesel emissions</b>	<b>Not applicable</b>	<b>Off-road vehicles and stationary diesel engines will use low-sulfur diesel fuel; to the extent practicable, use engines with exhaust filtration devices and/or catalytic converters; properly maintain diesel-fueled equipment by observing the manufacturer’s recommended maintenance schedule and procedures; train operators to perform routine inspection and maintenance; and employ safe work practices by, where appropriate, directing exhausts away from operators and nearby workers and ventilating indoor diesel equipment.</b>	<b>MPC – power plant NACC – mine</b>	<b>Annually during construction period; final report following end of demonstration period.</b>
<b>Air Quality – Fugitive Dust</b>	<b>Not applicable</b>	Implement Best Management Practices (BMPs) during lignite delivery and mining operations, including: <ul style="list-style-type: none"> <li>• Minimizing land clearing in advance of mining;</li> <li>• Reclaiming land as soon as practicable following lignite extraction;</li> <li>• Watering or applying other dust suppressants on mine haul roads;</li> <li>• Planting temporary cover crops on mined land;</li> <li>• Constructing earthen berms adjacent to sensitive receptors (e.g., homes and</li> </ul>	<b>NACC</b>	<b>Quarterly during mining operations.</b>

		<p>churches) if immediately adjacent mined land must remain unreclaimed for more than three years;</p> <ul style="list-style-type: none"> <li>• Restricting the speed of vehicles;</li> <li>• Frequent scraping and compaction of unpaved roads;</li> <li>• Revegetating, mulching, or otherwise stabilizing the surface of areas adjoining roads that are sources of fugitive dust;</li> <li>• Extinguishing any burning or smoldering coal and periodically inspecting for burning whenever the potential for spontaneous combustion is high;</li> <li>• Restricting fugitive dust at spoil and coal transfer and loading points with water sprays, negative pressure systems and baghouse filters, chemicals or other practices.</li> </ul>		
<b>Air Quality – Hazardous Air Pollutants (HAPs)</b>	<b>Characterize IGCC stack emissions of HAPs by testing turbine exhaust during normal operations for those HAPs identified in the PSD permit application as potentially resulting from syngas firing.</b>	<b>Not applicable</b>	<b>MPC</b>	<b>Test plan 90 days before testing; final report following end of demonstration period.</b>
<b>Climate</b>	<b>Determine carbon capture rate achieved during reporting period.</b>	<b>Use best efforts to achieve 67% carbon capture during the demonstration period.</b>	<b>MPC</b>	<b>1. Report any issue or development during design, construction or</b>

				<p><b>demonstration that may jeopardize achievement of 67% carbon capture during the demonstration period.</b></p> <p><b>2. Summary report of final carbon capture design and predicted performance 90 days before start of operations.</b></p> <p><b>3. Quarterly reporting during demonstration period; final report at end of demonstration period.</b></p>
<b>Surface Water - Quantity</b>	<b>Monitor impacts of mining construction and operation on volume of Lake Okatibbee consistent with the adaptive management plan developed in consultation with the</b>	<b>In the event that peak flows following storm events exceed historic peak in-stream flow rates by an amount to be set in the adaptive management plan as a result of project activities, implementation of the adaptive management plan will be initiated.</b>	<b>NACC</b>	<b>Draft adaptive management plan addressing volume effects on Lake Okatibbee to be prepared and submitted to DOE 90 days after issuance of</b>



	<b>USACE and MDEQ.</b>			<b>section 404 permit (if issued), or within 6 months of issuance of DOE ROD, whichever is sooner; quarterly monitoring reports upon start of mine construction.</b>
<b>Surface Water Quality– Mine area &amp; Lake Okatibbee</b>	<b>Monitoring upstream and downstream of the mine area (including sedimentation ponds), and upstream, and in, Lake Okatibbee consistent with an approved monitoring plan developed in consultation with the USACE and MDEQ. Monitoring parameters and locations will be determined in the approved monitoring plan.</b>	<b>Implement corrective measures identified in the adaptive management plan in the event that monitoring detects adverse impacts.</b>	<b>NACC</b>	<b>Draft monitoring plan and draft adaptive management plan addressing surface water quality to be prepared and submitted to DOE 90 days after issuance of section 404 permit (if issued), or within 6 months of issuance of DOE ROD, whichever is sooner; quarterly monitoring and mitigation</b>

				reports upon start of mine construction.
<b>Drinking water</b>	<b>To ensure that potable water supply wells are not affected, an updated supply well inventory will be prepared for all properties located within 10,000 feet of lands disturbed by lignite extraction. A groundwater monitoring network will be installed between the active mining area and the inventoried wells to identify potential impacts resulting from mining operations to such wells. The network will be sampled and analyzed quarterly for parameters specified in the approved monitoring plan. A preliminary list of parameters is shown in Appendix A.</b>	<b>None.</b>	<b>NACC</b>	<b>Draft monitoring plan to be prepared and submitted to DOE 90 days after Surface Mine Control and Reclamation Act permit (if issued), or within 18 months of issuance of DOE ROD, whichever is sooner; baseline and annual monitoring reports will be provided after well installation.</b>

<b>Terrestrial Ecology – Invasive Species</b>	<b>Monitoring to detect increases in invasive, exotic or nuisance plant species resulting from project activities.</b>	<b>Consistent with Executive Order 13112, implement chemical, fire, mechanical, or other weed control measures to remove invasive species that result from the Project; prevent the introduction of invasive species as a result of the Project; respond rapidly to and control adverse increases in populations of such species in a cost-effective and environmentally sound manner. Where economically practicable, native species will be restored to ecosystems that have been invaded.</b>	<b>MPC – power plant, transmission corridors; NACC – mine; Owners – other linear facilities</b>	<b>Annually during construction.</b>
<b>Terrestrial Ecology – Protected Species</b>	<b>Not applicable</b>	<b>Use best efforts to support DOE in the event additional consultation with U.S. Fish and Wildlife Service is initiated.</b>	<b>MPC – power plant, transmission corridors; NACC – mine; Owners – other linear facilities</b>	<b>Report to DOE promptly in the event it is determined that, during any phase of the project, federally listed species might be adversely impacted.</b>
<b>Aquatic Ecology - Habitat</b>	<b>Conduct rapid bioassessment protocols similar to those described in Appendix I of the Final EIS for macroinvertebrates and fish at all water quality monitoring stations immediately</b>	<b>Implement adaptive management plan in the event bioassessments identify material adverse impacts from mining operations to macroinvertebrate and fish communities.</b>	<b>NACC</b>	<b>Upon initiation of construction monitoring will occur quarterly for four quarters and annually thereafter for the duration of the demonstration project.</b>

	<b>upstream or downstream of areas affected by active mining or active reclamation.</b>			
Aquatic Ecology - Invasive Species	Monitor sediment ponds for invasive species by methods to be specified in the adaptive management developed in consultation with USACE and MDEQ.	Incorporate design features in consultation with USACE and MDEQ to avoid or minimize release of fish species from sedimentation pond discharges. Implement mitigation specified in adaptive management plan, consistent with Executive Order 13112	NACC	Draft adaptive management plan identifying design features and addressing aquatic invasive species to be prepared and submitted to DOE 90 days after issuance of section 404 permit (if issued), or within 6 months of issuance of DOE ROD, whichever is sooner; annual monitoring reports upon start of mine construction.
<b>Floodplains</b>	<b>Not applicable</b>	<b>Floodplain impacts to be minimized through construction methods and timing to the extent practicable.</b>	<b>MPC – transmission corridors; Owners – other linear facilities</b>	<b>Annually</b>
<b>Wetlands</b>	<b>Not applicable</b>	<b>Wetland impacts to be avoided until the USACE makes a final decision in accordance with 33 CFR 325. Mitigation</b>	<b>MPC – power plant, transmission corridors;</b>	<b>Quarterly progress reports of discussions</b>

		plans to be consistent with 33 CFR 332, Compensatory Mitigation for Losses of Aquatic Resources; Final Rule. The USACE will determine the specifics of the mitigation requirements in the Section 404 permit application evaluation process.	NACC – mine; Owners – other linear facilities	with USACE and MDEQ; schedule for reporting on wetlands mitigation based on mitigation plans approved by USACE and MDEQ.
Noise	Monitoring at appropriate locations during construction and operation.	Notification of affected residents before all steam blows. Noise impacts will be mitigated by the acquisition of additional properties surrounding the plant site. In the event any affected residents are located on unacquired properties, additional mitigation measures will include controlling noise from the loudest pieces of equipment to the extent practicable to mitigate impacts, either through construction of barrier walls or other means to achieve similar levels of reduction as barrier walls; limiting noisiest construction activities to daytime hours to the extent practicable.	MPC – power plant	Annually, including updates on the acquisition of nearby properties.
Transportation	Note road rutting before and after the 6 month delivery period for Red Hills lignite (road damage).	Mitigation to include limiting hauling from the Red Hills Mine to daytime hours to the extent practicable, and encouraging carpooling and off-peak truck deliveries to avoid peak-hour traffic; ascertain current traffic volumes; determine roadway widths; identify any possible “choke points” and	MPC – power plant site; NACC – mine, coal hauling	Quarterly

		<b>possibly establish passing lanes.</b>		
<b>Cultural Resources</b>	<b>Not applicable</b>	<b>Mitigation managed through a separate Programmatic Agreement which has been executed by all parties</b>	<b>Not applicable</b>	<b>Not applicable</b>
<b>Environmental Justice</b>	<b>Mississippi Power would monitor housing availability utilizing resources such as a local realty board.</b>	<b>Make information on housing availability, housing costs, utility costs, and information on potential sources of assistance available to the community as described in Mississippi Power’s Kemper County Community Plan. Continue to provide opportunities for community engagement and to pursue a strategy of employment and training opportunities for the local population.</b>	<b>MPC</b>	<b>Annually</b>

Appendix A  
Preliminary List of Water Monitoring Parameters

Parameter (Test Method – unless another method is approved by USACE or MDEQ)

Stream Flow, cubic feet per second  
Water level, ft msl (monitoring wells)  
Specific conductance (SC),  $\mu\text{S}/\text{cm}$   
Total Dissolved Solids (TDS), mg/l (EPA Method 160.1)  
Total Suspended Solids, mg/l  
Turbidity, Nephelometric Turbidity Units (NTU)  
Temperature,  $^{\circ}\text{C}$   
Sulfates, mg/l (EPA Method 300.0)  
Chlorides, mg/l (EPA Method 300.0)  
Bicarbonate Alkalinity, mg/l  
Total Dissolved Antimony,  $\mu\text{g}/\text{l}$  (EPA Method (EPA Method 200.8))  
Total Dissolved Arsenic,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Beryllium,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Cadmium,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Chromium,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Copper,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Iron,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Lead,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Manganese,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Mercury,  $\mu\text{g}/\text{l}$  (EPA Method 1631E or 245.7)  
Total Dissolved Nickel,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Selenium,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Silver,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Total Dissolved Thallium,  $\mu\text{g}/\text{L}$  (EPA Method 200.8)  
Total Dissolved Zinc,  $\mu\text{g}/\text{l}$  (EPA Method 200.8)  
Hardness, mg/l (as  $\text{CaCO}_3$ ) (SM 2340B)  
pH, Standard Units  
Total Calcium,  $\mu\text{g}/\text{l}$  (EPA Method 200.7)  
Total Magnesium,  $\mu\text{g}/\text{l}$  (EPA Method 200.7)  
Total Sodium,  $\mu\text{g}/\text{l}$   
Total Potassium,  $\mu\text{g}/\text{l}$