

EXHIBIT A
PROJECT DESCRIPTION

FINAL

**ALABAMA POWER COMPANY
WARRIOR RIVER PROJECT
FERC NO. 2165**

**APPLICATION FOR NEW LICENSE
FOR MAJOR WATER POWER PROJECT - EXISTING DAM**

EXHIBIT A

PROJECT DESCRIPTION

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1.0 INTRODUCTION

The Warrior River Hydroelectric Project (Project) is comprised of two, existing, licensed major hydroelectric facilities owned and operated by Alabama Power Company (APC), a wholly owned subsidiary of Southern Company. The Project is comprised of the Lewis Smith (Smith) and Bankhead hydroelectric developments, both of which entered service in the early 1960's. The Lewis Smith development is located in northwestern Alabama in the headwaters of the Black Warrior River on the Sipsy Fork in Cullman, Walker, and Winston counties. The Bankhead development is located in central Alabama downstream of the Lewis Smith development, on the Black Warrior River in Tuscaloosa County.

The existing 50-year project license was issued to APC by the Federal Power Commission (FPC), the predecessor to the Federal Energy Regulatory Commission (FERC), on September 12, 1957, and is due to expire on August 31, 2007.

APC has been granted permission by FERC to utilize Alternative Licensing Procedures (ALP) to combine the FERC relicensing/consultation process with the National Environmental Policy Act (NEPA) process. As part of its ALP, APC has developed an Applicant Prepared Environmental Assessment (APEA) that is being filed concurrently with this license application. The APEA analyzes the Project's environmental resources as well as potential operational alternatives and recommends the preferred alternative in which the Project should be operated to

balance power and non-power values. This APEA is being filed in lieu of an Exhibit E, as authorized by FERC in a letter to APC dated January 29, 2001.

Through the ALP, APC has created the Warrior Cooperative Relicensing Team (WCRT), which has met regularly over the past five years to discuss relicensing issues. Comprised of federal, state, and local regulatory agencies, non-governmental organizations, and interested stakeholders, the WCRT has assisted with the preparation of the APEA by identifying, developing, and making recommendations on important, resource oriented, relicensing issues.

The information in the License Application is required by the FERC under the Code of Federal Regulations Part 18, §4.51 and 16.10. In accordance with these requirements (§4.51(b)), each development hereinafter is described individually.

Detailed drawings of Project facilities are located in Exhibits F and G of this license application and all references to elevations in this license application are to the U.S. Geological Survey's National Vertical Geodetic Datum (NGVD).

Table A-1 and Table A-2 at the end of each section contain detailed listings of facts and information on the Lewis Smith and Bankhead developments, respectively.

2.0 LEWIS SMITH DEVELOPMENT

2.1 Project Structures

The Smith Dam is a rock-fill embankment structure, 2,200-ft long and 300-ft high, with a top elevation of 550-ft msl. The top width is 50-ft and the base width is approximately 1,060-ft. The spillway consists of a 95-ft long uncontrolled weir at elevation 522-ft msl in the right abutment, which feeds into a 350-ft wide channel cut through rock on the west upstream bank. This 3,000-ft long channel discharges into Mill Creek, which flows into the Sipsey Fork of the Warrior River approximately 2.5 miles downstream from the dam.

The powerhouse, which contains two turbines and generators, is a rectangular reinforced concrete structure 193 ft long, 60 ft wide, and 140 ft high, and is built into the right abutment about 500 ft downstream from the dam centerline. The concrete intake structure, which is 105 ft high and located 120 ft upstream from the dam, is also located in the right abutment and is used to provide flow to the hydro turbines through two 22 ft diameter, 630 ft long concrete-lined tunnels, which are controlled by vertical gates. Information relating to trash racks is given in Table A-1.

Powerhouse releases are channeled through a 700 ft long artificial tailrace canal, which at its end re-enters the natural stream channel. The normal tailwater elevation is 256 ft msl.

2.2 Reservoir Characteristics

Smith Lake extends 35 miles upstream of the Smith Dam and creates 500 miles of project shoreline. At a normal water surface elevation of 510-ft msl, Smith Lake impounds a reservoir surface area of 21,200 acres. The drainage area above the dam is approximately 944 square miles.

The storage capacity of Smith Lake is 1,390,000 acre-ft at the normal pool elevation of 510-ft msl and 1,670,600 acre-ft at the spillway crest elevation of 522-ft msl. The lake is used for hydroelectric generation, flood control, navigation flow augmentation, storage for power generation, maintenance of downstream water quality, industrial and municipal water supply, recreational opportunities, and serves as habitat for fish and wildlife.

2.3 Turbines and Generators

The Lewis Smith powerhouse contains two Allis Chalmers, vertical Francis type turbines. Each turbine has a rated output of 111,500 Hp at 210-ft of net head and rotate at 138.5 rpm. Each turbine also has a maximum discharge capacity of 5,700 cfs.

Each turbine is connected to a 3 phase, 60 cycle General Electric generator, each rated at 78,750 kW and operated at a 0.9 power factor. This yields a total rated capacity for the Smith development of 157.5 MW. The estimated annual generation from the Project is 282,864 MWh (1990-1999).

2.4 Transmission System

The generators produce power at a voltage level of 13,800 volts. Transformers step this power up to 115,000 and 161,000 volts for transmission purposes. The plant's substation is connected to APC's transmission system through three high voltage lines: Haleyville, Gorgas, and Boyles. The Haleyville and Gorgas lines are rated at 161Kv. The Boyles line is rated at 115Kv.

2.5 Specifications of Appurtenant Facilities

There is a 290 ton Gantry crane at the powerhouse. Other equipment at the Lewis Smith development includes a draft tube crane, head works crane intake gates, and intake and draft tube stoplogs. Electrical equipment includes station service transformers, station service switchgear, supervisory control and data acquisition (SCADA) systems, plant electrical protection, governor systems, and generation step-up (GSU). Additional equipment at the project includes station batteries, CO2 fire protection, service air, air compressors, service water, station drainage systems and pumps, and a lube oil system.

2.6 Lands of the United States

The Lewis Smith Development boundary includes property owned and managed by the U.S. Forest Service's Bankhead National Forest. There are 2691.44 acres (inundated and non-inundated) of Federal lands within the development's boundaries.

Table A-1: Lewis Smith Development – Standard Numbers

| DESCRIPTION | NUMBER OR FACT |
|---|---|
| General Information | |
| FERC Number | 2165 |
| License Effective Issuance Date | September 1, 1957 |
| License Expiration Date | August 31, 2007 |
| Licensed Capacity | 157,500 kW |
| Project Location | Near Town of Jasper; Counties of Winston, Walker and Cullman; Warrior River; 443 river miles above Mobile |
| Total Area Encompassed by Existing Project Boundary (*land and water) | 26,823 acres |
| Acres of Water Within Existing Project Boundary | 21,200 acres |
| Acres of Land Within Existing Project Boundary | 5,623 acres |
| Lewis Smith Dam Drainage Basin | 944 mi ² |
| 1. Dam | |
| Start Date of Construction | November 25, 1957 |
| In-Service Date | September 5, 1961 |
| Construction Type | Rock-fill |
| Elevation Top of Dam | 550 ft msl |
| Height of Dam | 300 ft |
| Gross Head at Normal Pool Elevation | 254 ft |
| Spillway Elevation | 522 ft msl |
| Total Length of Water Retaining Structures | 2,200 ft |
| Length of Powerhouse (substructure) | 193 ft |
| Length of Spillway (total) | 956 ft |
| Hazard Classification | High |
| Spillway Capacity (at 532 ft msl) | 88,000 cfs |
| 2. Lewis Smith – General Information | |
| Length of Impoundment | 35 mi |
| Pool Elevations: Maximum (not including parapet wall) | 522 ft msl |
| Normal | 510 ft msl |
| Winter | 496 ft msl |
| Gross Storage: Normal Pool Elevation (510 ft msl) | 1,390,000 acre-ft |
| Maximum Pool (522 ft msl) | 1,670,600 acre-ft |
| Usable Storage Capacity | 675,000 acre-ft |
| Surface Area (at msl) | 21,200 acres |
| Miles Shoreline (including tributaries) at msl | 500 mi |

| DESCRIPTION | | NUMBER OR FACT |
|--------------------------|-----------------|----------------|
| Number of Boat Docks | | 1,917 |
| Water Residence Time | | 435 days |
| Water Temperature Range: | Typical Maximum | 82.8°F July |
| | Typical Minimum | 44.6°F Jan-Feb |
| Existing Classification | | F&W/S/PWS |

3. Powerhouse

| | | |
|-------------------------------------|-----------------|----------------|
| Length (Superstructure) | 193 ft | |
| Width (Superstructure) | 60 ft | |
| Height | 140 ft | |
| Construction Type (Superstructure) | Concrete | |
| Draft Tube Crest Elevation | 229.5 ft msl | |
| Operating Floor Elevation | 313 ft msl | |
| Normal Tailwater Elevation | 256 ft msl | |
| Tailrace canal (man made) | 700 ft | |
| Intake Openings: Number of Openings | 2 | |
| | Crest Elevation | 420 ft msl |
| | Gate Opening | 14 ft by 30 ft |
| Outdoor Gantry Crane Capacity | 290 tons | |

4. Turbines

| | | |
|---------------------------|--------------|-----------------|
| Rated Net Head | 210 ft | |
| Turbines: | 2 | |
| | Manufacturer | Allis Chalmers |
| | Type | Francis |
| Rated Discharge Capacity: | Maximum | 5,700 cfs each |
| Speed | | 138.5 rpm |
| Rated Output | | 111,500 hp each |

5. Generators

| | | |
|--|---|------------------|
| Nameplate Rating | 2 | 78,750 kW each |
| Manufacturer | | General Electric |
| Power Factor | | 0.9 |
| Voltage | | 13,800 |
| Number of Phases | | 3 |
| Frequency | | 60 |
| Average Annual Generation (1/1/90 to 12/31/99) | | 282,864 MWh |

6. Transformers

| | |
|----------------------|-----------------------------------|
| Transmission Voltage | Low side – 13,800 volts |
| | High side – 115,000/161,000 volts |
| Rating | 190,000 kilovolt – amperes |

| DESCRIPTION | NUMBER OR FACT |
|-------------|----------------|
|-------------|----------------|

7. Flood Flow

| | | |
|-------------------------|-----------|---------------|
| Probable Maximum Flood: | Elevation | 547.27 ft msl |
| | Flow | 288,000 cfs |

8. Trash Rack Data

| | |
|---|---------------------------|
| Total Area of Individual Trash Rack (ft ²) | 183 |
| Invert Elevation | 420 |
| Summer Pool | 510 |
| Approximate Total Intake Area for One Unit (ft ²) | 4072 |
| Turbine Design Flow (cfs) | 11400 |
| Height of Individual Rack | 25 ft 9 in |
| Width of Trash Rack | 7 ft 1.5 in |
| Distance Between Vertical Supports | 7 ft 0.5 in |
| Grating Opening | 5.375 |
| Grating Bar Cross-Section | 4 x 5/8 in |
| Length Between Supports | 4 ft 3.5 in |
| Spacing | 6 in |
| Comments | Beams spaced at 6 ft 6 in |

3.0 BANKHEAD DEVELOPMENT

3.1 Project Structures

The FERC license for Bankhead includes the powerhouse only. The dam and reservoir are owned and operated by the U.S. Army Corps of Engineers (USACE). The rectangular concrete powerhouse is 135 ft long, 77 ft wide, and 153 ft high. The 100 ft long intake canal is 54 ft wide at the upper end, 25 ft upstream of the spillway, and narrows to 50 ft wide at the 78 ft diameter conduit opening. There are 30 trash racks at the Bankhead Project, each with a width of 5 ft 7.5 in, and a vertical grating spacing of 6 in.

Powerhouse releases re-enter the Warrior River along the west bank, perpendicular to the river channel. The normal tailwater elevation is 186.5 ft msl.

3.2 Reservoir Characteristics

The USACE's Bankhead Lake extends 78 miles upstream of their John Hollis Bankhead Dam and creates 400 miles of lake shoreline. It has a maximum depth of 74 ft at the dam. At a normal water surface elevation of 255-ft msl, Bankhead Lake impounds a reservoir surface area of 9,200 acres. The drainage area above the dam is approximately 3,969 square miles.

3.3 Turbines and Generators

The Bankhead powerhouse contains one General Electric, vertical Propeller type turbine. This turbine has a rated output of 71,400 Hp at 68.5-ft of net head and rotates at 102.8 rpm. The turbine has a maximum discharge capacity of 10,338 cfs.

The turbine is attached to a 3 phase, 60 cycle Allis Chalmers generator with a name plate rating of 53,985 kW. Estimated annual generation from the Bankhead development is 180,230 MWh (1990-1999).

3.4 Transmission System

The generator produces power at a voltage level of 13,800 volts. Transformers step this power up to 115,000 volts for transmission purposes. The plant's substation is connected to APC's transmission system by one high voltage line (115 Kv) that feeds the Tuscaloosa Transmission Substation. There is a 12 Kv Emergency Feed from the Spencer Hill Substation that can be used to supply station service.

3.5 Specifications of Appurtenant Facilities

There is a 250 ton Gantry crane at the powerhouse. Other equipment at the Bankhead development includes a draft tube crane, intake gates, and intake and draft tube stoplogs. Electrical equipment includes station service transformers, station service switchgear, SCADA systems, plant electrical protection, governor systems, and generation step-up (GSU). A solid state static excitation system was added in 2004. Additional equipment at the project includes station batteries, CO2 fire protection, service air, air compressors, service water, station drainage systems and pumps, and a lube oil system.

3.6 Lands of the United States

There are 18.7 acres of Federal lands (BLM) within the development's boundaries.

Table A-2: Bankhead Development – Standard Numbers

| DESCRIPTION | NUMBER OR FACT |
|--|--|
| General Information | |
| FERC Number | 2165 |
| License Effective Issuance Date | September 1, 1957 |
| License Expiration Date | August 31, 2007 |
| Licensed Capacity | 53,550 kw |
| Project Location | Near Town of Northport; County of Tuscaloosa; Warrior River; 366 river miles above Mobile |
| Total Area Encompassed by Existing Project Boundary (*land and water) | 126 acres |
| Acres of Water Within Existing Project Boundary | 0 |
| Acres of Land Within Existing Project Boundary | 126 acres |
| Bankhead Dam Drainage Basin | 3,969 mi ² |
| 1. Dam | |
| Start Date of Construction | February 13, 1961 |
| In-Service Date | July 12, 1963 |
| Construction Type | Concrete gravity |
| Elevation Top of Dam | 270 ft msl |
| Head at Normal Pool Elevation | 68.5 ft |
| Length of Powerhouse (substructure) | 135 ft |
| Hazard Classification | High |
| 2. Bankhead – General Information | |
| Length of Impoundment | 77.8 mi |
| Normal Pool Elevation: | 255 ft msl |
| Existing Classification | S/F&W |
| 3. Powerhouse | |
| Length (Superstructure) | 135 ft |
| Width (Superstructure) | 77 ft |
| Height | 153 ft |
| Construction Type (Superstructure) | Concrete |
| Draft Tube Crest Elevation | 135 ft msl |
| Operating Floor Elevation | 230 ft msl |
| Normal Tailwater Elevation | 186.5 ft msl |
| Discharge Capacity | 11,500 cfs |
| Intake Canal | 54 ft wide by 100 ft long |

| DESCRIPTION | | NUMBER OR FACT |
|---|--------------------|---------------------------|
| Intake Openings: | Number of Openings | 3 |
| | Crest Elevation | 195.6 ft msl |
| | Gate Opening | 16 ft by 38 ft |
| Trashgate | | 8 ft wide |
| Outdoor Gantry Crane Capacity | | 250 tons |
| 4. Turbines | | |
| | | 1 |
| Design Head (Rated Net Head) | | 68.5ft |
| Turbines | | |
| | Manufacturer | General Electric |
| | Type | Propeller |
| Rated Discharge Capacity: | Maximum | 10,338 cfs |
| Speed | | 102.8 rpm |
| Rated Output | | 71,400 hp |
| 5. Generators | | |
| Nameplate Rating | | 53,985 kW |
| Rated Output | | 53,985 kW |
| Power Factor | | 0.915 |
| Voltage | | 13,800 volts |
| Number of Phases | | 3 |
| Frequency | | 60 |
| Estimated average annual output (1/1/90 – 12/31/99) | | 180,230 MWh |
| 6. Transformers | | |
| Transmission Voltage | | |
| | Low side | 13,800 volts |
| | High side | 115,000 volts |
| Rating | | 52,500 kilovolt - amperes |
| 7. Trash Rack Data | | |
| Number of Trash Racks | | 30 |
| Total Area of Individual Trash Rack (ft ²) | | 16 @ 123 |
| | | 8 @ 121 |
| | | 4 @ 128 |
| | | 2 @ 127 |
| Invert Elevation | | 254.5 |
| Summer Pool | | 254.5 |
| Approximate Total Intake Area for One Unit (ft ²) | | 3596 |
| Turbine Design Flow (cfs) | | 10,338 |

| DESCRIPTION | NUMBER OR FACT |
|------------------------------------|-----------------------|
| Height of Individual Rack | 20 ft 4 in |
| Width of Trash Rack | 5 ft 7.5 in |
| Distance Between Vertical Supports | 5 ft 7.5 in |
| Grating Opening | 5.375 |
| Grating Bar Cross-Section | 4 x 3/4 in |
| Length Between Supports | 2 ft 3 in |
| Spacing | 6 in |