3.0 Site Layout and Plant Parameter Envelope

The proposed Grand Gulf early site permit (ESP) site is located within the current boundaries of the Grand Gulf site, which contains Grand Gulf Nuclear Station (GGNS), Unit 1. As noted in Chapter 1, System Energy Resources, Inc. (SERI) did not define a particular reactor design and facilities layout in its ESP application. Instead, SERI used a plant parameter envelope (PPE) to provide bounds for assessing the environmental impact and determining site suitability. SERI's application (SERI 2005a) encompasses construction and operation of one or more new nuclear units generating as much as 8600 MW(t) or 3000 MW(e) output. The site layout and existing facilities are discussed in Section 3.1. The PPE itself is presented in Appendix I and discussed in Section 3.2. The electrical transmission system is discussed in Section 3.3.

3.1 External Appearance and Site Layout

The Grand Gulf ESP site, which lies within the 850-ha (2100-ac) confines of the Grand Gulf site, is situated on the eastern shore of the Mississippi River (Figure 2-1). The existing reactor unit at the GGNS (Unit 1) is a boiling-water reactor that went online in 1985. The reactor unit generates 3898 MW(t) or 1353 MW(e). It is cooled by a natural draft cooling tower and auxiliary mechanical draft tower located to the southwest of the containment and powerblock buildings. Makeup water for the cooling system is brought from radial wells along the Mississippi River via underground pipeline; discharge water is also piped to the Mississippi River via underground pipeline. The switchyard, which was originally constructed to support power from two units, lies to the east of the containment and powerblock buildings.

Originally, the Grand Gulf site was licensed by the Nuclear Regulatory Commission (NRC) for the construction of two units, although only one unit was completed and is currently operating. A portion of the containment building for Unit 2 was built before that unit was abandoned. This structure is located north of Unit 1. An area adjacent to Unit 1 was cleared and excavated for construction of a cooling tower for Unit 2, but it also was abandoned. These features are visible in the aerial view of the facilities shown in Figure 3-1, which also shows the main features of the GGNS facilities and the pipeline route to the Mississippi River. The existing facilities and structures of the GGNS facility cover 68 ha (169 ac) of the Grand Gulf site (SERI 2005a). The Grand Gulf ESP site, much of which has been disturbed previously, is located outside the area occupied by the existing GGNS facility and its support structures.

Figure 3-1. Aerial Photo of the Grand Gulf Nuclear Station

3.2 Plant Parameter Envelope

| As described in Subpart A of Title 10 of the Code of Federal Regulations (CFR) Part 52
| (10 CFR 52.17), the applicant for an ESP need not provide a detailed design of a reactor or reactors and the associated facilities, but must provide sufficient bounding parameters and

characteristics of the reactor or reactors and the associated facilities so that an assessment of site suitability can be made. Consequently, the ESP application may refer to a PPE as a surrogate for a nuclear power unit or units and associated facilities.

A PPE is a set of values of plant design parameters that an ESP applicant expects will bound the design characteristics of the reactor or reactors that might be constructed at a given site. The PPE values are a surrogate for actual reactor design information. Analysis of environmental impacts based on a PPE approach permits an ESP applicant to defer the selection of a reactor design until the construction permit (CP) or combined construction permit and operating license (combined license or COL) stage. The PPE reflects upper or lower bounds of the values for each parameter that it encompasses rather than the characteristics of any specific reactor design. Appendix I lists the complete PPE values that are provided in the SERI ESP application.

Reactor Designs Considered in the PPE

In its ESP application, SERI used a composite of values from seven reactor designs to develop the bounds of its PPE (SERI 2005a). The values in this EIS are not design-specific. Rather, they are used to determine the environmental impact of any reactor design that falls within the bounding values used in this environmental impact statement (EIS). These reactor designs include the following five light water reactor and two gas-cooled reactor types:

- Advanced Canada Deuterium Uranium Reactor (ACR-700) – This reactor, developed by Atomic Energy Canada Limited, is an evolutionary extension of the CANDU 6 plant using very slightly enriched uranium fuel and light water coolant.

- Advanced Boiling Water Reactor (ABWR) – This reactor, developed by General Electric Company, is a standardized plant that has been certified under U.S. Nuclear Regulatory Commission (NRC) requirements (10 CFR Part 52, Appendix A). The ABWR is fueled with slightly enriched uranium and uses a light water cooling system.

- Advanced Pressurized Water Reactor (AP1000) – This is an earlier version of the AP1000 reactor final design developed by Westinghouse Electric Company and under review by the NRC, using slightly enriched uranium and a light water cooling system. This design is not the AP1000 that has been certified under U.S. Nuclear Regulatory Commission (NRC) requirements (10 CFR Part 52, Appendix A); therefore, this design will be referred to as the "surrogate AP1000."

- Economic Simplified Boiling Water Reactor (ESBWR) – This reactor, developed by General Electric Company, is fueled with slightly enriched uranium and uses a light water cooling system.

- International Reactor Innovative and Secure (IRIS) next-generation pressurized water reactor (PWR) – This reactor, under development by a consortium led by Westinghouse Electric Company, is a modular light water reactor.

- Gas Turbine Modular Helium Reactor (GT-MHR) – This reactor, developed by General Atomics, is a modular helium-cooled graphite-moderated reactor.

- Pebble Bed Modular Reactor (PBMR) – This reactor, developed by PBMR (Pty) Ltd., is a modular graphite-moderated helium-cooled gas turbine reactor.

| The ABWR and AP1000 designs have been certified by the NRC in accordance with 10 CFR
| Part 52, Subpart B. The other designs are in the pre-application stage.

| SERI (or another applicant) would not be required to use any of these designs if it chooses to
| submit a CP or COL application, but the characteristics of the reactor ultimately chosen would
| have to be demonstrated to be within the bounds of the PPE for the assessment contained in this EIS to be applicable.

Review Approach

NUREG-1555, *Environmental Standard Review Plan* (ESRP) (NRC 2000), and review standard RS-002, *Processing Applications for Early Site Permits* (NRC 2004), provide guidance to the NRC staff to help ensure a thorough, consistent, and disciplined review of any ESP application. The staff's June 23, 2003 response to comments received on draft RS-002 (NRC 2003) provide additional insights on the staff's expectations and approach to the review of an application employing the PPE approach.

| Because PPE values were used as a surrogate for design-specific values, the staff expected SERI to provide sufficient information for the staff to develop a reasonable independent assessment of potential impacts to specific environmental resources. In some cases, the
| design-specific information called for in the ESRP were not provided in the SERI ESP application because it did not exist or was not available. Therefore, the NRC staff could not apply the ESRP guidance in those review areas. In those cases, the NRC staff used its experience and judgment to adapt the review guidance in the ESRP and to develop assumptions necessary to evaluate impacts to certain environmental resources to account for this missing information. These assumptions are discussed in the appropriate sections of this EIS.

Because the SERI PPE values do not reflect a specific design, they were not reviewed by the NRC staff for correctness. However, the NRC staff made a determination that the application was sufficient to enable the staff to conduct its required environmental review and that the PPE values are not unreasonable for consideration by the staff when making its finding on the application in accordance with 10 CFR 52.18. During its environmental review, the staff used its judgment to determine whether SERI provided sufficient information for the staff to perform its independent assessment of the environmental impacts of construction and operation of a new nuclear unit or units. The staff considered the PPE values to be bounding parameters. Therefore, the staff's evaluation serves as a bounding estimate of the potential environmental impacts resulting from constructing and operating one or more new nuclear units at the ESP site.

Throughout the Grand Gulf ESP environmental report, SERI (2005a) provides:

(1) Commitments to address certain issues in the design, construction, and operation of the facility

(2) Statements of planned compliance with current laws, regulations, and requirements

(3) Commitments to future activities and actions that it will take should it decide to apply for a CP or COL

(4) Descriptions of SERI's estimate of the environmental impacts resulting from the construction and operation of a new nuclear unit or units on the Grand Gulf ESP site

(5) Descriptions of SERI's estimates of future activities and actions of others and the likely environmental impacts of those activities and actions that would be expected should SERI decide to apply for a CP or COL.

The activities described include, but are not limited to, such actions as:

- Considering the results of testing and monitoring during the development of a CP or COL application
- Complying with NRC and other agency regulations, including obtaining appropriate permits from other agencies
- Taking actions to mitigate adverse environmental impacts, including following industry or company standards, practices, or protocols
- Addressing certain issues at the CP or COL stage that were not addressed in the ESP application.

Some of these future actions are those that SERI would be required to implement because they are currently required by law, and others are actions that SERI has indicated that they would implement without the legal obligation to take such actions. Those matters considered by the staff in determining the level of impacts to a resource are discussed throughout this EIS and are listed in Appendix J.[a]

The staff performed its evaluation of the impacts of constructing and operating one or more new nuclear units at the ESP site assuming that these commitments, activities, and actions would be undertaken by SERI and others during future licensing activities.[b] As discussed previously, the staff developed assumptions necessary to evaluate impacts to certain environmental resources to account for missing detailed information. In addition to other sources of information obtained independently, the staff considered the commitments, future activities and actions, and estimates of expected environmental impacts that were identified by SERI in its environmental report and listed in Appendix J, as well as the PPE values listed in Appendix I, when developing the inputs and assumptions used in the NRC staff's independent review of the environmental impacts of constructing and operating one or more new units on the Grand Gulf ESP site.

In addition, as a result of the staff's environmental review of the SERI ESP application, the staff determined that conditions or limitations on the ESP may be necessary in specific areas, as set forth in 10 CFR 52.24. Therefore, the staff identified when and how assumptions and bounding values limit its conclusions on the environmental impacts to a particular resource, where appropriate.

During the review of a CP or COL application referencing an ESP, the staff would assess the environmental impacts of the construction and operation of a specific plant design. If the environmental impacts addressed in the ESP EIS are found to be bounding by the staff, no additional analysis of these impacts would be required, even if the ESP applicant employed the PPE approach. However, environmental impacts not considered or not bounded at the ESP stage would be assessed at the CP or COL stage. The inputs and assumptions that were used or considered during the staff's evaluation of the ESP application (listed in Appendixes I and J) would provide the basis for the staff's verification review in which the staff must determine whether or not a specific design in a CP or COL application falls within the PPE.

(a) The listing is not intended to be a complete list of the commitments described in the environmental report.

(b) Necessary commitments, activities, and actions may change over time as new laws are enacted and regulations are issued.

3.2.1 Facility Water Use

Raw water would be needed to support construction and operation of the Grand Gulf ESP facility. The installation of an additional well would likely be required for construction purposes, such as concrete batch facility operation, dust suppression, and sanitary needs. The normal heat sink (NHS), service water system (SWS), and ultimate heat sink (UHS) have operational water needs, that would be met using raw water withdrawn from the Mississippi River. Other water sources, such as wells, may be used to supply water for general site purposes including potable, sanitary, and landscape maintenance.

In the PPE (see Appendix I), SERI specified average and maximum raw water makeup for the Grand Gulf ESP facility. The PPE provides bounding constraints on portions of facility water use. Other constraints on facility water use are based on site-specific information. This EIS assesses the impact of facility water use bounded by the PPE and site-specific constraints. The following sections describe the water uses of the Grand Gulf ESP facility and the associated facility water treatment systems. The cooling systems are described in more detail in Section 3.2.2.

3.2.1.1 Facility Water Consumption

The dominant water use is makeup water for the NHS. That makeup water replaces water lost by evaporation, drift, and blowdown. The PPE (see Appendix I) lists the average makeup water flow as 3020 L/s (47,900 gpm) and the maximum makeup water flow as 4920 L/s (78,000 gpm). Average and maximum blowdown are listed as 807 L/s (12,800 gpm) and 2500 L/s (39,000 gpm). SERI proposes to discharge the NHS blowdown to the Mississippi River. The SWS water obtained from the Mississippi River would be routed to the NHS system for reuse, and the flows are therefore bounded by the flows identified for the NHS. The UHS would supply cooling water to safely shut down and cool down the facility in the event of an emergency. SERI's proposed UHS design is an engineered water basin with mechanical draft cooling towers. During emergency conditions, the UHS would draw water from that water basin and there would not be a demand for water from the local environment.

3.2.1.2 Facility Water Treatment

SERI discusses facility water treatment in Section 3.3.2 of the environmental report (SERI 2005a). The water supply system would provide water for the circulating water system, NHS, SWS, UHS, demineralized water system, fire protection system, and other miscellaneous raw water supply needs. The sources of water for the Grand Gulf ESP facility would be a new well in the Catahoula aquifer and a new intake on the Mississippi River. Filtration equipment, such as clarifiers, would remove suspended solids from the river water. Clarified, filtered, and chemically treated water would be required. The specific methods and chemicals required for

the prevention of corrosion, biological fouling, and for process-water treatment are not known at this time. Discharge of chemical effluents from water treatment processes would be limited by a National Pollutant Discharge Elimination System (NPDES) permit issued by the Mississippi Department of Environmental Quality (MDEQ).

3.2.2 Cooling System

The Grand Gulf ESP facility would have several different cooling systems. The largest heat load would be dissipated by the NHS. The SWS would have a far smaller heat rejection load, and the UHS designed heat rejection load is only required to safely shut down the facility. SERI has not yet finalized a detailed design for the cooling water systems. However, based on the location of the proposed site, SERI has considered the potential for three cooling system designs for the NHS: mechanical draft, natural draft, and a wet-dry hybrid design. While it can be expected that a wet-dry hybrid system would have lower water demands than a natural draft or mechanical draft tower, wet-dry hybrid towers were not included in the PPE (Appendix I) and were not considered further in the staff's review. The staff's discussion of the various heat-dissipation alternatives at the Grand Gulf ESP site is provided in Section 8.3.1 of this EIS.

3.2.2.1 Description and Operational Modes

Waste heat is a by-product of power generation at a nuclear power plant. The NHS is an integral part of such power generation. The NHS comprises a closed-loop circulating water system, pumps, water basin, and cooling towers. The circulating water system pumps water through the main condenser and then to the cooling towers. Heat is transferred to the water in the condenser and is dissipated to the atmosphere by evaporation. The main condenser for each unit of a new facility would reject heat to the atmosphere at a rate of 3140 MW(t) (10.7×10^9 Btu/hr) during normal full-power operation, according to the PPE (see Appendix I).

During the heat-dissipation process, evaporation of water increases the dissolved solids in the NHS cooling water. To limit the concentration of solids in the NHS cooling water, a portion of the water is discharged from the NHS system as blowdown. In addition to the blowdown and evaporative losses, a small percentage of water in the form of droplets (drift) is lost from the cooling towers. SERI states that water pumped from the Mississippi River would be used to replace water lost by evaporation, drift, and blowdown. Blowdown water would be returned to the Mississippi River via a new outfall, thereby dissipating a small portion of the rejected heat to the Mississippi River. In the PPE (see Appendix I), SERI provides bounding values for water and energy fluxes for the NHS. The NHS values follow:

- Maximum blowdown flow would be 2500 L/s (39,000 gpm).
- Maximum blowdown temperature would be 38°C (100°F).

- Maximum evaporation rate would be 2500 L/s (39,000 gpm).
- Maximum makeup flow value would be 5000 L/s (78,000 gpm).

According to SERI, the SWS represents less than 1 percent of the NHS heat rejection load and is included in the NHS bounding values in the PPE.

SERI (2005a) proposes a closed-loop UHS for the Grand Gulf ESP facility. The UHS system would comprise pumps, heat exchangers, a dedicated water basin, and cooling towers. The basin would be required to maintain an adequate supply of water for 30 days of emergency operation. The UHS supplies the cooling water to structures, systems, and components required to safely shut down and cool down the nuclear power plant under normal operations, anticipated operational occurrences, and accident conditions. SERI (2005a) has provided bounding values for water and energy fluxes for the UHS. The UHS values follow:

- Maximum blowdown flow would be 110 L/s (1700 gpm).
- Maximum blowdown temperature would be 35°C (95°F).
- Maximum evaporation rate would be 110 L/s (1700 gpm).

According to these values, the UHS represents less than 1 percent of the NHS heat rejection load.

3.2.2.2 Component Descriptions

The following sections describe the intake, discharge, and heat-dissipation systems.

Intake System

SERI (2005a) states that water would be withdrawn from the Mississippi River through a proposed intake structure on the river shore, at or near the GGNS barge slip location. Water would be withdrawn from an embayment via piping connected to pumps and equipment housed in an intake pumping station in the vicinity of the embayment. Dredging would be required to form the embayment. The environmental report (SERI 2005a) shows the location of proposed intake, suction pipelines, and intake screens. To minimize erosion by river currents and to protect the integrity of the embayment, the slopes would be covered by riprap or other similar means. Screens would be mounted at the entrance to each suction pipeline to minimize uptake of aquatic biota and river debris. The intake screens would be designed so that the average velocity at the screens would be less than 0.15 m/s (0.5 ft/s), as required by 40 CFR 125.84, to limit organism mortality from impingement and entrainment. SERI would design the embayment to limit the amount and rate of sediment deposition and littoral debris carried into the embayment.

Discharge System

Effluent from the Grand Gulf ESP facility (including blowdown, excess service water, sanitary waste, filter process waste, radwaste effluent, and miscellaneous drain effluent) would be combined with the existing discharges from GGNS Unit 1 facility downstream from the embayment and intake. SERI (2005a) states that an outfall diffuser, located on the shoreline, would be used to enhance distribution and cooling of the effluent, thereby limiting thermal impact in the area of the discharge. SERI (2005a) states that the effluent discharge outfall would be located approximately 150 to 180 m (500 to 600 ft) downstream of the intake screens, and at approximately 9 m (30 ft) above the low water reference plane for the Mississippi River. The maximum discharge from all sources would be 2630 L/s (41,700 gpm). The NHS cooling tower blowdown would be the major contributor to the total discharge flow, and its return temperature is estimated at 38°C (100°F).

Heat Dissipation Systems

Heat dissipation from the NHS, SWS, and UHS would occur through the use of cooling towers and blowdown to the Mississippi River. Wet cooling towers were proposed by SERI (2005a) for the NHS and UHS. The SWS heat dissipation was incorporated into the NHS. Two different options for NHS cooling towers were evaluated for the Grand Gulf ESP facility. The first consisted of four natural draft cooling towers and the second used four 20-cell linear mechanical draft cooling towers. In both cases, the total heat rejection rate and the bounding values of blowdown flow rate and blowdown water temperature are defined in the PPE (Appendix I).

3.2.3 Radioactive Waste Management System

Liquid, gaseous, and solid radioactive waste management systems would be used to collect and treat the radioactive materials that are produced as a by-product of operating the proposed unit or units on the Grand Gulf ESP site. These systems would process radioactive liquid, gaseous, and solid effluents to maintain releases within regulatory limits and to levels as low as is reasonably achievable (ALARA) before being released to the environment. Waste processing systems would be designed to meet the design objectives of 10 CFR Part 50, Appendix I (*Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonably Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents*). Radioactive material in the reactor coolant would be the primary source of gaseous, liquid, and solid radioactive wastes in light water reactors. Radioactive fission products build up within the fuel as a consequence of the fission process. These fission products would be contained in the sealed fuel rods, but small quantities escape the fuel rods and contaminate the reactor coolant. Neutron activation of the primary coolant system would also be responsible for coolant contamination.

The SERI ESP application did not identify specific radioactive waste management systems for new facilities constructed at the Grand Gulf ESP site. The PPE concept was used to provide an upper bound on liquid radioactive effluents, gaseous radioactive effluents, and solid radioactive waste releases (SERI 2005a). For liquid releases, a composite release from the following reactors was used to bound the releases: two ABWR units, two surrogate AP1000 units, and four ACR-700 units. With regard to gaseous releases, the bounding releases were determined using two ABWR units, two surrogate AP1000 units, eight GT-MHR modules, four ACR-700 units, and six IRIS units (SERI 2005b). Bounding gaseous effluent releases are found in Table 3.0-7 of the Grand Gulf ESP environmental report (SERI 2005a). Bounding liquid effluent releases are found in Table 3.0-8 of the environmental report (SERI 2005a).

The bounding total annual volume of solid radioactive waste is estimated at 540 m^3/yr (1.9×10^4 ft^3/yr) with a bounding total amount of radioactive material of 2×10^{14} Bq/yr (5400 Ci/yr) as found in the PPE (SERI 2005a).

3.2.4 Nonradioactive Waste Management

SERI has not finalized design of nonradioactive waste management systems yet. These systems include cooling water and auxiliary boiler blowdown that may contain water-treatment chemicals or biocides, water-treatment wastes, floor and equipment drain effluent, storm water runoff, laboratory waste, trash, hazardous waste, effluent from the sanitary sewer system, miscellaneous gaseous emissions, and liquid and solid effluent. Nonradioactive liquid waste effluents would be regulated under the NPDES permit process and would require a permit from the MDEQ.

3.2.4.1 Effluents Containing Chemicals or Biocides

Chemicals are typically used to control water quality, scale, corrosion, and biological fouling. The chemical concentrations within effluent streams from a new facility would be controlled through engineering, operational, and administrative controls in order to meet NPDES requirements at the time of construction and operation.

3.2.4.2 Sanitary System Effluents

SERI (2005a) states that a permanent sanitary waste system would be provided for the operational phase of the Grand Gulf ESP facility. Industrial materials, such as chemistry laboratory waste, would be excluded from the sanitary waste system. The chosen sanitary waste system design would incorporate state-of-the-art sewage treatment and disposal technologies to treat domestic waste only and it would comply with future expected NPDES permit requirements.

3.2.4.3 Other Effluents

Nonradioactive gaseous emission results from operating auxiliary boilers and from testing and operating the standby power system, which may use diesel and/or gas turbine generators. These emissions commonly include particulates, sulfur oxides, carbon monoxide, hydrocarbons and nitrogen oxides. Gaseous releases would comply with Federal, State, and local emissions standards.

Chemical waste from laboratory drains, equipment decontamination, and chemical additives would be collected in chemical waste sumps or approved chemical storage units. Chemical drainage system waste would be monitored, treated, and released in accordance with an approved NPDES permit, or otherwise disposed. Discharges from the chemical drainage system would comply with applicable Federal, State, and local standards in place during operation of a new facility. Hazardous nonradioactive waste would be treated and disposed of in accordance with all applicable Federal, State, and local regulations.

Storm water from structures constructed at the Grand Gulf ESP site would typically flow into major drainage courses and finally to Hamilton Lake, which is hydraulically connected to the Mississippi River. The design of the storm water systems for a new facility would comply with NPDES storm water regulations administered by MDEQ.

Other nonradioactive waste (such as paper, metals, and garbage) would be disposed in accordance with applicable regulations. Nonradioactive effluent would be treated, controlled, and discharged or disposed as required to meet Federal, State, and local regulations and guidelines.

3.3 Transmission System

| The ESP site is adjacent to the GGNS Unit 1 facility and wholly contained within the property
| boundary of the Grand Gulf site. The Grand Gulf site is linked to load centers by a system of transmission lines in the Entergy Mississippi, Inc. (EMI) electric system. The EMI electric system consists of interconnected hydro, fossil-fuel, and nuclear power plants that supply electrical energy over a 500/230/115 kV transmission system. EMI owns the GGNS switchyard where the GGNS Unit 1 facility is connected to two transmission lines. The two lines are the

| • 40.3-km (25.2-mi) long, single-circuit 500-kV line that connects to the Baxter-Wilson Extra High Voltage Substation

| • 69.8-km (43.6-mi) long, single-circuit 500-kV line that connects to the Franklin Extra High Voltage Substation.

In addition to the length, the power transmission line right-of-way widths and areas of these transmission lines are listed in Table 3-1. Electrical energy from GGNS Unit 1 is transmitted by the 500-kV lines, which existed when the GGNS Unit 1 facility was built (SERI 2005a). A separate distribution line (single-circuit 115 kV) runs from the Port Gibson substation to the GGNS switchyard to provide offsite power to GGNS. The staff assumes that this line would be sufficient to service any new units at the ESP site without modification. Therefore, this line and its right-of-way are not considered further.

Table 3-1. Existing Transmission Line Rights-of-Way to the Grand Gulf Site

Right-of-Way	Voltage	Length km (mi)	Average Width m (ft)	Area ha (ac)
Baxter-Wilson	500 kV	40.3 (25.2)	61 (200)	248 (612)
Franklin	500 kV	69.8 (43.6)	61 (200)	428 (1057)
Total		**110.7 (68.8)**		**675 (1669)[a]**

(a) Difference from 1575 in SERI environmental report (2005) due to rounding.
Source: SERI 2005a

SERI (2005a) states that the power transmission and distribution system existing at the time of startup and operation of a new facility would be relied upon to distribute the power generated by the facility. A study of the existing system conducted by SERI concluded that the existing system is adequate for an additional 1311 MW(e) generating capacity assuming that modifications and upgrades are made to equipment in the GGNS switchyard (SERI 2005a).

SERI (2005a) states that the maximum generating capacity of the proposed new units is approximately 3000 MW(e). If 3000 MW(e) generating capacity were installed, the existing transmission lines would have to be upgraded or additional transmission lines would be required. Assuming that a new facility at the Grand Gulf ESP site would be a merchant generator, procedures for requesting connection to the transmission system are set forth in the Federal Energy Regulatory Commission standard interconnection procedures and agreement called out in 18 CFR 35.28(f), “Standard Generator Interconnection Procedures and Agreement,” as described below.

The Federal Energy Regulatory Commission process starts when the interconnection customer, in this case SERI, submits an interconnection request to EMI, the transmission provider. When the interconnection request is determined to be valid, the transmission provider and interconnection customer have a scoping meeting to discuss alternative interconnection options and exchange information. On the basis of this meeting, the interconnection customer designates its point of interconnection, and one or more alternative point(s) of interconnection.

Following the scoping meeting, the transmission provider conducts an interconnection feasibility study to evaluate the feasibility of the proposed interconnection to the transmission system. This study includes a power flow and short circuit analysis. The interconnection feasibility study is followed by an interconnection system impact study that focuses on the impact of the interconnection on the reliability of the transmission system.

Finally, the transmission provider conducts an interconnection facilities study to specify and estimate the cost of the equipment, engineering, procurement, and construction work needed to implement the conclusions of the interconnection system impact study in accordance with good utility practice to physically and electrically connect the interconnection facility to the transmission system. These studies are conducted by the transmission provider, but the interconnection customer pays for the studies.

SERI has not submitted an interconnection request to EMI. However, the staff assumes that the process for obtaining any additional transmission services required would be completed prior to submission of an application for construction and operation of a new facility at the Grand Gulf ESP site. In addition, the staff assumes that the Grand Gulf ESP facility connection with the transmission system would be similar to the GGNS Unit 1 facility connection and would make use of existing transmission line rights-of-way to the extent possible. Additional land might be required, if only to widen existing rights-of-way. Land use in the existing transmission line rights-of-way is described in Table 3-2.

Table 3-2. Land Use in the Existing Transmission Line Rights-of-Way to the Grand Gulf Site

Right-of-Way	Agriculture	Developed Nonresidential	Residential	Undeveloped	Water or Wetlands
Baxter-Wilson	23.9%	0.4%	4.5%	62.8%	8.3%
Franklin	9.4%	0.0%	0.0%	86.3%	4.3%
Total	**14.7%**	**0.2%**	**1.7%**	**77.7%**	**5.8%**

Notes: U.S. Geological Survey land-cover classes have been aggregated for presentation purposes. Rounding may affect totals.
Source: Vogelmann et al. 2001

3.4 References

10 CFR Part 50. Code of Federal Regulations, Title 10, *Energy,* Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, "Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear Power Plants."

18 CFR Part 35. Code of Federal Regulations, Title 18, *Conservation of Power and Water Resources*, Part 35, "Filing of Rate Schedules and Tariffs," Section 28(f), "Standard Generator Interconnection Procedures and Agreement."

40 CFR Part 125. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 125, "Criteria and Standards for the National Pollution Discharge Elimination System."

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