DOE/EA 1704

MITIGATION ACTION PLAN FOR THE FINAL ENVIRONMENTAL ASSESSMENT, NOTICE OF WETLAND INVOLVEMENT, AND MITIGATED FINDING OF NO SIGNIFICANT IMPACT FOR THE CONSTRUCTION AND OPERATION OF A LIGNOCELLULOSIC BIOREFINERY, BLUEFIRE FULTON RENEWABLE ENERGY, LLC, FULTON, MISSISSIPPI

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1.0 Introduction

The United States Department of Energy (DOE) has issued a Final Environmental Assessment (EA) and Notice of Wetland Involvement (NOWI) and a Finding of No Significant Impact (FONSI) for the proposed construction and operation of a lignocellulosic ethanol biorefinery, BlueFire Fulton Renewable Energy, LLC in Fulton, Mississippi. The EA for this project was completed in compliance with the National Environmental Policy Act (NEPA) as required by 40 Code of Federal Regulations (CFR) 1508.18. The Final EA and NOWI and the FONSI are available at http://www.eere.energy.gov/golden/reading_room.aspx.

Through the environmental review process, the DOE determined that there would be potential environmental impacts from the proposed project that would require mitigation to assure that the impacts would not become significant. Therefore, the DOE prepared this Mitigation Action Plan (MAP) to establish conditions for issuing the FONSI as required by 10 Code of Federal Regulations (CFR) 1021.322, which stipulates that:

> *(b) In addition to the requirements found at 40 CFR 1508.13, a DOE FONSI shall include the following:*
>
> *(1) Any commitments to mitigations that are essential to render the impacts of the proposed action not significant, beyond those mitigations that are integral elements of the proposed action, and a reference to the Mitigation Action Plan prepared under 1021.331 of this part:*

The potential impacts requiring commitments and mitigation relate to the following:

1. Site from construction and operation of the Fulton Project;
2. Wetland impacts from site construction; and
3. Storage and handling of hazardous materials.

1.1 Purpose of the Mitigation Action Plan

The purpose of this MAP is to specify the methods for implementing mitigation measures that address the potential environmental impacts identified in the DOE EA and NOWI 1704. The development of these measures and an implementation plan, as a necessary condition for the FONSI, is described by 40 CFR 1021.331(b) "Mitigation action plans", as follows:

> *(b) In certain circumstances, as specified in §1021.322(b)(2), DOE shall also prepare a Mitigation Action Plan for commitments to mitigations that are essential to render the impacts of the proposed action not significant. The Mitigation Action Plan shall address all commitments to such necessary mitigations and explain how mitigation will be planned and implemented. The Mitigation Action Plan shall be prepared before the FONSI is issued and shall be referenced therein.*
>
> Mitigation measures identified herein shall be incorporated and enforceable through DOE's Technology Investment Agreement with POET.

1.2 Structure of the Mitigation Action Plan

This MAP is organized as follows:

- Section 1 presents the introduction, purpose and structure;

- Section 2 presents the potential impacts, mitigation measures, metrics for defining success or failure of the mitigation measures, and monitoring methods for the potential site geology and soils impacts;
- Section 3 presents the potential impacts, mitigation measures, metrics for defining success or failure of the mitigation measures, and monitoring methods for the potential biological resource; and
- Section 4 presents the potential impacts, mitigation measures, metrics for defining success or failure of the mitigation measures, and monitoring methods for the potential impacts due to storage and use of hazardous materials.

2.0 Geology and Soils

This section of the MAP presents the potential impacts, mitigation measures, metrics for defining success or failure of the mitigation measures, and monitoring methods for the potential Geological and Soil impacts.

2.1 Potential Impacts

Construction of the facility and associated infrastructure would include development of approximately 38 acres of land that is currently vacant. The site would require grading, excavation, and site development activities associated with construction of the Fulton Project. These construction activities have potential to impact the surface soils on the project site via erosion.

2.2 Mitigation Measures

BlueFire would develop an Erosion Control Plan as part of the Storm Water Pollution Prevention Plan (SWPPP) for construction to prevent excess erosion or degradation of the site during construction. The construction SWPPP would contain Best Management Practices (BMPs) regarding soil erosion, sedimentation control and spill response/control measures necessary to protect the environment. These BMPs may include:

- Installation of silt fencing;
- Installation of hay bales for sediment control;
- Construction of temporary stormwater retention ponds;
- Retention of vegetative cover where practical.

The areas disturbed during construction, such as equipment laydown areas that are not part of the active facility, would be seeded with appropriate grasses and vegetation as part of the erosion control plans and SWPPP for the facility.

2.3 Metrics for Determining Success or Failure of the Mitigation Measures

The metrics for success would be the completion and implementation of the Erosion Control Plan and construction SWPPP. Inspections to ensure the BMPs were implemented would be completed and documented routinely throughout the construction activities.

2.4 Monitoring Techniques for Mitigation Measures

BlueFire would conduct routine site inspections throughout the construction activities. The site inspections would be documented and records maintained on-site. BlueFire would maintain the site inspection documentation for the BMPs specified in the construction and operation SWPPPs, for the duration of the contract with the DOE.

A copy of the construction SWPPP and the operation SWPPP would be provided to DOE.

3.0 Biological Resources

This section of the MAP presents the potential impacts, mitigation measures, metrics for defining success or failure of the mitigation measures, and monitoring methods for the potential biological resource impacts.

3.1 Potential Impacts

The Fulton Project would impact approximately 13.5 acres of wetlands on-site. Approximately 12 acres of wetlands would be cleared and approximately 1.48 acres of wetlands would be filled. The Itawamba County Board of Supervisors has filed an application under Section 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act with the United States Army Corps of Engineers (USACOE) Mobile District to allow clearing and filling of wetlands on-site. Itawamba County completed Wetland Rapid Assessment Procedure (WRAP) to determine the amount of wetland mitigation that would be required. Based on the WRAP, Itawamba County has determined that a total of 7.5 acres of mitigation wetlands would be required. The mitigation wetlands would consist of restored former bottomland hardwood forested wetlands located in Monroe County, Mississippi.

The draft permit for the wetland impacts has been put on public notice by the USACOE Moblie District for these impacts.

3.2 Mitigation Measures

Seven and one-half acres of mitigation wetlands would be purchased by the Itawamba County Board of Supervisors to offset the loss of on-site wetlands.

3.3 Metrics for Determining Success or Failure of the Mitigation Measures

The metric for determining success of the wetland mitigation would be acquiring confirmation of the purchase of wetland mitigation acres from the Itawamba County Board of Supervisors. A copy of the confirmation would be submitted to the DOE. The above documents would be maintained by BlueFire for the duration of the contract with the DOE

3.4 Monitoring Techniques for Mitigation Measures

No monitoring would be required.

4.0 Waste Management and Hazardous Materials

This section of the MAP presents the potential impacts, mitigation measures, metrics for defining success or failure of the mitigation measures, and monitoring methods for the potential Waste Management and Hazardous Materials impacts.

4.1 Potential Impacts

The Fulton Project would store and use various hazardous materials. The following table summarizes the hazardous chemicals that are expected to be present on-site in significant quantities.

Table 1 - Summary of Hazardous Materials Stored On-Site

Chemical	Use	Stored on Site		Form/Type
		Quantity	Units	
Alumina Silicate ($AlSiO_3$)	Mole sieve desiccant	193	ton	1-3" balls
Alumina Silicate ($AlSiO_3$)	Air Dryer Desiccant	241	Cubic Feet (CuFt)	Small Pellets
Anion & Cation Exchange Resin	Demineralizer Water Treatment	135	CuFt	Granular, sacks or drums
Anion & Cation Exchange Resin	Simulated Moving Bed (SMB) Chromatographic Separator	23,327	CuFt	Fine 300-micron pellets
Boiler Sand	Circulating Bed makeup material	220	ton	Granules
Carbon Absorbent	Vapor Recovery Carbon Bed	2,410	lbs.	Granules
Diesel Fuel	Mobile equipment and fixed firefighting fuel	4,000	gal	Liquid
Fire Foam Detergent	Firefighting foam dispersant	1,000	gal	Liquid
Laboratory Reagents	QA/QC Product Test Analysis, Plant analysis	50	gal	Small Reagent containers 0.5-1 L
Lubrication Oil	Rotating Equipment Lubricant	3,200	gal	Liquid, Drums

Chemical	Use	Stored on Site		Form/Type
Mineral Insulating Oil	Transformers' Coil Insulator	2,410	gal	Liquid, Drums
Sodium Hypochlorite (NaOCl)	Disinfectant for potable water system	165	gal	Liquid, 10% NaOCl
Sucrose Sugar	Emergency Fermentation Food Source for Yeast	143,169	lbs.	Granular, sacks or drums
Unleaded Gasoline	Ethanol Product Denaturant	16,400	gal	Liquid, Flammable Fuel
Fermentation Beer	Sugars in process or product of fermentation	637,300	gal	Liquid, ~8% ethanol, some sugar, water
Hydrolysate	Biomass conversion product in process	69,500	gal	High Solids Liquid acid and sugar mixture
Mixed sugars raffinate	Purified mixed sugar SMB product	91,200	gal	Liquid, ~18% mixed sugars
Sulfuric Acid (H_2SO_4)	Diluted acid SMB extract or intermediate ARU product	96,700	gal	Liquid, 18-20% H_2SO_4
Sulfuric Acid (H_2SO_4)	75% Reconcentrated acid ARU product	70,900	gal	Liquid, 75% H_2SO_4
Ammonium Bifluoride (NH_4HF_2)	Boiler Heat Recovery Steam Generator (HRSG) Chemical Cleaning	1,000	lbs.	Granular, sacks or drums
Battery Electrolyte	Stationary and mobile batteries	120	gal	Liquid, 5-gallon containers
Citric Acid	Boiler HRSG Chemical Cleaning	1,000	lbs.	Granular, sacks or drums
Formic Acid	Boiler HRSG Chemical Cleaning Feedwater system	165	gal	Liquid
Hydrochloric acid (HCl)	Boiler HRSG Chemical Cleaning	500	gal	Liquid, 90% HCl

Chemical	Use	Stored on Site		Form/Type
Hydroxyacetic acid	Boiler HRSG Chemical Cleaning Feedwater system	1,000	lbs.	Granular, sacks or drums
Sodium Carbonate (Na_2CO_3)	Boiler HRSG Chemical Cleaning	1,000	lbs.	Granular, sacks or drums
Sodium Nitrate ($NaNO_3$)	Boiler HRSG Chemical Cleaning	1,000	lbs.	Granular, sacks or drums
Carbon Dioxide	Recovered Fermenter Industrial Gas	10,400	gal	Liquid CO_2 under pressure
Ethanol	Product and dehydrated ethanol	131,000	gal	Liquid, 99.5-95% ethanol flammable
Gypsum ($CaSO_3$)	Gypsum Product	90	ton	Chunks of fine agglomerated particles 50% moisture
Lignin	Boiler Fuel, soil amendment	350	ton	Chunks of fine agglomerated particles 50% moisture
Ammonia (NH_3OH)	Selective Non-Catalytic Reduction (SNCR) Boiler Emissions	20,000	gal	Liquid, 30% NH_3
Cyclohexylamine ($C_6H_{11}NH_2$)	Boiler Feedwater pH control	55	gal	Liquid
Hydrazine (N_2H_4)	Boiler Feedwater Oxygen scavenger	110	gal	Liquid, 35% N_2H_4
Limestone ($CaCO_3$)	Boiler Combustion Sulfur Reagent	100	ton	Rocks of 1-3" size
Phosphoric Acid (H_3PO_4)	Nutrient and pH Adjustment for Sugar Fermentation	23,300	gal	Liquid, 90% H_3PO_4
Potassium Hydroxide (KOH)	Nutrient and pH Adjustment for Sugar Fermentation	1,400	gal	Granular, sacks or drums
Scale Inhibitor	Circulating Water scale control	775	gal	Liquid

Chemical	Use	Stored on Site		Form/Type
Slaked Lime ($Ca(OH)_2$)	Neutralizer Feedstock for Residual Sulfuric Acid	1,775	ton	Powder, Truck Delivery
Sodium Hydroxide (NaOH)	5% CIP Sterilization Circulating Fluid	20,000	gal	Liquid, 5% NaOH
Sulfuric Acid (H_2SO_4)	Demineralizer resin regeneration and neutralization	1,000	gal	Liquid, 93% H_2SO_4
Sulfuric Acid (H_2SO_4)	Circulating Water pH and Alkalinity control	550	gal	Liquid, 93% H_2SO_4
Sulfuric Acid (H_2SO_4)	Acid Hydrolysis Process Makeup Catalyst	21,300	gal	Liquid, 93% H_2SO_4
Trisodium Phosphate (Na_3PO_4)	Boiler feedwater water pH and scale control	165	gal	Granular, sacks or drums
Urea (H_2NCONH_2)	Nutrient for Sugar Fermentation	500	gal	Granular, sacks or drums
Sodium Hydroxide (NaOH)	5% CIP Sterilization Circulating Fluid	10,000	gal	Liquid, up to 50% NaOH

The potential impact to the environment would be a spill or release of one or more hazardous material to the environment.

4.2 Mitigation Measures

Hazardous Waste

The hazardous wastes would be transported off-site by a licensed hazardous waste transportation company to a licensed hazardous waste treatment, storage, and disposal facility. Spent acids and acidic waste that could not be reused on-site would be neutralized on-site. Neutralized solid waste would be disposed off-site with other non-hazardous waste. Neutralized liquid waste would be discharged with other waste water to the City of Fulton POTW.

Universal Waste

The universal wastes generated by the facility would include used oil, fluorescent and high intensity discharge (HID) light bulbs, and batteries will be transported off-site by a licensed universal waste transportation company to a licensed disposal facility.

Hazardous Materials

The storage tanks located outside would be designed and constructed with secondary containment structures sufficient to hold the contents of the largest tanks plus sufficient additional volume for rain fall. Tanks located inside the buildings may also be located in secondary containment if determined to be necessary for employee safety or protection of the environment. Each storage tank would be constructed using materials compatible with the chemical being stored.

BlueFire would develop appropriate spill response, pollution prevention, and Emergency Response Plans (ERPs) to address the medical and environmental hazards associated with the Fulton Project. The plans would include, at a minimum, a Spill Prevention, Control and Countermeasure (SPCC) Plan, a SWPPP for operations, and an ERP. The plans would be completed in accordance with federal and Mississippi Occupational Safety and Health Administration (OSHA) and USEPA and MDEQ regulations and guidance. Spill equipment kits would be acquired as needed. Spill response training would be provided to employees working with the hazardous materials stored and used on-site. These measures would prevent impacts from spills of hazardous materials.

BlueFire would also prepare appropriate safety and emergency response procedures for construction activities, excavation and trenching, electrical, hazardous chemicals, hot work permits, fall prevention, proper equipment usage, confined space entry, fire protection and prevention, and hearing and respiratory protection for employees, contractors and visitors.

4.3 Metrics for Determining Success or Failure of the Mitigation Measures

The metric for determining success would be completion of the ERPs.

4.4 Monitoring Techniques for Mitigation Measures

No monitoring would be required for this mitigation measure.