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ENVIRONMENTAL ASSESSMENT

ENTERGY MISSISSIPPI, INC., FLORENCE-SOUTH JACKSON, MISSISSIPPI, 115-KILOVOLT TRANSMISSION LINE UPGRADE

Hinds, Rankin, and Scott Counties, Mississippi

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

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ACRONYMS, ABBREVIATIONS, AND GLOSSARY OF TERMS USED

§	Section
acre	A unit measure of land area equal to 43,560 square feet, i.e., a square area 208.7 feet on a side
BMPs	Best management practices, i.e., accepted construction practices designed to reduce environmental effects
CFR	Code of Federal Regulations
CNOI	Storm Water Construction Notice of Intent
conductors	Cables that carry electrical current
cultural resources	Archaeological and historic resources
danger tree	A tree located outside the right-of-way that could pose a threat of grounding a line if allowed to fall near a transmission line or a structure
distribution line	A series of electrical conductors (“wires”) and their supporting structures used to transfer electric power locally between substations or from substations to power consumers
EA	Environmental assessment
easement	A legal agreement that gives TVA the right to use property for a purpose such as a right-of-way for constructing and operating a transmission line
EMF(s)	Electric and magnetic field(s)
EMI	Entergy Mississippi, Inc.
endangered species	A species in danger of extinction throughout all or a significant part of its range
EO	Executive order
feller-buncher	A piece of heavy equipment that grasps a tree while cutting it, which can then lift the tree and place it in a suitable location for disposal; this equipment prevents trees falling into a sensitive area, such as a wetland
firm transmission service	The highest quality (priority) service offered to customers under a filed rate schedule that anticipates no planned interruption
firm capability	The amount of electric power an electrical power system is able to deliver reliably
groundwater	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations

guy	A cable connecting a structure to an anchor that helps support the structure
I-	Interstate Highway
kV	Kilovolt (1 kV equals 1,000 volts)
load	That portion of the entire power in a network consumed within a given area; also synonymous with “demand”
MDAH	Mississippi Department of Archives and History
MDEQ	Mississippi Department of Environmental Quality
MDWFP	Mississippi Department of Wildlife, Fisheries, and Parks
MVA	Megavolt amperes
MW	Megawatt
n.d.	Indicates “no date,” or date which Web site was accessed is unknown
NEPA	*National Environmental Policy Act*
NERC	North American Electric Reliability Corporation
NGVD	National Geodetic Vertical Datum; as corrected in 1929, a vertical control measure used as a reference for establishing varying elevations
NIEHS	National Institute of Environmental Health Sciences
Non-RPW	Non-Relatively Permanent Waters; characterized as shallow stream channels with the overall lack of a significant vegetative component; further characterized as “ephemeral”
NPS	National Park Service
NRI	Nationwide Rivers Inventory
pile foundation	Part of a structure used to carry and transfer the load of the structure to the bearing ground located at some depth below ground surface
right(s)-of-way (ROWs)	Corridor(s) containing a transmission line
riparian	Related to or located on the banks of a river or stream
RM	River Mile
RPW	Relatively Permanent Waters (RPW); these streams will have either “typical year-round flows” (more specifically designated as “perennial” streams) or “seasonal flows” (intermittent) throughout the year based upon rainfall events
runoff	That portion of total rainfall that eventually enters a stream or river
SHPO	State Historic Preservation Officer

SMZs	Streamside management zones
socket piles	A construction method in which a pile is driven, a tapered socket is fitted over it, and the pole or support member goes into the socket
structure	A pole or tower that supports a transmission line
substation	A facility connected to a transmission line used to reduce voltage so that electric power may be delivered to a local power distributor or user
surface water	Water collecting on the ground or in a stream, river, lake, or wetland; it is naturally lost through evaporation and seepage into the groundwater
switch	A device used to complete or break an electrical connection
SWPPP	Storm Water Pollution Prevention Plan
threatened species	A species likely to become endangered within the foreseeable future
transmission line	A series of electrical conductors (“wires”) and their supporting structures used to transmit electric power from one location to another
Transmission Provider	Any public utility that owns, operates, or controls facilities used for the transmission of electric energy in interstate commerce
TNW	Traditional Navigable Waters; new guidance relative to the stream classifications utilized by the USACE Vicksburg District Regulatory Branch
TVA	Tennessee Valley Authority
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
wetland	A marsh, swamp, or other area of land where the soil near the surface is saturated or covered with water, especially one that forms a habitat for wildlife
WHO	World Health Organization
WTSI	Wildlife Technical Services, Inc.

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CHAPTER 1

1.0 PURPOSE OF AND NEED FOR ACTION

1.1. Proposed Action – Improve Power Supply

Tennessee Valley Authority (TVA) proposes upgrading approximately 7.5 miles of an existing 115-kilovolt (kV) transmission line on the Entergy Mississippi, Inc. (EMI), transmission system in Hinds and Rankin counties, Mississippi (Figure 1-1). The upgrade is needed to support the yearly firm (guaranteed) transmission network service transfer of 724 megawatts (MW) of generated electricity from the Ackerman (Suez Choctaw) generating facility to the TVA transmission system.

The upgraded transmission line would utilize mostly single-pole steel structures on existing 100-foot right-of-way (ROW) occupying about 92 acres. Additionally, two switches would be replaced at EMI's Morton 115-kV Substation in Scott County. TVA would provide the funds to EMI for these necessary upgrades.

1.2. Need for the Proposed Action

TVA operates the nation's largest public power system, producing 4 percent of all the electricity in the nation. TVA provides electricity to most of Tennessee and parts of Virginia, North Carolina, Georgia, Alabama, Mississippi, and Kentucky (Figure 1-2). It serves about 9 million people in this seven-state region through 158 power distributors and 58 directly served large industries and federal facilities. The *TVA Act* requires the TVA power system to be self-supporting and operated on a nonprofit basis and directs TVA to sell power at rates as low as are feasible. TVA transmits electricity from its generating facilities, as well as electricity it purchases from non-TVA owned facilities, over 15,000 miles of transmission lines. Like other utility systems, TVA has power interchange agreements with utilities surrounding its region and purchases and sells power on an economy basis almost daily.

As a subsidiary of the energy company Entergy Corporation, EMI provides electricity in 45 counties in Mississippi. Sixteen of these counties are serviced by both TVA and EMI. The areas where the TVA and EMI transmission system meet are called the interface. Through a long-term power purchase agreement, the Ackerman facility has committed to supply up to 724 MW of electricity for transfer to the TVA power system from January 2010 through January 2013. This generation facility is located in Ackerman County within the TVA power service area near TVA's Choctaw 500-kV Switching Station (Figure 1-2). The location of the facility is also near the TVA EMI interface located in the adjacent Attala County (Figure 1-3).

TVA's transmission system is required to meet standards federally mandated by the North American Electric Reliability Corporation (NERC). According to these standards, TVA must ensure that the transmission capability is available to support the generated capacity necessary to meet TVA's projected loads for the next several years.

To assess the firm capability of the TVA Transmission Provider to provide the 724 MW of generated capacity resource to the TVA system and identify any transmission constraints, EMI completed an Affected System Facilities Study (Entergy 2008). The study identified that portions of EMI's transmission system could be affected by the output from the generating plant. One constraint is EMI's Florence-South Jackson 115-kV Transmission

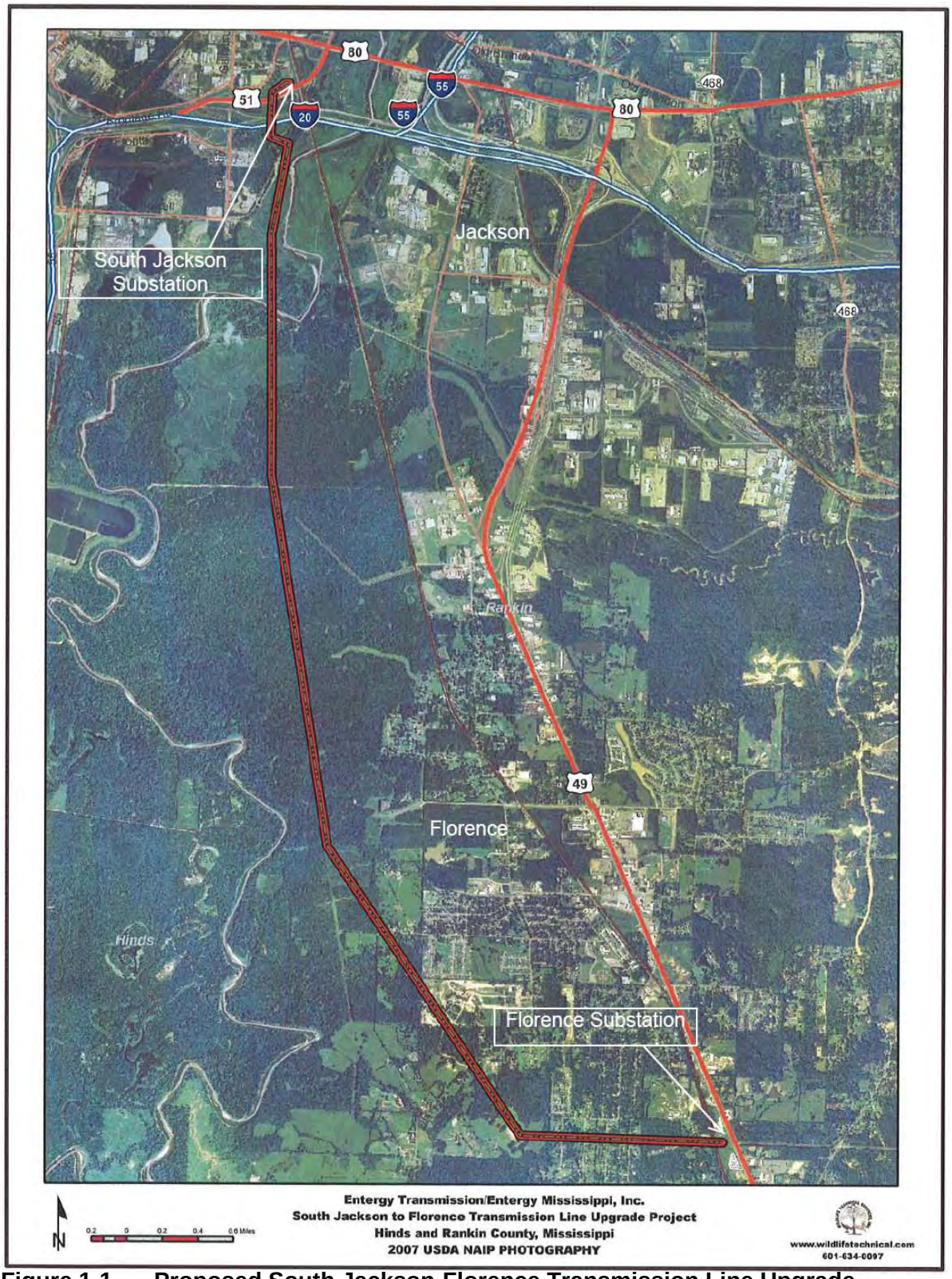


Figure 1-1. Proposed South Jackson-Florence Transmission Line Upgrade

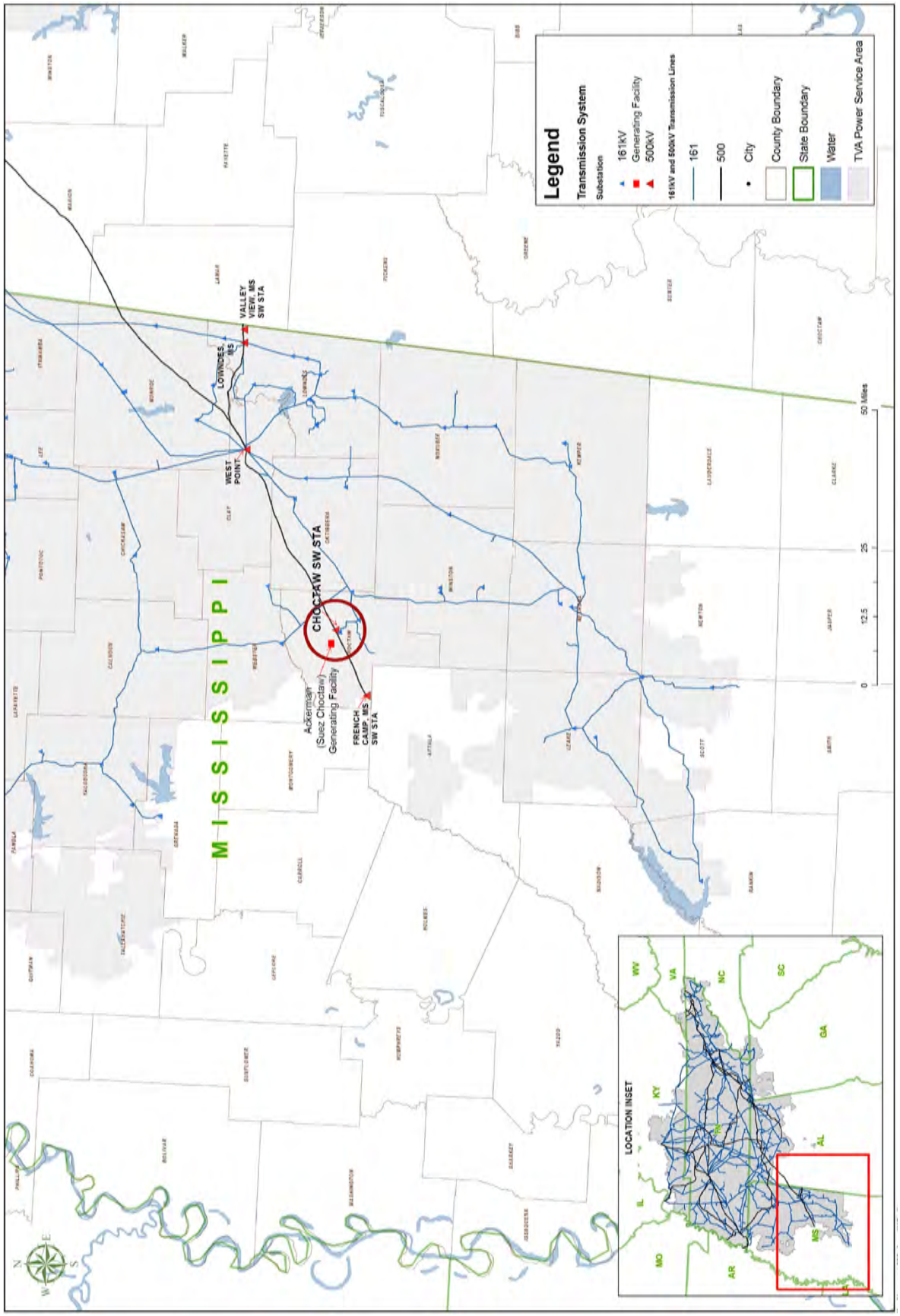


Figure 1-2. TVA 161-kV and 500-kV Transmission Lines With Inset

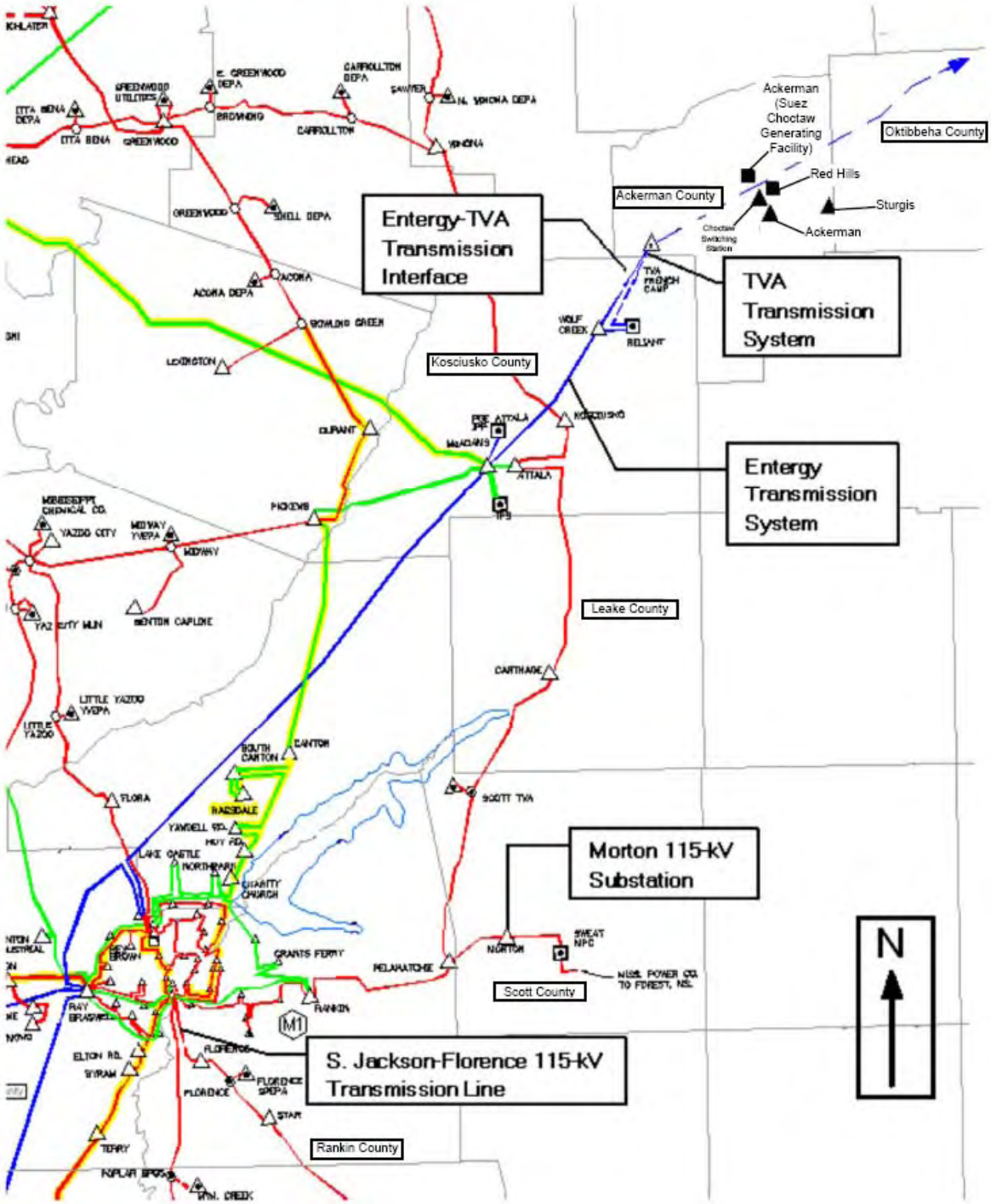


Figure 1-3. Entergy Mississippi, Inc., and Tennessee Valley Authority Transmission System Interface in the Proposed Project Area

Line, which would overload with the loss of TVA's Choctaw-West Point 500-kV Transmission Line. For this line to meet the proposed transfer capability, it would require that the 7.5-mile Florence-South Jackson 115-kV Transmission Line be upgraded from the current capacity of 160 megavolt amperes (MVA) to at least 183 MVA. Additionally, two 600-ampere switches at the Morton 115-kV Substation would need to be replaced with 1200 amperes. Another identified constraint was the Florence-Florence Switching Station 115-kV Transmission Line; subsequent analysis, however, has shown that this line has adequate capacity.

TVA would need to address the EMI transmission system constraints to meet NERC standards ensuring that the transmission system would be capable of supporting the generation capacity from the Ackerman facility. To address the constraints, TVA proposes to contract with EMI to perform the upgrades to the existing South Jackson-Florence 115-kV Transmission Line and the Morton Substation.

1.3. Decisions

The primary decision before TVA is whether to provide the funding to enable EMI to make the required upgrades to EMI's existing South Jackson-Florence 115-kV Transmission Line and associated improvements that would provide for TVA to transfer an annual network transmission service of 724 MW to the TVA transmission system. A detailed description of the alternatives is provided in Section 2.1.

If the proposed transmission lines and a substation upgrades are upgraded, other secondary decisions are involved. These include the following considerations:

- The timing of improvements
- Determining any necessary mitigation and/or monitoring measures to implement in order to meet both TVA and EMI standards and minimize the potential for damage to environmental resources

1.4. The Scoping Process and Public Involvement

Individual property owners along the existing transmission line who would be affected by upgrades along the ROW were notified of the proposed project by EMI and survey permission was requested. TVA and EMI also contacted the following federal and state officials or agencies and Native American tribes concerning the project. In addition, internal reviews by a network of designated environmental specialists were conducted.

- Chickasaw Nation
- Choctaw Nation
- Jena Band of Choctaw Indians
- Mississippi Band of Choctaw Indians
- Quapaw Tribe of Oklahoma
- Tunica-Biloxi Tribe
- Hinds-Rankin Levee District
- Mississippi Department of Archives and History
- Mississippi Department of Environmental Quality
- Mississippi Department of Wildlife, Fisheries, and Parks
- Mississippi Department of Transportation

- U.S. Army Corps of Engineers
- U.S. Department of Agriculture, Farm Services Agency
- U.S. Department of Agriculture, Natural Resource Conservation Service
- U.S. Fish and Wildlife Service

This proposal was reviewed in accordance with Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), the *Farmland Protection Policy Act,* the *National Historic Preservation Act,* the *Endangered Species Act*, Section 404 of the *Clean Water Act*, and EO 12372 (Intergovernmental Review). Correspondence related to this coordination is contained in Appendix A.

1.5. Issues to be Addressed

Affected resources were identified initially through an internal scoping process. This list of issues was refined based on comments received during the public comment process. The major issues addressed in this environmental assessment are potential impacts to the following resources:

- Water quality for both surface water and groundwater
- Aquatic ecology
- Vegetation
- Wildlife
- Threatened and endangered species and their critical habitats
- Wetlands
- Floodplains
- Visual resources
- Managed areas and ecologically significant sites
- Recreation
- Historic and archaeological resources

Potential effects related to air quality, hazardous and nonhazardous wastes, noise, land use including prime farmland, and health and safety have been considered but, because of the nature of the action, did not require detailed evaluation.

1.6. Necessary Federal Permits or Licenses

A permit would be required from the Mississippi Department of Environmental Quality (MDEQ) for discharge of construction site storm water associated with construction activities within the transmission line ROW. The EMI Transmission Line Construction Group would prepare the required Storm Water Construction Notice of Intent (CNOI) and associated Storm Water Pollution Prevention Plan (SWPPP) and coordinate with the MDEQ for issuance of the appropriate Storm Water General Permit authorization covering the construction activities.

The U.S. Army Corps of Engineers (USACE) Vicksburg District Regulatory Branch issued a provisional Nationwide 3 permit on October 13, 2009, covering the proposed project construction activities. MDEQ has issued a conditional Section 401 Water Quality Certification for both Nationwide 12 and Nationwide 3 permits pursuant to Section 401(1)(1) of the *Clean Water Act* (see Appendix A). Additionally a permit would be required from the Mississippi Department of Transportation for crossing Interstate (I) 20.

CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

As described in Chapter 1, TVA proposes upgrades to the EMI transmission system to provide for the yearly transference of 724 MW service from the Ackerman (Suez Choctaw) generating facility to the TVA power system.

This chapter contains the following four major sections:

- Alternatives
- Description of Construction, Operation, and Maintenance of the Existing and Proposed Transmission Line Upgrades
- Project and Siting Process
- The Preferred Alternative

This chapter describes all of the alternatives explored and provides a detailed description of the necessary steps in constructing a transmission line. Additional background information about transmission line operation and maintenance is provided.

2.1. Alternatives

Two alternatives—No Action and Action—are addressed in this environmental assessment. Under the No Action Alternative, TVA and EMI would not undertake the proposed action and therefore the proposed transmission line upgrades and associated improvements would not take place. The Action Alternative would include the completion of the proposed transmission line and substation upgrades.

During the development of this proposal, other alternatives were considered. However, these other alternatives have high costs and their own associated environmental impacts, and they do not meet the project needs as well as the Action Alternative described below does.

2.1.1. Alternative A – Do Not Complete the Planned Transmission Line Upgrades (No Action Alternative)

Under the No Action Alternative, TVA would not supply funding to EMI; therefore, the upgrades to their transmission system would not be completed, and the EMI transmission system would continue to function as it currently does. The addition of the generating capacity from the Ackerman facility without the upgrades could result in overloads on parts of the EMI transmission system with the loss of TVA's Choctaw-West Point 500-kV Transmission Line. As a result, the TVA Transmission Provider could not provide firm transmission service as required by NERC from the generating facility on the TVA transmission system. As a result, TVA would not be able to utilize the contracted 724 MW of generated electricity efficiently, leading to a high-risk level of electrical energy interruptions within the TVA system in the future.

2.1.2. Alternative B – Complete the Planned Transmission Line Upgrades (Action Alternative)

Under the Action Alternative, TVA would pay EMI to upgrade the existing South Jackson-Florence 115-kV Transmission Line from a current capacity of 160 MVA to a minimum of 183 MVA to meet the proposed TVA transfer capability (Figure 2-1). Additional improvements would also be completed at the Morton Substation (Figure 2-1). These include the replacement of the existing 600-ampere switches J3461 and J8961 to carry 1200 amperes (120 MVA). The South Jackson-Florence 115-kV Transmission Line upgrades would be for a distance of approximately 7.5 miles located within the existing ROW running from the South Jackson Substation site at the northern extreme to the Florence Substation at the southern extreme of the project route.

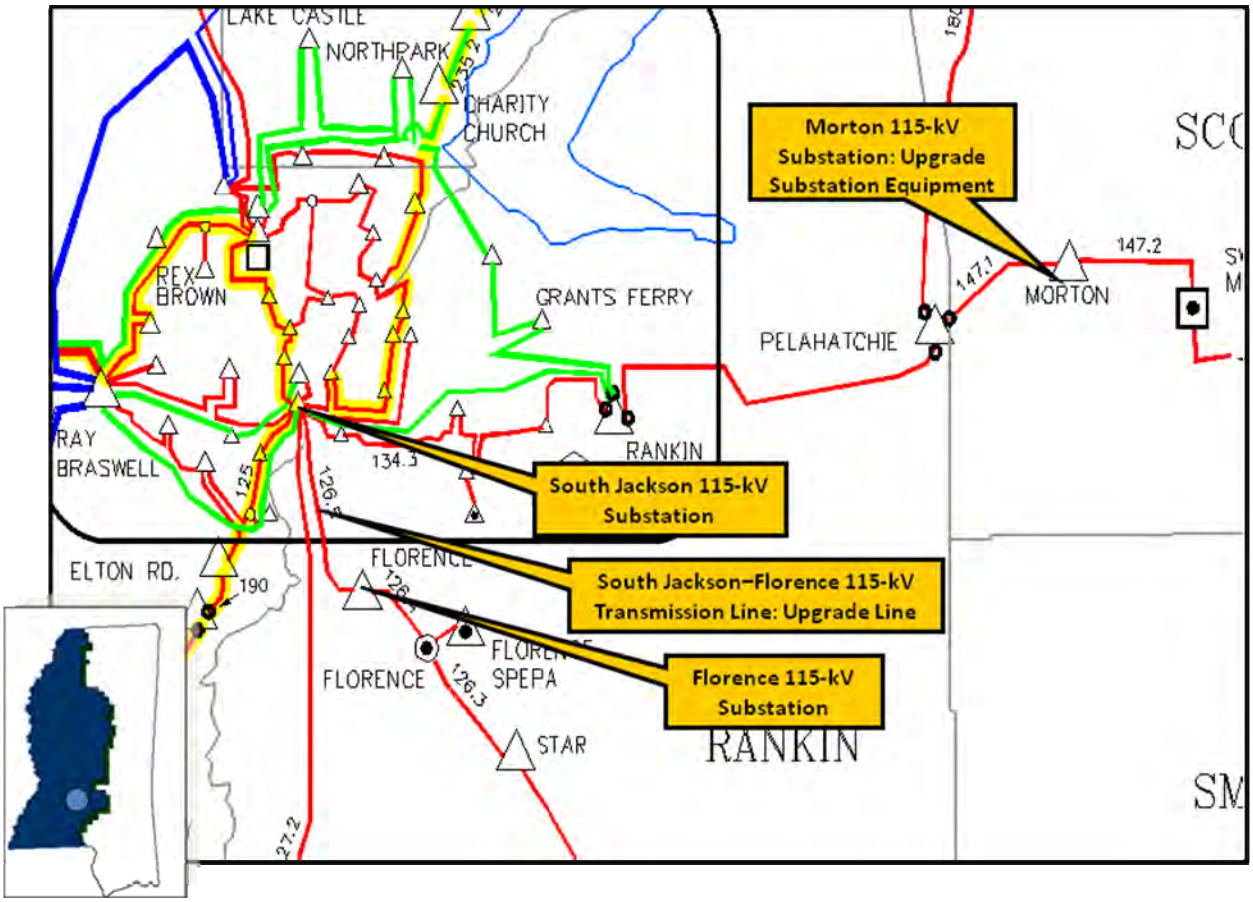


Figure 2-1. Location of the South Jackson-Florence Transmission Line and Morton Substation on the Entergy Mississippi, Inc., Transmission System

With the exception of the first few lattice tower structures coming out of the South Jackson Substation and the dead-end tower at the Florence Substation, the existing 115-kV transmission line is constructed on tangent wood H-frame structures and three-pole guyed wood angle and dead-end structures. As a part of the proposed action, all of the existing wood structures, wire, insulators, guys, and anchors would be removed and replaced with single-pole steel structures. The new steel structures would be direct embedded or vibratory pile supported, generally to a depth of 15 feet. The angle structures would be guyed. The existing lattice towers coming out of the South Jackson Substation site and crossing I-20 would not be replaced.

Implementation of this alternative would support the firm transmission network service transfer of 724 MWof generated electricity from the Ackerman generating facility to the TVA transmission system by addressing the constraints identified on the EMI transmission system.

2.2. Description of Construction, Operation, and Maintenance of the Existing and Proposed Transmission Line Upgrades

2.2.1. Transmission Line Construction

2.2.1.1. Right-of-Way Acquisition and Clearing

The proposed transmission line would be constructed within EMI's existing 200-foot-wide ROW currently occupied by two parallel transmission lines. The 7.5-mile South Jackson-Florence 115-kV Transmission Line occupies the eastern 100-foot-wide portion of the ROW, and the South Jackson-Silver Creek 115-kV Transmission Line occupies the western section. No new ROW would be required for the proposed Action Alternative.

The construction activities would mostly take place in and around the structure locations to remove the existing structures and to erect the new structures. Given this, ROW disturbance activities would be limited to the construction zone around each structure and equipment movement along the ROW from structure to structure. As a result, limited ROW clearing would take place to remove the larger scrub-shrub species to facilitate the construction.

Streamside management zones (SMZs) and jurisdictional wetland areas were identified along the ROW route during a field survey completed by Wildlife Technical Services, Inc. (WTSI). The SMZs would be established and identified on the ground along the intermittent and perennial streams prior to the commencement of the construction activities. A buffer zone of no less than 100 feet would be established along each bank of the Pearl River crossing to ensure that no adverse impacts relative to water quality during the construction activities would take place. In addition, to minimize the potential impacts during the construction period, all jurisdictional wetland areas would be identified and marked on the ground prior to construction. Any clearing needed within the SMZs or any jurisdictional wetland areas would be accomplished using hand-held equipment or remote-handling equipment, such as a feller-buncher, in order to limit ground disturbance. The *Tennessee Valley Authority Transmission Construction Guidelines Near Streams* (Appendix B) as well as Entergy's *Right-of-Way Clearing Construction Specifications* and *Erosion and Sediment Control Measures Construction Specifications* (Appendices C and D) would be followed in all clearing and construction activities.

Subsequent to clearing and construction, the ROW would be restored as much as is possible to its state prior to the construction activities as described in Appendix E (Entergy *Seeding, Fertilizing and Mulching Construction Specifications*) and as a part of the SWPPP best management practices (BMPs).

2.2.1.2. Access Roads

The project would take place within an existing ROW with established access roads. Typically, access roads located along the ROW route are maintained to provide ongoing access to the ROW for maintenance and vegetation control activities. These access roads are typically designed to avoid areas with steep slopes and to minimize stream crossings and potential impacts to jurisdictional wetland areas. Access roads are typically approximately 20 feet wide and surfaced with dirt or gravel.

A significant portion of the ROW is accessed via permanent access roads along the ROW that interconnect to public road systems. Additional access is provided via permanent roads on private lands. These access roads are primarily existing roads that include privately built, farm and field roads, some of which would need temporary upgrading and the placement of some surface material.

Along the transmission line ROW, EMI has identified one existing access road crossing a wet-weather conveyance that would require the installation of a culvert. Typically, culverts and other drainage devices, fences, and gates would be installed as necessary during the construction period. Any stream crossings would be temporary, and culverts installed would be removed following construction. However, in wet-weather conveyances (i.e., streams that run only following a rain event), they would be left or removed, depending on any permit conditions that might apply. If desired by the landowner, new temporary access roads would be restored to previous conditions. Additional applicable ROW clearing and environmental quality protection specifications are listed in Appendices C and D.

2.2.1.3. Construction Assembly Areas

A construction assembly (laydown) area would be required for worker assembly, vehicle parking, and material storage. The site identified for this project is an existing graveled parking lot area located just off Old U.S. Highway (US) 49 in the city of Richland. The site selected is a portion of an existing trucking company trailer parking area (Figure 2-2). EMI has previously utilized this site as a laydown yard. The laydown area would be leased for the construction period from the trucking company. The construction assembly area for this project is approximately 2.6 acres in size, relatively flat, previously cleared and graveled, and in close proximity to the line ROW. The area is fenced, and trailers used for material storage and office space would be parked on the area. Following the completion of the construction activities, all trailers, unused materials, and construction debris would be removed from the site.

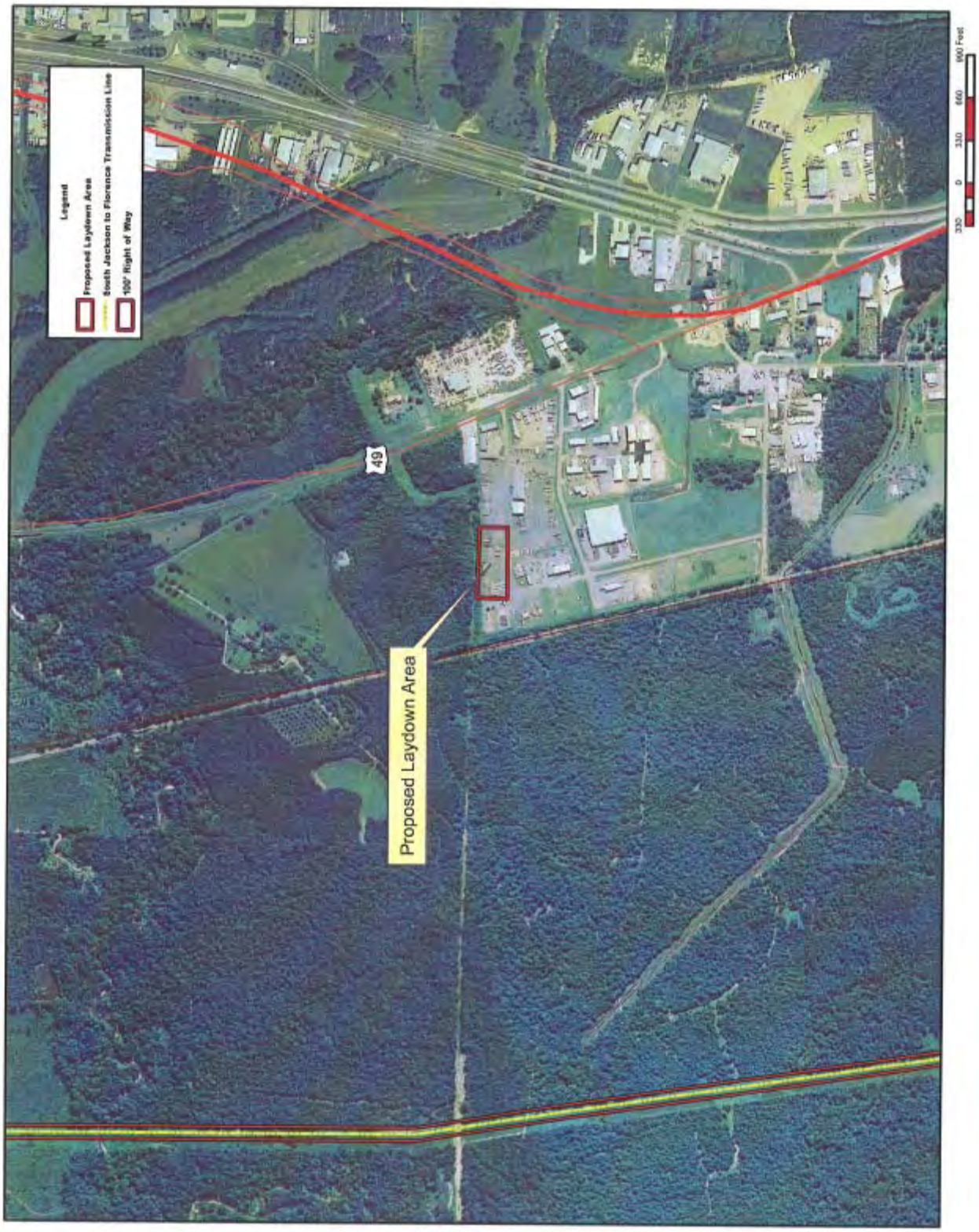
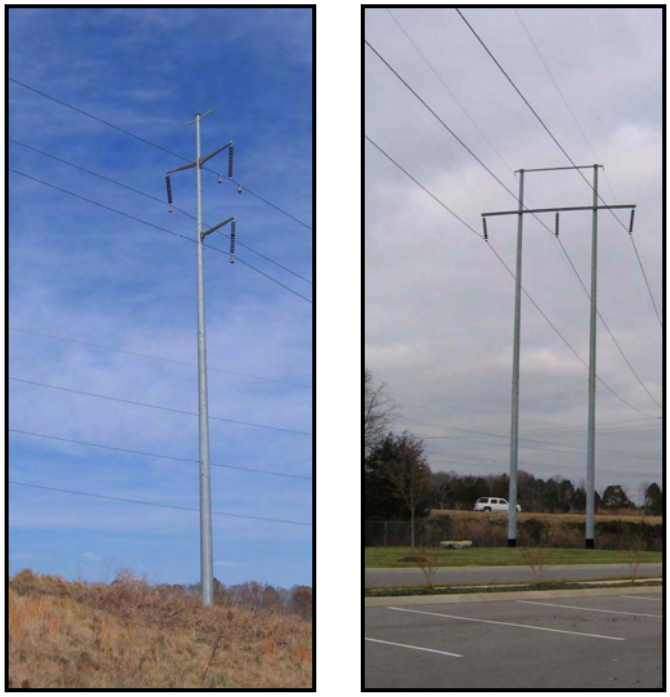


Figure 2-2. Construction Laydown Area for the Proposed Entergy Mississippi, Inc., South Jackson-Florence Transmission Line Upgrade Project

2.2.1.4. Structures and Conductors

With the exception of the first few lattice tower structures coming out of the South Jackson Substation and the dead-end tower at the Florence Substation, the existing 115-kV transmission line is constructed on tangent wood H-frame structures and three-pole guyed wood angle and dead-end structures. All the existing wood structures, wire, insulators, guys, and anchors would be removed and replaced utilizing both single- and double-pole steel structures (Figure 2-3). Structure type would depend on terrain and the resulting distance between structures. The structure heights would vary according to the terrain and would range between 80 and 110 feet. The existing lattice towers coming out of the South Jackson Substation site and crossing I-20 would not be replaced.



(a) Single Steel-Pole Structure (b) Double Steel-Pole Structure

Figure 2-3. Examples of Single and Double Steel-Pole Transmission Structures

The tangent structures would consist of 56 single-pole steel structures and two steel H-frame structures for a total of 60 poles. There would also be one three-pole dead-end structure and four single-pole angle structures. New 1272 ACSR “Bittern” conductor (the cables that carry the electrical current) and a new GW2400 fiber optic shield wire would be installed on the structures.

The 43 proposed structures located within the Pearl River floodplain area would be constructed using socket piles because of the soils in this area. Pile foundations are the part of a structure used to carry and transfer the load of the structure to the bearing ground located at some depth below ground surface (Abebe and Smith 1994). For this structure construction method, a pile is driven, a tapered socket is fitted over it, and the pole or support member goes into the socket (Dywidag-Systems International, Ltd., 2005). The

remaining new structures outside of the Pearl River floodplain area would be embedded directly in holes augured into the ground or vibratory pile supported, generally to a depth of 15 feet. Poles at angles (i.e., angle points) in the transmission line may require supporting guys.

Equipment used during the construction phase would include trucks, truck-mounted augers and drills, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (e.g., areas with south ground) to reduce the potential for environmental impacts.

2.2.1.5. Conductor and Ground Wire Installation

Reels of conductor and ground wire would be delivered to various staging areas along the ROW route. Temporary clearance poles would be installed at road and railroad crossings to reduce interference with traffic. Installation of conductors would begin with a small rope being pulled from structure to structure. The rope would then be connected to the conductor and ground wire and used to pull them down the line through pulleys suspended from the insulators mounted on the structures. A bulldozer and specialized tensioning equipment would be used to pull conductors and ground wires to the proper tension. Finally, the wires would be clamped to the insulators, and the pulleys would be removed.

2.2.2. Operation and Maintenance

2.2.2.1. Inspection

Periodic inspections of the EMI transmission lines are performed from the ground and by aerial surveillance using a helicopter. These inspections, which occur on approximately five-year cycles after operation begins, locate damaged conductors, insulators, or structures, and discover any abnormal conditions that might hamper the normal operation of the line or adversely affect the surrounding area. During these inspections, the condition of vegetation within the ROW, as well as immediately adjoining the ROW, is noted. These observations are then used to plan corrective maintenance and routine vegetation management.

2.2.2.2. Vegetation Management

Management of vegetation along the ROW would be necessary to ensure access to structures and to maintain an adequate distance between transmission line conductors and vegetation. The transmission line would be designed to meet a 24-foot-minimum clearance as required by the National Electrical Safety Code.

Management of vegetation along the ROW would consist of two different methods. These would include the felling of danger trees adjacent to the cleared ROW and the control of vegetation within the cleared ROW.

Danger trees are those trees that are located away from the cleared ROW but are tall enough to pass within 5 feet of a conductor or strike a structure should it fall toward the transmission line.

Management of vegetation within the cleared ROW would use an integrated vegetation management approach designed to encourage the low-growing plant species and

discourage tall-growing plant species. A vegetation management plan would be developed for each transmission line segment based on the results of the periodic inspections described above. Given the land use in the area of this project, ROW maintenance is expected to be minimal. The two principal management techniques are mechanical mowing, using tractor or track-mounted rotary mowers and/or brush-cutter-type mulching heads, and herbicide application. Herbicides are normally applied in areas where heavy growth of woody vegetation is occurring on the ROW and where mechanical mowing is not practical. Herbicides would be selectively applied by helicopter or from the ground with backpack sprayers or vehicle-mounted sprayers.

Any herbicides used would be applied in accordance with applicable state and federal laws and regulations and the commitments listed in this document (Appendix C). Only herbicides registered with the U.S. Environmental Protection Agency (USEPA) would be used.

2.2.2.3. Structure Replacement

Other than vegetation management, little other maintenance work would normally be required. The transmission line structures and other components typically last several decades. In the event that a structure must be replaced, the structure would normally be lifted out of the ground by crane-like equipment and the replacement structure would be inserted into the same hole or an immediately adjacent hole. Access to the structures would be on existing roads where possible. Replacement of structures may require leveling the area surrounding the replaced structures, but there would be little, if any, additional area disturbance when compared to the initial installation of the structure.

2.3. Project and Siting Process

TVA and EMI have long employed a set of evaluation criteria that represent opportunities and constraints for development of transmission line routes. Both entities utilize criteria that are oriented toward factors such as existing land use, ownership patterns, environmental features, cultural resources, and visual quality. Cost is also an important factor, with engineering considerations, property, and ROW acquisition cost being the most important elements. Routing opportunities also considered include the use of existing utility corridors, couse of transportation corridors, and the upgrading of existing transmission lines to create a circuit with higher electrical capacity or the installation of multiple circuits.

The first task in defining alternatives to meet the TVA additional annual network transmission service was to identify a power source that could supply the identified objective. TVA identified a generating plant within the TVA service area located in the vicinity of the EMI/TVA system interface. The proposed EMI transmission line upgrades were identified as the most viable alternative to provide the annual network transmission service, which would have otherwise necessitated the construction or purchase of additional generating capacity to provide the secure resource requirements of the TVA native load.

Since the opportunity to meet the project objectives through the upgrade of the existing EMI transmission line on an existing ROW was identified, a broad study area was not developed nor were any additional routes considered that would require significant amounts of new ROW. As a result, no alternative locations were considered to meet the project objectives.

Therefore, the analysis and resource assessments were completed on the existing EMI transmission line ROW route.

2.4. The Preferred Alternative

Alternative B – Complete the Planned Transmission Line Upgrades (Action Alternative) is TVA's preferred alternative for this proposed action. EMI would complete the proposed upgrades to the 7.5-mile South Jackson-Florence 115-kV Transmission Line with all construction activities taking place within the existing transmission line ROW. In addition, EMI would complete the associated upgrades to the switches at the Morton Substation.

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CHAPTER 3

3.0 AFFECTED ENVIRONMENT

Various environmental resources could be affected by the implementation of the alternatives described in Chapter 2. This chapter describes the status of these potentially affected environmental resources. The resources include the following: groundwater and geology; surface water; aquatic life; wildlife; vegetation; threatened and endangered species; wetlands; floodplains; visual and aesthetic quality; recreation, parks, and natural areas; and historical and archaeological resources. The affected environment descriptions below are based on field surveys conducted in 2009, on published and unpublished reports, and on personal communications with resource experts and agency representatives. This information establishes the baseline conditions against which the decision maker and the public can compare the potential effects of the alternatives under consideration.

3.1. Groundwater and Geology

The proposed project area is located within the Mississippi Valley Loess Plains level III ecoregion of the Coastal Plain Physiographic Province (Chapman et al. 2004). This ecoregion stretches from near the Ohio River in western Kentucky to Louisiana. The proposed project would occur specifically within the Loess Plains level IV ecoregion. The topography in this ecoregion consists primarily of irregular plains. A highly erodible, thick layer of loess is the distinguishing characteristic of this ecoregion (Omernik 1987; Omernik and Griffith 2008). Streams within this flatter topography tend to have less gradient and more silty substrates (Omernik and Griffith 2008).

For the most part, the groundwater resources within the project area are accumulated as a result of infiltration and percolation of the precipitation that falls within the river basin. Overall, the groundwater within the basin is relatively free from pollution and is generally constant in terms of both quality and temperature. The groundwater resources within the Pearl River Basin as a whole are considered good to excellent in quality and abundant in supply.

Groundwater within the Pearl River Basin is used for a variety of purposes including public and private water supply. The proliferation of industrial users within the project area contributes significantly to the estimated 75 million gallons of groundwater withdrawals from aquifers within the project area on a daily basis. Most of the public water supply within the Jackson metropolitan area is supplied by the Pearl River Valley Water Supply District Ross Barnett Reservoir located to the north of the project area. This is supplemented by groundwater that is pumped from deep aquifers within the project area. Because the project area remains dependent upon groundwater supplies for both public and private uses, increases in groundwater withdrawals may eventually lead to additional utilization of the available surface water resources within the Jackson metropolitan area and specifically from Ross Barnett Reservoir. For the Pearl River Basin as a whole, most of the potable water supply is provided via the estimated 604 large capacity public water system wells operating within the basin or from the numerous private domestic wells present within the basin.

In terms of magnitude, the Pearl River Basin is a rather large basin. There are outcrops of at least 13 different geologic formations ranging in age from the Lower Eocene to the Holocene periods. In addition, there are at least 10 known and distinct aquifers found

within the river basin. The recharge areas for the aquifers are thought to be characterized by the unconfined aquifers that also furnish the base flows to some of the surface water resources located within the basin. Most of the recharge areas found within the basin have sandy strata at or near the land surface. These characteristics can result in an increase in susceptibility to issues relative to contamination from surface or aboveground activities. Most of the public water supply within the basin is obtained from deep confined aquifers, with the exception of the city of Jackson area.

Aquifers in the Claiborne Group furnish the majority of the groundwater supplies within the project area and the northern two-thirds of the basin. The underlying Wilcox Group contains a much more substantial fresh water supply. However, the Wilcox Group is seldom utilized because of its greater depth and the complexities and costs of tapping into the aquifer. In addition, there are still abundant groundwater supplies available within the much shallower Claiborne Group.

The Pearl River Basin is not a contained unit because formations extend beyond topographic divides into the adjoining stream basins. The formations at the surface tend to be sedimentary and dip in a southwest orientation throughout the northern three-fourths of the river basin except where they are interrupted by structural features such as the Jackson Dome and other smaller salt domes.

The proposed project area is located within the Coastal Plain Physiographic Province Loess Plains ecoregion (Chapman et al. 2004). As indicated by the Geologic Map of Mississippi, the geology of this area consists of outcrops of the Yazoo Clay Formation of the Jackson Group. The Yazoo Clay consists of homogeneous clays throughout, with the exception of the upper 50-foot interval, which contains several thin limestone and bentonitic clay beds. Alteration during weathering is accompanied by swelling when wet and shrinking when dry so that bedding is soon obliterated. When the Yazoo Clay becomes wet or saturated, the swelling clay particles compress and further decrease the effective permeability of the Yazoo Clay. The Yazoo Clay, however, is generally considered an impermeable formation and barrier to contiguous groundwater aquifers or ponded surface waters.

Information obtained from the Soil Surveys of Hinds and Rankin counties, Mississippi (USDA 1976; USDA 1984), indicated that the three primary soil association units (General Soil Map Units) underlying the proposed project area consist of the Cascilla-Arkabutla and Tippo-Leverett-Guyton soil associations in Rankin County and the Cascilla-Bonn-Deerford soil association in Hinds County (Appendix F).

3.2. Surface Water

Rainfall within the project area is generally considered to be abundant and well distributed throughout the year. Snowfall within the Pearl River Basin is generally a rare occurrence. The average annual precipitation is about 55 inches. The greatest monthly precipitation normally occurs in March or July and the least in October. Of the total average annual rainfall, half generally falls in the April to September time frame. Temperatures range from a winter average of 48 degrees Fahrenheit to a summer average of 80 degrees Fahrenheit.

The proposed project is located in the Mississippi Valley Loess Plains ecoregion where the flatter topography tends to contribute to streams with less gradient and more silty substrates (Omernik and Griffith 2008). The proposed project would occur within the Pearl River Drainage Basin in the southern portion of the Jackson metropolitan area. The Pearl

River is formed in Neshoba County, Mississippi, by the confluence of the Nanawaya and Tallahaga creeks. From its confluence, the river flows in a generally southwestern direction a distance of approximately 130 miles to the city of Jackson, Mississippi. The Ross Barnett Reservoir is located on the Pearl River just north of the Jackson metropolitan area and north of the project area. On the Pearl River bank heighths through the project area average from 20 to 90 feet, and channel widths average approximately 400 feet. Average flows within the Pearl River are 54,600 gallons per second.

The Pearl River Basin contains five major subbasins. The proposed project is located in the Upper Middle Pearl Subbasin. Streams within the subbasin generally have fairly fast, deep flows for a short time after rain events, and relatively shallow base flows. Streams within the subbasin have fair water quality. The two principal tributaries of the Pearl River located within the project area are Richland Creek and Squirrel Branch, both of which are transected by the proposed project. Other named streams that are transected by the project ROW route include Lynch Creek and Howard Creek. Through the project area, the Pearl River and the two primary tributaries are classified as fish and wildlife streams according to the *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters* (MDEQ 2007).

Water quality within the project area is considered good with localized impacts that at least temporarily impact the water quality of the riverine system at the point of occurrence. The primary land use within the project area is forestry with an increasing trend toward urbanization (MDEQ 2004a; 2004b). Nonpoint source pollution attributed to the more developed portions of the project area is primarily associated with storm water runoff from the adjoining land surfaces. The *State of Mississippi Water Quality Assessment Report* prepared on a biennial basis pursuant to Section 305(b) of the *Clean Water Act*, assimilates and documents water quality within the Pearl River Basin on a watershed basis (MDEQ 2008). For the most recent report, the Pearl River and the associated tributaries have been determined to fully support all assessed uses.

3.3. Aquatic Ecology

All of the proposed transmission line upgrades would take place within the existing South Jackson-Florence Transmission Line ROW located within the Pearl River Basin. During the project field assessment, all of the stream crossings associated with the ROW route were identified and mapped. WTSI completed a *Wetlands Delineation and Determination Report* and the associated wetlands and stream maps as well as the USACE Wetland Location Worksheet. WTSI noted the Global Positioning System location for each crossing, the linear distance of each crossing, and the total acres included within the ROW crossing for each of the affected stream crossings.

The affected streams along the ROW route have been classified utilizing the USACE techniques for the delineation of wetland habitats and/or boundaries (Environmental Laboratory 1987). The streams located along the project route were also classified utilizing the new guidance relative to the stream classifications utilized by the USACE (U.S. Department of Defense and USEPA 2003).

The existing ROW route transects one segment of the Pearl River channel itself designated as Traditional Navigable Waters (TNW). In addition, the existing ROW route crosses eight Relatively Permanent Waters (RPW) with “typical year-round flows.” These stream channels exhibit typical year-round flows or are more specifically designated as “perennial”

streams. Additionally, six crossings are classified as RPW with "seasonal flows." These are characterized as well-defined stream channels that lack significant vegetative components within the channel and that exhibit seasonal or "intermittent" flows throughout the year based upon rainfall events (Cowardin et al. 1979). The field assessment also revealed the presence of six Non-Relatively Permanent Waters (Non-RPW) that transect the existing ROW. These drains are best characterized as shallow stream channels with the overall lack of a significant vegetative component and characterized as "ephemeral" under the normal stream classification. In addition, the field assessment revealed the presence of two open water slough areas that are associated with seasonal flooding along the Pearl River (Strand 1997).

The Pearl River and its major tributaries are important fisheries within the state. For the most part, the fishery resources are of high quality and a testament to the overall health and water quality conditions within the river system. The portion of the river and the associated tributaries and other water bodies within the specific project area also support significant fisheries. The river, the major tributaries, and sloughs contain healthy populations of the most common native freshwater species of the state. Common fish species found within the project area include largemouth bass, white bass, bluegill, redear sunfish, crappie (white and black), channel catfish, blue catfish, bowfin, buffalo, carp, alligator gar, spotted gar, and several species of minnows (Ross 2001).

Because transmission line construction and maintenance activities mainly affect riparian conditions, in turn affecting instream aquatic habitat, an evaluation was completed of the conditions of each stream crossing in the field assessment for the aforementioned *Wetlands Delineation and Determination* report (WTSI 2009). Typically, TVA utilizes three classes to indicate the current condition of streamside vegetation across the length of the proposed transmission line. The same methodology was employed for assessing the stream crossings within the existing ROW for this project. The assigned classes are as follows:

- **Forested** – Riparian area is fully vegetated with trees, shrubs, and herbaceous plants. Vegetative disruption from mowing or grazing is minimal or not evident. Riparian width extends more than 60 feet on either side of the stream (Brinson et al. 1981).

- **Partially forested** – Although not forested, sparse trees and/or scrub-shrub, vegetation is present within a wider band of riparian vegetation (20 to 60 feet). Disturbance of the riparian zone is apparent.

- **Nonforested** – No or few trees are present within the riparian zone. Significant clearing has occurred, usually associated with pasture or cropland.

As noted, the proposed project includes the upgrade of the existing South Jackson-Florence 115-kV Transmission Line. Given this, all of the project construction activities would take place within the existing 100-foot-wide ROW within which the existing line is located. Since it is an existing transmission line ROW, the vegetation within the ROW has been maintained by EMI. In addition, the portion of the ROW in the northern end of the project area crosses the Pearl River channel within a floodway zone where the USACE Vicksburg District and the Hinds-Rankin Levee District maintain the vegetative component. All of the identified stream crossings on the ROW route were classified as "partially forested" under the above-referenced classification system (Reed 1988).

3.4. Vegetation

The Pearl River Basin lies within the Loess Plains level IV ecoregion of the Mississippi Valley Loess Plains where oak-hickory, oak-hickory-pine, and some mixed mesophytic forests are the dominant natural vegetation (Omernik and Griffith 2008). The project area contains gently rolling terrain with elevations that range between about 220 and 280 feet NGVD.

The northern terminus of the proposed project is located at the South Jackson Substation site located adjacent to US 80 and just north of I-20. The portion of the project ROW running from the South Jackson Substation site south to the Pearl River channel crossing is located within floodway zone in which the vegetation is managed by the USACE and the Hinds-Rankin Levee District as a part of flood control activities within the Jackson metropolitan area. Sandy silt deposits associated with high water events along this segment of the line further impact the vegetative components and the extent of the vegetative cover found within the floodway area in general.

From the Pearl River crossing going south, the existing ROW transects a predominant bottomland forestland habitat type (Harris 1984). Further south, the preponderance of ROW transects what is best characterized as an upland forestland habitat type. The more southern extreme of the ROW route is located in a more urbanized area located within the city of Florence.

Though primarily a bottomland hardwood habitat type, the Pearl River Basin is somewhat unique in that topographic features within the project area result in a significant presence of intermingled upland habitats (Wharton 1982). Within the project area, a significant amount of more upland forestland habitats occur interspersed throughout the predominant bottomland hardwood forestland habitat type (Hodgkins et al. 1979).

Because the proposed project is located within an existing transmission line ROW, the observed vegetative components are reflective of the ongoing EMI vegetation management program but are generally reflective of the adjoining habitat types. The habitat within the existing transmission line ROW at the time of the assessments is primarily scrub-shrub with intermingled areas of herbaceous habitats. The most common tree species observed included water oak, willow oak, Nuttall oak, Shumard oak, cherrybark oak, overcup oak, sweetgum, baldcypress, hawthorne, red mulberry, post oak, hickory, water tupelo gum, red maple, green ash, sugarberry, persimmon, sycamore, black willow, eastern red cedar, winged elm, deciduous holly, Chinese tallow tree, loblolly pine, and shortleaf pine (Carter 1978; Radford et al. 1968). Because of the vegetation management practices, these tree species are primarily present as regeneration within the existing ROW and are seldom greater than 10 to 12 feet in height. The most commonly occurring scrub-shrub, vine, and herbaceous species include smartweed, *Juncus* spp., woolgrass, bulrush, floating primrose, buttonbush, redvine, switch cane, trumpet creeper, laurel greenbrier, *Rubus* spp., poison ivy, *Cyperus* spp., *Sesbania* spp., dallis grass, wild millet, vervain, Bermuda grass, bahia grass, wooly crotin, *Aster* spp., *Heliotrope,* common lespedeza, partridge pea, dog fennel, Johnson grass, pepper vine, broom sedge, saw greenbrier, wild rye, goldenrod, saw grass, foxtail grass, ladies eardrop, wild rye, red root, rosemallow, muscadine, Indian wood oats, Japanese honeysuckle, boneset, Japanese climbing fern, and Chinese privet (Brown 1991; Godfrey 1979; 1981; MacRoberts 1989).

Nonnative, invasive species are a threat to biodiversity and natural plant communities. Unchecked invasive species lead to the degradation of natural areas and displace native

species. Nonnative, invasive species occur in and around the existing transmission line ROW. However, the species observed are of no larger a component than typically observed within similar habitats and with similar conditions. None of the commonly occurring nonnative, invasive species observed within the existing project ROW during the field assessments (Table 3-1) are considered especially abnormal or a significant threat to the native species within the project area.

Table 3-1. Invasive Plant Species Observed in the Existing South Jackson-Florence 115-kV Transmission Line Right-of-Way

Common Name	Scientific Name
Chinese privet	*Ligustrum sinense*
Japanese climbing fern	*Lygodium japonicum*
Japanese honeysuckle	*Lonicera japonica*
Chinese tallow tree	*Triadica sebifera*
Johnson grass	*Sorghum halepense*

3.5. Wildlife

From an overall ecological perspective, the Pearl River Basin is broadly described as being located within the deciduous forest formation. Within this formation, the associated climax vegetation is typically defined as the oak-gum-cypress complex. The primary habitat type found within the basin and particularly within the project area would be the bottomland hardwood forestland habitat type. Within this habitat type are occurrences of what are best referred to as bald cypress/tupelo gum brake areas that are fairly well characterized as having persistent water conditions. There are also other open water areas found within the predominant bottomland hardwood forestland habitat that are characterized as old lake areas, sloughs, and other open water bodies. In addition, there are areas found within the project vicinity that have been significantly disturbed in the past and that contain a preponderance of black willow regeneration and other pioneer species that typically regenerate within similarly disturbed sites. As previously noted, within the predominant bottomland hardwood forestland habitat, the Pearl River Basin is somewhat unique relative to the presence of significant amounts of upland habitat. Throughout the project area, substantial upland forestland and open field type habitats occur. This overall diversity in habitat types within the general area of the project results in an associated level of diversification in wildlife species that frequent the general project area.

As previously noted, all of the proposed project construction activities would take place within the existing 10-foot-wide 115-kV transmission line ROW. Because it is a maintained ROW, the habitat within the ROW is scrub-shrub and represents an early successional corridor type habitat that transects the predominant forestland habitats that occupy the adjoining property. Many native wildlife species occupy this early successional habitat type on a frequent basis, and others utilize the ROW for feeding, bedding, and travel.

The Pearl River Basin as a whole supports fairly diverse populations of varied wildlife species. Though the project area is located within and to the south of the Jackson metropolitan area, the floodplain along the river continues to be a relatively productive area for wildlife. Most of the common game and nongame wildlife species native to Mississippi can be found in the project area (Brinson et al. 1981). Some of the more common mammal species found within the project area include white-tailed deer, rabbits (swamp and

cottontail), gray squirrels and red phase fox squirrels, coyotes, armadillos, bobcats, nutria, beavers, skunks, opossums, deer mice, raccoons, and cotton rats (Blair 1957). Numerous bird species are found within the project area including common species such as bluebird, blue jay, American robin, American crow, Carolina wren, northern cardinal, downy woodpecker, eastern meadowlark, indigo bunting, and several other songbird species (Robbins 1983). The area also hosts populations of eastern wild turkeys and northern bobwhite, both of which are important game bird species found in the area. In addition, the river channel and its major tributaries, lakes, and sloughs located within the project area support significant populations of migratory waterfowl including wood ducks, mallards, and other migratory species such as mourning doves. The project area also supports rather healthy populations of many common reptiles and amphibians including alligator snapping turtles, box turtles, black racers, copperheads, and cottonmouths (Conant 1975).

3.6. Threatened and Endangered Species

Four federally listed species are known from Hinds and Rankin counties (USFWS 1992) (Table 3-1; Appendix G). Of these the gulf sturgeon and ringed map turtle are known from the Pearl River watershed (Appendix A). Additionally, the bald eagle is known to nest adjacent to the Pearl River. The bald eagle is protected under the *Bald and Golden Eagle Protection Act* and the *Migratory Bird Treaty Act*.

The State of Mississippi does not have a state threatened and endangered species program. However, the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) Museum of Natural Science maintains the Natural Heritage Database. This database contains a continuously updated inventory of plant and animal species and representative natural communities within the state. The database is utilized to document the occurrence and status of rare plant and animal species and other elements of natural diversity (Mississippi Museum of Natural Science 2008). The database includes records of 31 plant species and 37 animal species “of special concern” that are known to occur in Hinds and Rankin counties (Appendix G). Three of these species are known to occur within 2 miles of the project site (Table 3-2). These species were identified in correspondence received from the MDWFP dated September 15, 2009 (Appendix A).

Table 3-2. Federally Listed and State-Listed Species Known From Hinds and Rankin Counties, Mississippi

Common Name	Scientific Name	Status[1]	
		Federal	State[2]
Fish			
Bayou darter	*Etheostoma rubrum*	T	S1
Gulf sturgeon	*Acipenser oxyrhynchus desotoi*	T, CH	S1
Northern starhead topminnow[3]	*Fundulus dispar*	--	S2
Mussels			
Rayed creekshell[3]	*Anodontoides radiates*	--	S2
Rock pocketbook[3]	*Arcidens confragosus*	--	S2
Reptile			
Ringed map turtle	*Graptemys oculifera*	T	S2
Bird			
Bald eagle	*Haliaeetus leucocephalus*	--	S1B,S2N[4]
Mammal			
Louisiana black bear	*Ursus* a. *luteolus*	T	--

[1]*Status Codes*: **T** =Threatened; **CH** = Listed with critical habitat
[2]*State Ranks*: **S1** = Critically imperiled in Mississippi because of extreme rarity (5 or fewer occurrences or very few remaining individuals) or because of some factor(s) making it vulnerable to extirpation; **S2** = Imperiled in Mississippi because of rarity (6 to 20 occurrences or few remaining individuals) or because of some factor(s) making it vulnerable to extirpation;
[3] Species are known to occur within 2 miles of the project site
[4]*Breeding*: **B** = Breeding; **N** = Nonbreeding

3.6.1. Aquatic Animals

The stretch of the Pearl River through the project area supports two aquatic species listed as threatened by the U.S. Fish and Wildlife Service (USFWS), the Gulf sturgeon and the ringed map turtle (Appendix A). The portion of the Pearl River running from the Ross Barnett Reservoir to the north of the project area running south through the project area has been designated as critical habitat for the Gulf sturgeon by the USFWS (2002).

The Gulf sturgeon is an anadromous fish (ascending rivers from the sea for breeding) that have historically inhabited coastal rivers from the Mississippi River in Louisiana to the Tampa Bay in Florida (Barkullo 1958). There are documented sightings of Gulf sturgeon as far upstream as the city of Jackson and within the proposed project area. From a historical perspective, the last recorded sighting of a Gulf sturgeon within the proposed project area occurred in 1984 when a 160-pound female was caught in close proximity to the project area (Huff 1975). Two other Gulf sturgeon were collected in the project area in 1978 and 1982. Based upon documented records, no other documented sightings within the project area or in proximity to the project area have occurred since 1984.

The ringed map turtle is a small narrow-headed turtle with laterally compressed, black, spinelike vertebral projections and a slightly serrated posterior carapacial margin (Anderson 1958. Habitat for the ringed map turtle is typically riverine with a moderate current and numerous basking logs (Cagle 1953). Populations are typically most abundant in areas of the river that have moderate to fast currents with deep water and sand and gravel bottoms (Jones 1991).

The ringed map turtle was designated as a federally threatened species in 1986 because it is endemic to the Pearl River in the states of Mississippi and Louisiana (Stewart 1988;

USFWS 1988). Studies have shown that populations exist within the Pearl River from the Neshoba County, Mississippi, headwaters southward downstream through Saint Tammany Parish, Louisiana. To date, the highest densities of turtle populations have been documented above the Ross Barnett Reservoir and below the Jackson metropolitan area in the general project vicinity.

Coordination with the MDWFP and specifically relative to the listing of the species of "special concern" for Hinds County revealed the listing of two other federally listed as threatened species, the bayou darter and the inflated heelsplitter. The USFWS also list the bayou darter on the listing for Hinds County but does not include a listing for the inflated heelsplitter. The bayou darter does exist within the Big Black River and its primary tributaries located in the southwest portion of the county. However, the bayou darter is not known to exist in the Pearl River or any of its tributaries. The inflated heelsplitter is listed as threatened by the USFWS in the states of Alabama and Louisiana but not in the state of Mississippi (Albertson et al. 2002). It is known to exist in the Lower Pearl River in the state of Louisiana and is thought to have historically existed in the Upper Pearl River within the project area. Due to the potential historical presence, the MDWFP includes the inflated heelsplitter on the listing of species of "special concern" for Hinds County. However, there have been no documented sightings within the past 50-year period.

3.6.2. Plants

No federally listed plants or designated critical habitats are known to exist within the general vicinity of the project area. In addition, no federally listed plant species were observed during field surveys conducted in August 2009. A total of 31 state-listed plant species of concern are known from Hinds and Rankin counties (Appendix G). None of these plant species are known from the project area, and none were found during field surveys of the proposed transmission line ROW.

3.6.3. Terrestrial Animals

The American bald eagle is known to frequent portions of the Pearl River Basin (Dugoni 1980; Gerrard et al. 1988; Harris et al. 1987). Active nesting sites are present to the north of the project area around the Ross Barnett Reservoir. On June 28, 2007, the USFWS removed the bald eagle from the threatened and endangered listing. However, the bald eagle is still protected under the *Migratory Bird Treaty Act* and the *Bald and Golden Eagle Protection Act*. Bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding (Appendix A). Management plans prepared by the USFWS after the delisting require that care be taken in any actions that would affect active nesting sites that may be near any proposed project area (Simons et al. 1988; Snow 1973). Given this, survey efforts and coordination completed with the USFWS in August 2009 were focused on the determination of bald eagle activity within the project area. No occurrences of any bald eagles or active nesting sites were noted during the field surveys conducted in August 2009.

Review of the USFWS Mississippi List of Threatened and Endangered Species revealed the listing of the threatened Louisiana black bear for both Rankin and Hinds counties (USFWS 2008). This is due, in part, by the presence of suitable habitat for the black bear within the Pearl River Drainage Basin. However, consultation with the USFWS concurred that there have been no documented sightings within the project area. This is primarily due to the proximity of the project area to the Jackson metropolitan area. Therefore, the

USFWS did not include the Louisiana black bear in the correspondence following their review of the project details.

A number of species state-listed as “of special concern” are known from Hinds and Rankin counties (Appendix G). However, consultation with the Mississippi Department of Archives and History (MDAH) confirmed none are known from within 2 miles of the proposed project area (Table 3-2; Appendix A).

3.7. Wetlands

Wetlands are areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include swamps, marshes, bogs, wet meadows, and lacustrine and palustrine shoreline fringes. WTSI was retained by EMI to complete a wetlands delineation and determination on the existing South Jackson to Florence 115-kV Transmission Line ROW within which the proposed project would be located. WTSI completed the wetland delineation and determination through the time period of August 13, 2009, through September 3, 2009.

The proposed project scope included the assessment of the existing South Jackson-Florence Transmission Line easement. This easement extends from the EMI South Jackson Substation approximately 7.5 miles to the EMI Florence Substation. The easement is maintained within a 100-foot ROW totaling approximately 92 acres.

The initial field assessment revealed that the property within the boundaries of the alignment transect primarily open field with scrub-shrub habitats. From our field wetland assessment, it was confirmed that the majority of the existing ROW alignment transects through the historic bottomland habitat within the Pearl River Drainage Basin. The proposed alignment also transects segments of the Pearl River, Lynch Creek, Richland Creek, Squirrel Branch, and Howard Creek.

The South Jackson-Florence Transmission Line ROW alignment transects a historically predominant bottomland hardwood habitat with characteristic emergent wetland habitats throughout. The ROW has been regularly maintained by mowing and herbicide applications. Given this, the predominant habitat within the transmission line ROW is best described as a scrub-shrub habitat type with interspersed habitats more closely depicting open field areas due to the ongoing vegetative controls within the alignment.

Table 3-3 provides a breakdown of the different wetland habitat types that were found to be present on the subject property.

Table 3-3. Wetland Habitat Types Observed Along the Existing South Jackson-Florence 115-kV Transmission Line Right-of-Way

Wetland Habitat Type	Acres
Emergent Wetlands	19.795
Open Water Slough Habitats	1.292
TNW[1]	0.537
RPW Typical Year Round Flows[1]	1.181
RPW Seasonal Flows[1]	0.353
Non-RPW	0.056
Open Field Uplands and Associated Easements	68.906
TOTAL	**92.12**

[1]Other Waters of the United States

3.8. Floodplains

A floodplain is that relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a 1 percent chance of flooding in any given year is called the 100-year floodplain.

A substantial portion of the South Jackson-Florence Transmission Line ROW that encompasses the project area, as well as the proposed laydown yard, is located within the 100-year floodplain of the Pearl River. The exact extent of the 100-year floodplain within the Pearl River Basin relative to the transmission line ROW is depicted on the Federal Emergency Management Agency Flood Insurance Rate Maps covering the project area and is included in Figure 3-1.

The highest recorded flood event on the Pearl River within the project area occurred in April 1979. In a two-day period from April 12 through April 13, 1979, rainfall amounts measuring up to 19.6 inches were recorded within the headwaters area of the Pearl River Basin. The resulting flood event had a recorded peak of approximately 128,000 cubic feet per second at the U.S. Geological Survey Jackson gage. The resulting peak river stage at the Jackson gage was recorded at 43.3 feet National Geodetic Vertical Datum (NGVD). The most recent flood event of note occurred in May 1983 at which time a peak flow of approximately 78,600 cubic feet per second with a peak river stage of approximately 39.5 feet NGVD was recorded at the Jackson gage. The frequencies of the 1979 and 1983 flood events at the Jackson gage were 200- and 35-year events, respectively.

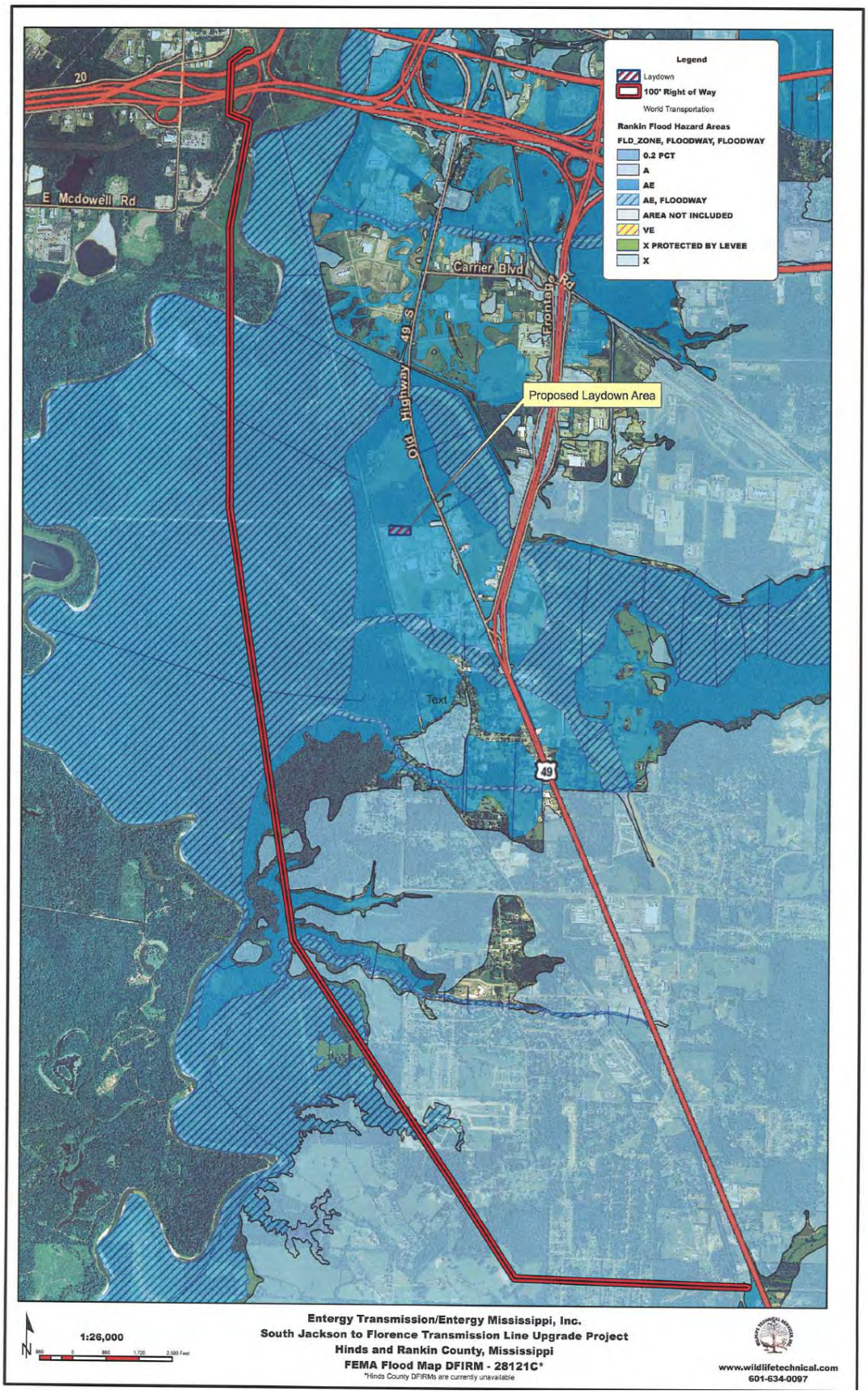

Figure 3-1. Federal Emergency Management Agency Flood Insurance Rate Map of the Area Surrounding the South Jackson-Florence 115-kV Transmission Line

3.9. Visual and Aesthetic Quality

The physical, biological, and cultural features of an area combine to make the visual landscape character both identifiable and unique. Scenic integrity indicates the degree of unity or wholeness of the visual character. Scenic attractiveness is the evaluation of outstanding or unique natural features, scenic variety, seasonal change, and strategic location. Where and how the landscape is viewed would affect the more subjective perceptions of its aesthetic quality and sense of place. Views of a landscape are described in terms of what is seen in foreground, middleground, and background distances. In the foreground, an area within 0.5 mile of the observer, details of objects are easily distinguished in the landscape. In the middleground, normally between 0.5 and 4 miles from the observer, objects may be distinguishable, but their details are weak and they tend to merge into larger patterns. Details and colors of objects in the background, the distant part of the landscape, are not normally discernible unless they are especially large and standing alone. The impressions of an area's visual character can influence how it is appreciated, protected, and used. The general landscape character of the project area is described in this section.

As noted, the proposed project would take place within the existing South Jackson-Florence 115-kV Transmission Line ROW. The project would begin at the South Jackson Substation site located adjacent to US 80 and just north of I-20. The landscape character within this area is generally urban development to the maintained Pearl River floodway area looking to the south along the existing transmission line ROW. Scenic attractiveness is minimal and integrity is rated as low.

From the Pearl River crossing, within the floodway area looking south, the view is along the existing transmission line ROW that transects bottomland hardwood forestland. Scenic attractiveness is common. Scenic integrity is moderate. The Pearl River is listed by the National Park Service (NPS) as a Nationwide Rivers Inventory (NRI) stream (NPS 2009). This listing is in part because of outstanding scenery along the river.

From that point south, the existing transmission line ROW transects the predominant bottomland hardwood forestland into the upland forestland through which the more southern portion of the existing ROW runs. Scenic attractiveness is common. Scenic integrity is low to moderate.

From the point the existing transmission line turns east toward the Florence Substation site, the ROW runs through a generally urban environment. Scenic attractiveness is common. Scenic integrity is low.

3.10. Recreation, Parks, and Natural Areas

As a part of the interagency coordination process, a database review was conducted by the MDWFP for natural areas in Mississippi. No public or commercial recreation areas are located in the vicinity of the existing transmission line ROW. In addition, the transmission line ROW is not within or adjacent to any natural areas, and there are no records in the Natural Areas Registry for the proposed project area. Concurrence relative to the MDWFP Mississippi Natural Heritage Program is included in their letter dated September 15, 2009 (Appendix A).

As previously mentioned, the Pearl River is listed as an NRI stream. The Pearl in Marion, Lawrence, Copiah, Simpson, Hinds, and Rankin counties, from River Mile (RM) 161 located just above the city of Columbia upstream to RM 312, 1 mile south of Jackson, is listed on the NRI. The NPS recognizes this stream for its outstanding scenic, recreational, fish, and wildlife values (NPS 2009). The existing transmission line ROW within which the proposed transmission line would be constructed crosses the Pearl River just north of where the NRI begins running downstream from RM 312.

While the varied terrain and mix of habitat types make the project area suitable for some dispersed recreation use such as hunting, walking, hiking, fishing, and nature observation, there appears to be limited opportunities for public recreation in the area, and private land owners would likely account for most of the use that does occur. The majority of the transmission line ROW transects private land, and the area is utilized for hunting, fishing, and related outdoor recreation by the private landowners. Though the Pearl River itself is a public waterway, there is limited public use of the river for boating and fishing activities due to the limited access points on the river. At present, there are no public boat ramps providing access to the river within close proximity to the project area.

3.11. Historical and Archaeological Resources

Based upon the initial file reviews, it was determined that eight previous cultural resources surveys had been conducted within 0.75 mile of the existing transmission line ROW. Based upon the file review and coordination with MDAH, the cultural resources survey along the existing transmission line ROW route was based upon utilizing the floodplain/terrace-upland distinction as the sampling strata.

The cultural resources field survey was completed during September 5-6, 2009. A total of 14 known existing sites were noted within 0.75 mile of the survey area. During field surveys within the project ROW, no evidence of the existence of any culturally or historically significant sites was located. Therefore, the Cultural Resources report was submitted to MDAH with the recommendation that the survey area be considered clear of any significant cultural resources (Johnson 2009).

CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential effects of implementing the alternatives. Resources are presented in the same order as the previous chapter.

4.1. Groundwater and Geology

4.1.1. No Action Alternative

Under the No Action Alternative, there would be no direct effects to groundwater or geological resources because EMI would not complete the proposed transmission line upgrades. The existing transmission line would remain in operation, and periodic and routine maintenance of the ROW would continue as is. Thus, there would be no additional effects to groundwater or geological resources along the existing transmission line ROW under the No Action Alternative.

4.1.2. Action Alternative

Based upon the planned construction activities, potential impacts to groundwater resources would primarily be associated with the drilling and excavating activities associated with the placement of the new structures and with the potential for hazardous materials spills associated with equipment operations. As noted in Section 2.2.1.4, construction methods for the structures would be contingent on the soils encountered along the existing ROW. Softer loess-type soils found along the Pearl River floodplain area would be constructed utilizing socket piles, while new structures outside of the floodplain area would be embedded directly in holes augured into the ground or vibratory pile supported.

Since the new structures would be installed to a depth of approximately 15 feet, the drilling and excavation for the new structures would be well above the depth of aquifers within the project area. In addition, the project area is not known to be a primary aquifer recharge area. Implementation of the established EMI spill containment standards during construction would minimize potential for effects relative to hazardous materials spills (Appendix H). Implementation of the SWPPP and associate storm water BMPs during construction would ensure proper controls are in place to control sediment and storm water runoff to avoid any potential for groundwater contamination.

Revegetation of the construction areas around each new structure location as outlined in the EMI standards and the SWPPP would provide long-term controls. Maintenance activities following construction wherein herbicides are applied would be done in a manner consistent with the manufacturers' labels. During ROW maintenance, the EMI vegetation management guidelines and procedures would be followed. With the implementation of BMPs and routine precautionary measures and with the nature of aquifers including the depth, impacts to groundwater resources from the proposed action would be insignificant.

4.2. Surface Water

4.2.1. No Action Alternative

Under the No Action Alternative, there would be no direct effects to surface water because EMI would not complete the proposed transmission line upgrades. Thus, the existing transmission line would stay in operation as is and there would be no project-related effects to surface water or to surface water quality along the existing transmission line ROW route. Therefore, there would be no additional effects to surface water within the project area under the No Action Alternative.

4.2.2. Action Alternative

Soil disturbances associated with access roads and other construction activities can result in adverse water quality impacts. Soil erosion and sedimentation can clog small streams and threaten aquatic life. Removal of the tree canopy along stream crossings can increase water temperatures, algal growth, dissolved oxygen depletion, and adverse impacts to aquatic biota. Improper use of herbicides to control vegetation could result in runoff to streams and subsequent aquatic impacts.

EMI routinely includes precautions in the design, construction, and maintenance of its transmission line projects to minimize these potential impacts (see Appendices C and D). Permanent stream crossings would be designed to prevent impedance of runoff patterns and the blockage of the natural movement of aquatic fauna. Temporary stream and jurisdictional wetland crossings and other construction and maintenance activities would comply with the MDEQ Storm Water Construction General Permit conditions and the EMI construction standards. Canopies in all SMZs would be left undisturbed unless there were no practicable alternative. ROW maintenance would employ manual and low-impact methods wherever possible. In areas requiring chemical treatment, only USEPA-registered herbicides would be used in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts. Proper implementation of these controls is expected to result in only minor temporary impacts to surface waters and receiving streams.

The Pearl River, which is classified as TNW, is crossed by the existing transmission line. The USACE has issued a Nationwide Permit 3 based partially upon the preliminary determination that there may be jurisdictional areas subject to regulation pursuant to Section 10 of the *Rivers and Harbors Act of 1899* and/or Section 404 of the *Clean Water Act*. This permit covers the proposed transmission line crossing of the Pearl River.

Prior to commencement of the construction activities, EMI would apply for authorization under the aforementioned MDEQ Storm Water Construction General Permit. Prior to this, the CNOI and SWPPP would be developed that would include the necessary storm water BMPs and would include the installation of SMZs along either bank of the Pearl River and the tributaries that are transected by the transmission line ROW. Given this, no significant impacts to the Pearl River or any of the tributaries would be anticipated. In addition, no cumulative impacts are anticipated.

4.3. Aquatic Ecology

4.3.1. No Action Alternative

Under the No Action Alternative, EMI would not complete the transmission line upgrades. Thus, no changes to aquatic resources within the project area would occur. Adoption of the No Action Alternative is not expected to result in any additional effects to the local aquatic life.

4.3.2. Action Alternative

Aquatic life could be affected by the proposed action either directly by the alteration of habitat conditions within the affected stream crossings or indirectly due to modifications of the riparian zones and storm water runoff resulting from construction and maintenance activities along the transmission line corridor. Potential impacts due to removal of streamside vegetation within the riparian zones along the ROW include increased erosion and siltation, loss of instream habitat, and increased stream temperatures. Other potential construction and maintenance impacts include alteration of stream banks and stream bottoms by heavy equipment and runoff of herbicides into streams. However, herbicides would not be allowed in and around areas federally designated as critical habitat. Hand cutting only would be utilized within and immediately adjacent to any designated critical habitats.

Siltation has a detrimental effect on many aquatic animals adapted to riverine environments. Turbidity caused by suspended sediment can negatively impact spawning and feeding success of many fish species (Sutherland et al. 2002).

Streams that convey only surface water during storm events (i.e., wet-weather conveyances or RPW with “seasonal flows”) and that could be affected by proposed transmission line construction activities within the existing ROW route would be protected by the implementation of storm water BMPs as required by the EMI standards and the MDEQ Storm Water Construction General Permit Conditions. These BMPs and associated standards are designed in part to minimize disturbance of riparian areas and subsequent erosion and sedimentation that can be carried to streams potentially affecting water quality and instream habitat for aquatic organisms.

Implementation of the MDEQ Construction Storm Water Regulations and the EMI standards would protect all of the streams located along the existing transmission line ROW including the Pearl River. In addition, the Standard Stream Protection (Categories A and B) as defined by Muncy (1999) would be utilized (Appendix B). SMZs of appropriate size would be established on the ground along each stream crossing prior to the commencement of construction activities. The Pearl River channel would not be affected, and neither construction activities within the channel nor access crossings would be allowed. A minimal 50-foot SMZ would be established on all perennial stream crossings with the exception of the Pearl River. The Pearl River in the vicinity that the existing transmission line crosses is critical habitat for the Gulf sturgeon. Therefore, a minimal 100-foot SMZ would be established wherein no construction activities or equipment entry can take place on either bank of the Pearl River channel prior to construction.

Because appropriate BMPs and SMZs would be implemented during construction, operation, and maintenance of the transmission line ROW, any impacts to aquatic life resulting from the proposed action are anticipated to be insignificant.

A total of 22 ephemeral, intermittent, and perennial stream crossings were identified along the existing ROW. At present, most of the ephemeral and intermittent streams have existing road crossings. Most of these stream crossings could potentially have temporary impacts from the use of the road crossings during construction. However, appropriate BMP measures would be implemented to stabilize the crossings following construction. No perennial stream crossings would occur.

4.4. Vegetation

4.4.1. No Action Alternative

Under the No Action Alternative, EMI would not complete the proposed transmission line upgrades, and the existing transmission line ROW would remain in its current condition. Thus, adoption of the No Action Alternative would not affect plant life within the existing ROW because no project-related work would occur. Changes to local plant communities resulting from natural ecological processes and human-related disturbance, including ongoing ROW maintenance activities, would continue to occur, but the changes would not result from the proposed project.

Adoption of the No Action Alternative would not significantly impact the extent or severity of invasive terrestrial plants within the transmission line ROW. Because no project-related work would take place, adoption of the No Action Alternative would allow nonnative invasive plant species present within the ROW to remain. All invasive species found within the project ROW are common throughout the region.

4.4.2. Action Alternative

Adoption of the Action Alternative would not adversely affect the terrestrial ecology of the region. Since the proposed project construction activities would take place within the existing 115-kV transmission line ROW, clearing activities would be minimal and would only be associated with limited clearing at each structure location to provide construction access and to limit clearing and grading associated with the access roads. The existing transmission line ROW contains relatively low concentrations of nonnative plant species. However, these communities are common and well represented throughout the region (Gosselink and Lee 1987). No rare plant communities occur within the project area. Thus, any impacts to terrestrial ecology along the proposed project ROW route are expected to be minor and insignificant.

Adoption of the Action Alternative would not significantly affect the extent or severity of invasive terrestrial plants at the county, regional, or state level. Though nonnative invasive species are present within the ROW, adoption of the Action Alternative would not change the current situation or the prevalence of these species. The EMI standards for revegetation, which include revegetating with noninvasive species, would help prevent introduction and spread of invasive species within the project ROW or the adjoining habitats.

4.5. Wildlife

4.5.1. No Action Alternative

Under the No Action Alternative, EMI would not complete the proposed transmission line upgrades, and the transmission line ROW would remain in its current condition. Wildlife and wildlife habitats would not be affected by any project-related actions.

4.5.2. Action Alternative

Under the Action Alternative, construction of the new transmission line and access roads would not result in any significant changes in the composition of wildlife habitats within the project area. Since the proposed transmission line upgrades would take place within the existing 115-kV transmission line ROW, species composition and habitats would not be significantly affected. Temporary effects during construction activities could be anticipated but would have no adverse effects to the wildlife populations within the area. Habitat fragmentation would be insignificant due to the presence of the existing transmission line ROW. Because the proposed upgrades would take place within the existing ROW, no direct or indirect long-term impacts to terrestrial wildlife or their habitats would result from the proposed actions.

4.6. Threatened and Endangered Species

4.6.1. No Action Alternative

Under the No Action Alternative, EMI would not complete the proposed transmission line upgrades. Thus, any federally or state-listed threatened and/or endangered species and their habitats within the project area would not be affected directly by the proposed actions. The status and conservation of any potentially affected listed species would continue to be determined by the actions of others. Changes to the area would nonetheless occur over time, as factors such as population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests change within the area.

4.6.2. Action Alternative

4.6.2.1. Aquatic Animals

There are two aquatic species federally listed as threatened, the Gulf sturgeon and the ringed map turtle, thought to be present within the Pearl River within the project area. Further, as described in Section 3.6.1, the stretch of the river that runs through the project area is included as a part of the USFWS-designated critical habitat for the Gulf sturgeon. There have been no recent sightings of the Gulf sturgeon within the project area.

The MDWFP has identified three state-listed species of concern that are also known to occur within 2 miles of the project area. These include the rayed creekshell, the rock pocketbook, and the northern starhead topminnow, all of which are classified as S2, imperiled because of rarity.

Potential impacts to the federally and state-listed species from implementation of the Action Alternative would be associated with storm water runoff and sedimentation from the

proposed project construction activities and, more specifically, potential impacts occurring at the Pearl River crossing in the more northern extreme of the project ROW.

Implementation of the MDEQ Construction Storm Water Regulations and the EMI standards would protect all of the streams located along the existing transmission line ROW including the Pearl River. In addition, the Standard Stream Protection (Category A and B) as defined by Muncy (1999) would be utilized (Appendix B). Furthermore, SMZs of appropriate size, 50 feet for Category A streams and 100 feet for Category B, would be established on the ground along each stream crossing prior to the commencement of construction activities. More importantly, because of the listing as federally designated critical habitat, the Pearl River channel would not be affected, and neither construction activities within the channel nor access crossings across the Pearl River channel would be allowed. Construction access would be provided from either side of the river channel. In addition, a minimal 100-foot buffer zone wherein no construction activities or equipment entry can take place would be established on either bank of the Pearl River channel prior to construction to prevent any disturbance along the river top bank area or any potential effects within the river channel itself.

Coordination with the USFWS Mississippi Field Office was completed during the interagency coordination process. The USFWS concurred in a letter dated September 3, 2009, that no effect to either of the listed aquatic species would be anticipated as long as the main channel of the Pearl River was not affected by the proposed activities (Appendix A). The MDWFP has likewise concurred in a letter dated August 28, 2009, that the utilization of appropriate BMPs would prevent the potential adverse impacts to the three state-listed species of concern.

Because appropriate BMPs and SMZs would be implemented during construction, operation, and maintenance of the transmission line ROW, no impacts would occur to the federally and state-listed aquatic species due to the proposed action.

4.6.2.2. Plants

Adoption of the Action Alternative would not affect any federally listed plant species because no such plant species or their habitats occur within the proposed project ROW or in close proximity to the ROW. State-listed species of concern are known to exist within both Hinds and Rankin counties. However, there are no known occurrences of any of the species of concern within the project area. In addition, none of the plant species of concern were observed during the field surveys that were completed. Given this, no impacts to any of the state species of concern are anticipated with the implementation of the proposed project.

4.6.2.3. Terrestrial Animals

As a part of the proposed project assessment, EMI completed coordination with the USFWS Mississippi Field Office in accordance with the *Endangered Species Act* (87 Stat. 884, as amended; U.S. Code 1531 et seq.). The USFWS noted that the American bald eagle that is protected under both the *Migratory Bird Treaty Act* and the *Bald and Golden Eagle Protection Act* was known to nest adjacent to the Pearl River. The USFWS concurred in a letter dated September 3, 2009, that based upon the proposed project construction activities, no impacts to the American bald eagle would be anticipated. In addition, no bald eagle nesting sites within the project area are known to exist. Further

confirmation of the lack of nesting sites was provided during the project field surveys that were completed. Given this, it was concluded that the proposed project is not likely to adversely affect populations of the bald eagle.

4.7. Wetlands

Activities within jurisdictional wetlands and "other waters of the United States" are regulated under Sections 401 and 404 of the *Clean Water Act* and are further addressed by EO 11990. Activities that take place within jurisdictional wetlands require authorization under a Nationwide General Permit or Individual Permit, which would be issued by the USACE pursuant to Section 404. The MDEQ issues Water Quality Certification under Section 401 for projects with discharges permitted by the federal government under the auspices of the USEPA. EO 11990 further requires federal agencies to minimize wetland destruction, loss, or degradation, and to preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities.

4.7.1. No Action Alternative

Under the No Action Alternative, EMI would not complete the proposed transmission line upgrades within the existing transmission line ROW and therefore no disturbance to wetlands within the existing transmission line ROW would occur. Given this, no wetlands or "other waters of the United States" would be affected.

4.7.2. Action Alternative

Since the proposed project would be constructed within the existing transmission line ROW, wetland impacts would be associated with the placement of the new transmission line structures and access road crossings. The presence of existing access roads to and through the ROW would further limit potential impacts. The proposed transmission line construction activities would also not include any significant clearing activities at the individual structure locations. Because of the past ROW maintenance activities, the jurisdictional wetland areas present within the ROW are currently classified as emergent/scrub-shrub wetlands, and these jurisdictional areas would be maintained as such following the proposed project construction activities. Given this, the use of appropriate BMPs to minimize impacts associated with vehicular access and long-term maintenance, collectively, would result in insignificant impacts to wetland areas within the project ROW.

The *Wetlands Delineation and Determination* report was submitted to the USACE on September 23, 2009 (WTSI 2009). On October 13, 2009, the USACE issued a provisional Nationwide 3 Permit for the proposed project..

Cumulative impact analysis of wetland impacts took into account wetland loss and conversion at the Pearl River Basin watershed level. Since the proposed project would take place within the existing transmission line ROW and the overall project impacts are anticipated to be insignificant, the cumulative project-related effects on wetlands would be insignificant.

4.8. Floodplains

4.8.1. No Action Alternative

Under the No Action Alternative, the proposed transmission line upgrades and access roads would not be constructed. Therefore, the Pearl River floodplain would not be affected under this alternative because there would be no physical changes to the current conditions found within the floodplain.

4.8.2. Action Alternative

The more northern segment of the existing 115-kV transmission line ROW is located within the 100-year floodplain of the Pearl River. In addition, the more northern extreme of the existing ROW at the Pearl River crossing is located within the floodway that is maintained by the USACE and the Hinds-Rankin Levee District. Consistent with EO 11988, an overhead transmission line and related support structures are considered a repetitive action in the 100-year floodplain. Since the 115-kV transmission line already exists within the ROW, removal of the existing 115-kV transmission line structures and the construction of the new support structures for the proposed transmission line is not expected to result in any increase in flood hazard either as a result of increased flood elevations or changes in flow-carrying capacity of the Pearl River itself or any of the tributary streams that are being crossed. To minimize adverse impacts on natural and beneficial floodplain values, portions of the ROW affected by the construction of the new support structures would be revegetated where the natural existing vegetation is removed and the removal of unique vegetation would be avoided. In addition, appropriate storm water BMPs would be used during all construction activities.

The proposed laydown area is located within the 100-year floodplain and is therefore subject to compliance with EO 11998. EMI initiated a review of the available options for locating the laydown area within close proximity to the project area as a part of the initial project review process. As shown on Federal Emergency Management Agency Floodplain Maps (Figure 3-1), the vast majority of the area in and around the proposed project ROW is located within the 100-year floodplain, and it was determined there was no practicable alternative to locating the laydown area in the 100-year floodplain. Therefore, no available alternative sites outside of the 100-year floodplain area were deemed suitable because of the distance from the proposed project ROW. In addition, the limited amount of area outside of the 100-year floodplain in close proximity of the proposed project ROW is either currently forested, residential areas, or areas that were not available for lease and/or purchase for the location of a laydown yard.

Following the completion of the alternatives review, it was determined that the most practical alternative would be to utilize the existing trucking company parking lot area for the laydown area. Since it is an existing graded and graveled parking lot area, no adverse impacts relative to the floodplain are anticipated. The parking lot area would be utilized under a lease agreement for the project construction period on a temporary basis and would be maintained in its current condition during the construction time period.

Some of the existing access roads are also located within the Pearl River 100-year floodplain areas. Consistent with EO 11998, a road is considered a repetitive action within the 100-year floodplain. For the most part, access along the ROW for construction purposes would be limited to the utilization of the existing access roads. However, to

minimize adverse impacts, any new road construction would be done in such a manner that upstream flood elevations would not be increased.

4.9. Visual and Aesthetic Quality

Potential impacts to visual resources are examined in terms of visible changes between the existing landscape and proposed actions, sensitivity of viewing points available to the public, their viewing distances, and the visibility of proposed changes. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in landscape character based on commonly held perceptions of landscape beauty and the aesthetic sense of place.

4.9.1. No Action Alternative

Under the No Action Alternative, EMI would not complete the proposed transmission line upgrades within the existing ROW, and there would be no project-related effects to the visual resources of the area.

4.9.2. Action Alternative

Under the Action Alternative, EMI would remove the existing 115-kV transmission line and construct the upgraded line within the existing ROW. The existing 115-kV transmission line support structures are double-pole wooden structures. These existing structures would be removed and replaced with taller single-pole metal structures. Thus, the existing transmission line and associated support structures would be replaced with the proposed upgraded transmission line components.

The primary viewpoint for the project area is from the I-20 crossing at the northern terminus of the proposed project route. The Pearl River is an NRI-listed stream and is noted by the NPS as having outstanding scenery. Since the proposed action involves the replacement of an existing transmission line, no decline in scenic integrity at any of the viewpoints is anticipated. Access to the project ROW along most of the project route is limited or relegated to private access.

The proposed construction of the upgraded transmission line and ongoing operation and maintenance of the existing transmission line ROW would be visually insignificant. Minor visual discord would be probable during the construction period due to an increase in personnel and equipment and the use of laydown and material storage areas. However, these minor impacts to visual resources would be temporary until the construction areas have been restored relative to the EMI standard BMPs.

4.10. Recreation, Parks, and Natural Areas

4.10.1. No Action Alternative

Under the No Action Alternative, EMI would not complete the proposed transmission line upgrades. Thus, adoption of the No Action Alternative would have no effect on recreation or managed areas located within the proposed project area. However, over the long term, these features as well as their management objectives could be subject to change from various factors. These factors include local population trends, surrounding land use, area

development, regional recreational patterns, and changes in cultural, ecological, and educational interests.

4.10.2. Action Alternative

Because there are no parks or public recreation or natural areas located within close proximity to the project vicinity, no direct, indirect, or cumulative effects to these types of areas are anticipated as a result of the proposed action.

Currently, recreational activities within the project area are associated primarily with hunting and fishing activities on the part of the affected private landowners. Current public use, including fishing, of the Pearl River is overall limited due to the lack of public access points within the immediate area. Because the project is limited to an upgrade of an existing transmission line river crossing, there should be no significant impacts to existing recreation use or the longer-term recreation potential of this segment of the river. The proposed project could result in temporary shifts in recreational use patterns by the private landowners in the immediate area during construction but these interruptions would be considered minimal and would be a factor of construction timing. However, these minor and temporary shifts would not result in a significant impact on outdoor recreation activities in the area.

In addition to the recreational use factors, the Pearl River is listed as an NRI stream by the NPS beginning near the project area at RM 312. The existing transmission line ROW crosses the Pearl River just south of I-20 and north of RM 312 within a USACE maintained floodway associated with past flood control projects in the Jackson metropolitan area. The NRI stream designation stops at the southern extreme of the flood control project limits, south of the maintained floodway area. Given this, the proposed project construction activities would not likely adversely affect the NRI designation for the Pearl River.

4.11. Historical and Archaeological Resources

4.11.1. No Action Alternative

Under the No Action Alternative, the proposed actions would not be undertaken, and there would be no project-related effects to historic or archaeological resources if this alternative were adopted. Likewise, no additional new effects or cumulative effects to these resources along the proposed line route are expected under this alternative.

4.11.2. Action Alternative

No previously recorded archaeological or historic sites are located within the proposed project ROW. In addition, the cultural resources survey completed on the proposed project ROW in September 2009 did not reveal the presence of any culturally or historically significant sites within the proposed project ROW.

In compliance with Section 106 of the National Historic Preservation Act pursuant to 36CFR§§800, EMI consulted with MDAH, which serves as the State Historic Preservation Officer (SHPO), and other consulting parties. In a letter dated September 21, 2009, MDAH concurred with the findings of the coordination and research efforts and made the determination that the proposed undertaking would not adversely affect any historic properties that are potentially eligible or currently listed in the National Register of Historic Places (Appendix A).

TVA has determined that the proposed undertaking would not adversely affect any historic properties that are potentially eligible or currently listed in the National Register of Historic Places. TVA consulted with the Mississippi SHPO (Appendix A) and they had no comment, therefore, pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR part 800.4 (d)(1)(i) TVA has satisfied its obligations under Section 106 of the National Historic Preservation Act.

4.12. Post-Construction Effects

4.12.1. Electric and Magnetic Fields

Transmission lines, like all other types of electrical wiring, generate both electric and magnetic fields (EMFs). The voltage on the conductors of a transmission line generates an electric field that occupies the space between the conductors and other conducting objects such as the ground, transmission line structures, or vegetation. A magnetic field is generated by the current (i.e., the movement of electrons) in the conductors. The strength of the magnetic field depends on the current, the design of the line, and the distance from the line.

The fields from a transmission line are reduced by mutual interference of the electrons that flow around and along the conductors and between the conductors; the result is even greater dissipation of the low energy. Most of this energy is dissipated on the ROW, and the residual very low amount is reduced to background levels near the ROW or energized equipment.

Magnetic fields can induce currents in conducting objects. Electric fields can create static charges in ungrounded, conducting materials. The strength of the induced current or charge under a transmission line varies with: (1) the strength of the electric or magnetic field, (2) the size and shape of the conducting object, and (3) whether the conducting object is grounded. Induced currents and charges can cause shocks under certain conditions by making contact with objects in an electric or magnetic field.

The proposed transmission line, like other transmission lines, has been designed to minimize the potential for such shocks. This is done, in part, by maintaining sufficient clearance between the conductors and objects on the ground. Stationary conducting objects, such as metal fences, pipelines, and highway guardrails, that are near enough to the transmission line to develop a charge (typically, these would be objects located within the ROW) would be grounded by EMI to prevent them from being a source of shocks.

Under certain weather conditions, high-voltage transmission lines, such as the existing one, may produce an audible low-volume hissing or crackling noise. This noise is generated by the corona resulting from the dissipation of energy and heat as high voltage is applied to a small area. Under normal conditions, corona-generated noise is not audible. The noise may be audible under some wet conditions, but the resulting noise level away from the ROW would be well below the levels that can produce interference with speech. Corona is not associated with any adverse health effects in humans or livestock.

Other public interests and concerns have included potential interference with AM radio reception, television reception, satellite television, and implanted medical devices. Interference with radio or television reception is typically due to unusual failures of poor line

insulators or poor alignment of the radio or television antenna and the signal source. Both conditions are correctable and would be repaired if reported to EMI.

Implanted medical devices historically had a potential for power equipment strong-field interference when they came within the influence of low-frequency, high-energy workplace exposure. However, the older devices and designs (i.e., those beyond five to 10 years old) have been replaced with different designs and different shielding that prevent potential for interference from external field sources up to and including the most powerful magnetic resonance imaging medical scanners. Unlike high-energy radio frequency devices that can still interfere with implanted medical devices, low-frequency and low-energy powered electric or magnetic devices no longer potentially interfere (Journal of the American Medical Association 2007).

Research has been done on the effects of EMFs on animal and plant behavior, growth, breeding, development, reproduction, and production. Research has been conducted in the laboratory and under environmental conditions, and no adverse effects or effects on health or the above considerations have been reported for the low-energy power frequency fields (World Health Organization [WHO] 2007a). Effects associated with ungrounded, metallic object's static charge accumulation and discharge in dairy facilities have been found when the connections from a distribution line meter have not been properly installed on the consumer's side of a distribution circuit.

EMI transmission lines are built with overhead ground wires that would lead a lightning strike into the ground for dissipation. Thus, a safety zone is created under the ground wires at the top of structures and along a line for at least the width of the ROW. The National Electrical Safety Code is strictly followed when installing, repairing, or upgrading EMI lines, substations, or equipment.

There is some public concern as to the potential for adverse health effects that may be related to long-term exposure to EMFs. A few studies of this topic have raised questions about cancer and reproductive effects on the basis of biological responses observed in cells or in animals or on associations between surrogate measures of power line fields and certain types of cancer. Research has been ongoing for several decades.

The consensus of scientific panels reviewing this research is that the evidence does not support a cause-and-effect relationship between EMFs and any adverse health outcomes (e.g., American Medical Association 1994; National Research Council 1997; National Institute of Environmental Health Sciences [NIEHS] 2002). Some research continues on the statistical association between magnetic field exposure and a rare form of childhood leukemia known as acute lymphocytic leukemia. A recent review of this topic by the WHO (International Association for Research on Cancer 2002) concluded that this association is very weak, and there is inadequate evidence to support any other type of excess cancer risk associated with exposure to EMFs.

Both TVA and EMI follow medical and health research related to EMFs, along with media coverage and reports that may not have been peer reviewed by scientists or medical personnel. No controlled laboratory research has demonstrated a cause-and-effect relationship between low-frequency electric or magnetic fields and health effects or adverse health effects even when using field strengths many times higher than those generated by power transmission lines. Statistical studies of overall populations and increased use of low-frequency electric power have found no associations (WHO 2007b).

Neither medical specialists nor physicists have been able to form a testable concept of how these low-frequency, low-energy power fields could cause health effects in the human body where natural processes produce much higher fields. To date, there is no agreement in the scientific or medical research communities as to what, if any, electric or magnetic field parameters might be associated with a potential health effect in humans or animals. There are no scientifically or medically defined safe or unsafe field strengths for low-frequency, low-energy power substation or line fields.

The current and continuing scientific and medical communities' position regarding the research and the potential for health effects from low-frequency power equipment or line fields is that there are no reproducible or conclusive data demonstrating an effect or an adverse health effect from such fields (WHO 2007c). In the United States, national organizations of scientists and medical personnel have recommended no further research on the potential for adverse health effects from such fields (American Medical Association 1994; U.S. Department of Energy 1996; NIEHS 1998).

Although no federal standards exist for maximum EMF strengths for transmission lines, two states (New York and Florida) do have such regulations. Florida's regulation is the more restrictive of the two, with field levels being limited to 150 milligaus at the edge of the ROW for lines with voltages of 230 kV and less. The expected magnetic field strengths at the edge of the proposed ROW would fall well below these standards. Consequently, the construction and operation of the proposed transmission line are not anticipated to cause any significant impacts related to EMFs.

The proposed action includes upgrading the existing 115-kV transmission line from the current 160 MVA to 183 MVA. Since the 115-kV transmission line currently exists, EMFs are being produced. The increased line capacity would produce a higher level of EMFs over what is now being produced. The strength of the fields within and near the ROW would vary with the electric load on the line as well as with the terrain. Public exposure potential to EMFs would not be any more significant than what is presently in place. Public exposure to EMFs would be minimized through engineering features primarily. No significant impacts from EMFs are anticipated.

4.12.2. Lightning Strike Hazard

EMI transmission lines are built with overhead ground wires that lead a lightning strike into the ground for dissipation. Thus, a safety zone is created under the ground wires at the top of the structures and along the line for at least the width of the ROW. The National Electrical Safety Code is strictly followed when installing, repairing, or upgrading EMI lines or equipment. Transmission line structures are well grounded, and the conductors are insulated from the structure. Therefore, touching a structure supporting a transmission line poses no inherent shock hazard.

4.12.3. Transmission Structure Stability

EMI proposes to utilize single-pole steel structures to construct the new transmission line. These pole structures have demonstrated a good safety record and are a standard for the industry today. The steel-pole structures are not prone to rot or crack, like the existing wooden poles supporting the existing 115-kV transmission line, nor are they subject to substantial storm damage due to their low cross-section in the wind.

EMI routinely inspects transmission line structures visually at least once per year. Thus, the proposed structures would not pose any significant physical danger. For this reason, EMI does not typically construct barricades or fences around structures.

4.12.4. Noise and Odor

During construction of the proposed transmission line, equipment would generate noise above ambient levels. Because of the short construction period, noise-related effects are expected to be temporary and insignificant. In the more densely populated areas along the southern portion of the ROW route, construction techniques would be used to limit noise as much as possible. For similar reasons, noise related to periodic line maintenance is also expected to be insignificant. In residential areas, the need for periodic ROW vegetation maintenance, i.e., mowing, would be limited or nonexistent. As described in Section 4.12.1, transmission lines may also produce noise during operation under certain atmospheric conditions. Away from the ROW, this noise is below the level that would interfere with speech. Construction and operation of the line are not expected to produce any noticeable odors.

4.12.5. Other Impacts

After removal, the wooden poles from the existing transmission line would be transported for recycling to a site designated by EMI as a centralized yard in Jackson, Mississippi. Any poles deemed beyond use would be disposed of in an approved landfill. No poles would be abandoned on the project ROW.

No significant impacts are expected to result from the relatively short-term activities of construction such as air quality and solid or hazardous wastes. Appendices C, D, and H contain procedures for dealing with these issues.

4.13. Unavoidable Adverse Impacts

Construction and operation of the proposed transmission line has the potential to cause minimal unavoidable adverse effects to several environmental resources. Since the project would be constructed within an existing 115-kV transmission line ROW, these adverse impacts would be relatively insignificant and mostly temporary in nature. Restrictions on land use within the ROW would continue, but it would not be anticipated that the restrictions would be more significant than at present. Temporary impacts on access road crossings would be expected. In addition, temporary disruptions to wildlife populations could be anticipated and primarily associated with the short-term construction activities. The same is the case for the primary outdoor recreation activities within the area. There would also be an unavoidable adverse effect to wetland resources within the project ROW. However, these impacts would be minimal and would not result in any significant adverse effects to these resources. EMI has reduced the potential for such adverse effects during the planning and design processes. In addition, EMI would implement mitigation measures (see Section 4.15) to reduce potential adverse effects to certain environmental resources.

4.14. Relationship of Short-Term Uses and Long-Term Productivity

The construction of the proposed transmission line upgrades by EMI would increase the capacity and reliability of the power supply in both the EMI and TVA service areas. Not

doing this could undermine the economic and population growth within portions of the two service areas.

Construction and operation of the transmission line upgrades within the existing ROW would result in continued short-term and long-term effects on timber and wildlife production within the ROW but not at a higher level than is currently the case. Pole placement could adversely affect agricultural productivity for the life of the transmission line. However, any adverse effects would be no more significant than the existing conditions. In addition, agricultural production activities within the existing ROW are limited and could continue within the transmission line ROW.

4.15. Summary of TVA and EMI Commitments and Proposed Mitigation Measures

Since EMI would be completing the proposed transmission line upgrades, EMI would undertake the following routine measures to reduce the potential for adverse environmental effects.

- Appropriate storm water BMPs would be implemented during construction activities.
- During construction and operation of the proposed transmission line, the environmental quality protection specifications as described in Appendices B, C, D, and H of this document would be implemented.
- Any improvements to access roads for the ROW route would be done in a manner such that upstream flood elevations would not be increased.

The following nonroutine measure would be applied during construction and operation of the proposed transmission line to reduce the potential for adverse environmental effects.

- Due to the presence of two aquatic species federally listed as threatened within the Pearl River main channel, the ring map turtle and the Gulf Sturgeon, and the presence of the “critical habitat” designation for the Gulf Sturgeon, special measures would be taken on either top bank area of the main channel during construction and maintenance activities. A minimum SMZ of 100 feet on either side of the Pearl River main channel would be established prior to the commencement of any construction activities. This buffer zone would be designated as a no entry zone for construction purposes to help protect against the potential adverse effects on the listed species. The proposed project construction plans do not include any activities that would potentially affect the river main channel. Additionally, herbicides would not be allowed in and around areas federally designated as critical habitat. Hand cutting only would be utilized within and immediately adjacent to any designated critical habitats.

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CHAPTER 5

5.0 LIST OF PREPARERS

5.1. NEPA Project Management

Michael E. Goff

Position:	Contract (Executive Vice President and Managing Partner, Wildlife Technical Services, Inc.)
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Experience:	30 years in Forest Management and Ecological Management; 15 years in Environmental Permitting and Planning/NEPA Documentation and Review/Baseline Ecological Assessment
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5.2. Other Contributors

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Britta P. Dimick

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Robert A. Marker

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Involvement:	Recreation Resources Review

Jon C. Riley, ASLA

Position:	Senior Landscape Architect
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Experience:	10 years in Site Planning, Design, and Visual Resource Management; 4 years in Architectural History and Historic Preservation
Involvement:	Visual and Aesthetic Quality and Historic Architectural Resource Review

Jan K. Thomas

Position:	Contract Natural Areas Specialist
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Involvement:	Natural Areas Review (Managed Areas, Nationwide Rivers Inventory, and Ecologically Significant Sites)

Willie H. Tomlinson

Position:	Contract (President, Wildlife Technical Services, Inc.)
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W. Richard Yarnell

Position:	Archaeologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	B.S.
Experience:	37 years, Cultural Resource Management
Involvement:	Cultural Resources

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CHAPTER 6

6.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES ARE SENT

Federal Agencies

U.S. Army Corps of Engineers
U.S. Department of Agriculture
  Farm Services Agency
  Natural Resource Conservation Service
U.S. Fish and Wildlife Service

State Agencies

Mississippi Department of Archives and History
Mississippi Department of Environmental Quality
Mississippi Department of Wildlife, Fisheries, and Parks
Mississippi Department of Transportation

Tribal Nations

Chickasaw Nation
Choctaw Nation
Jena Band of Choctaw Indians
Mississippi Band of Choctaw Indians
Quapaw Tribe of Oklahoma
Tunica-Biloxi Tribe

Others

Hinds-Rankin Levee District

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CHAPTER 7

7.0 LITERATURE CITED

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