

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

## **10.0 ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION**

### **10.1 Unavoidable Adverse Environmental Impacts**

Unavoidable adverse environmental impacts are defined as adverse impacts to elements of the environment that remain after all practical means to avoid or mitigate the impact have been taken (Reference 1). This section presents such impacts for both the construction and operation of a new facility at the GGNS ESP Site.

#### **10.1.1 Facility Construction**

Potential impacts from the construction of a new facility at the GGNS ESP site are discussed in detail in Sections 4.1 through 4.5, along with potential mitigation measures to minimize or eliminate potential impacts. A summary of the potential impacts is presented in Section 4.6. Table 10.1-1 summarizes situations where mitigation does not entirely eliminate an adverse impact. The identified unavoidable adverse impacts are expected to be minimal.

#### **10.1.2 Facility Operation**

Potential impacts of operation of a new facility at the GGNS ESP Site are discussed in detail in Sections 5.1 through 5.9, along with potential mitigation measures to minimize or eliminate potential impacts. A summary of potential impacts is presented in Section 5.10. Table 10.1-2 summarizes situations where mitigation does not entirely eliminate an adverse impact. The identified unavoidable adverse impacts are expected to be minimal.

#### **10.1.3 References**

1. U.S Nuclear Regulatory Commission, 1999, Environmental Standard Review Plan (NUREG-1555), October.

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

10.2 Irreversible and Irretrievable Commitments of Resources

This section summarizes the irreversible and irretrievable commitments of resources, both environmental and material, to the construction and operation of a new nuclear power electrical generation facility at the GGNS ESP Site.

10.2.1 Irreversible and Irretrievable Commitments of Environmental Resources

The irreversible and irretrievable commitments of environmental resources are presented in Table 10.2-1.

10.2.2 Irreversible and Irretrievable Commitments of Material Resources

The amount and types of materials required for the construction and operation of a new facility at the GGNS ESP Site cannot be assessed until a design of the facility has been chosen.

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

### 10.3 Relationship Between Short Term Uses and Long Term Productivity of the Human Environment

For the purpose of this discussion, the terms “short-term” and “long-term” are consistent with the NRC’s use in NUREG-1555 (Reference 1). “Short-term” represents the period from the start of construction to the end of plant life, including prompt decommissioning. “Long-term” refers to the period extending beyond the end of plant life, including the period up to and beyond that required for delayed plant decommissioning.

The GGNS site was originally developed for the construction of two nuclear generating units. Preliminary work for the construction of Units 1 and 2 at the GGNS site began around 1970. Unit 1 is licensed to operate until 2022. Construction of Unit 2 was officially cancelled in 1991. Development of a new facility at the GGNS ESP Site is consistent with the intended short-term use of the GGNS site; i.e., electrical power generation. The construction and operation of a new facility would further extend the short-term preemption of this land. However, as discussed below, the overall benefits of power production and realization of economic productivity are considered greater than those that would be derived from other likely uses of this site during this period.

Section 10.1 presents the unavoidable adverse environmental impacts of construction and operation of a new facility. These impacts are limited to within the boundaries of the GGNS site and would not affect the short- or long-term productivity of land beyond the boundaries. Section 10.2 discusses irreversible commitments of environmental resources. As in Section 10.1, the principal commitment has to do with land temporarily impacted during construction, and that relatively small portion committed to permanent new facility structures for the life of the plant.

Some of the land within the GGNS site could be classified as prime farm land, based on soil types; however, agriculture has been precluded from the site since its inception. Other uses of this site could be silvaculture, or a wildlife refuge.

Wildlife would be disturbed during the construction of a new facility. Wildlife would avoid construction areas, both in the bottomlands and upland areas. However, this would be a temporary effect, as wildlife would be expected to return after the construction crews have left. Some wildlife may be permanently displaced from the relatively small areas with permanent facilities.

Impacts to the Mississippi River would be minor, with the most significant occurring during construction of a new facility; however, effective mitigation measures are available to manage those impacts. Impacts to the Mississippi River in terms of aquatic resources and water use are expected to be minimal during facility operation. There are no lasting effects on fishing or recreational use of the river expected, following facility construction.

The principal short-term benefit of construction and operation of a new facility would be the production of electrical energy and the economic productivity of the site, when used for this purpose. The jobs created by the construction and operation of a new facility would represent a significant input of resources to the local economy. In addition, tax revenues from the facility would also present an economic stimulus to Claiborne County, the region, and the State of Mississippi. This economic benefit would be extremely large compared with the productivity from agriculture or from other potential uses for the site.

For the purpose of this ESP application, a new facility would operate until the year 2070. The maximum long-term impact to productivity of the land within the GGNS ESP Site from other uses would result if the facility were not decommissioned in a timely manner. Consequently, the

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

land occupied by the facility structures would not be available for any other use. However, it is expected that a new facility would be decommissioned in a timely manner per 10 CFR Part 50.82, following the end of its useful life, along with other facilities on site. There is no reason known at this time as to why the site would not be released for unrestricted use or why such actions would not be undertaken in a timely manner, thus minimizing impact to long-term productivity.

Overall, the enhancement of regional productivity resulting from the electrical energy produced by a new facility would be expected to result in a correspondingly large increase in regional productivity that would not be equaled by any other use of the site. In addition, most long-term impacts resulting from land-use preemption by plant structures could be eliminated by removing these structures or by converting them to other productive uses.

#### 10.3.1 References

1. Environmental Standard Review Plan (NUREG-1555), Office of Nuclear Reactor Regulation, Washington, DC.

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

10.4 Benefit-Cost Balance

This section is not included in the ESP Application as per NUREG-1555 Appendix A.

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

TABLE 10.1-1

UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS OF FACILITY CONSTRUCTION

Impact Category	Adverse Impact	Potential Mitigation Measures	Unavoidable Adverse Impacts
4.1.1 Site & Vicinity (Land Use)	Clearing and grading would affect approximately 400 acres of the 2100-acre GGNS site. Soils would be disturbed, vegetation destroyed, drainage patterns altered.	Land in the proposed construction areas would be reclaimed following construction to the maximum extent possible.	Approximately 125 acres of land would be occupied by permanent structures. Approximately two-thirds of this land has been previously disturbed or is currently a parking lot.
4.1.3 Historic Properties	Possibility of unknown archaeological resources in two potential construction areas. Impact expected to be minimal based on previous construction site survey.	Archaeological survey and analysis, prior to land disturbance followed by data recovery, if necessary.	Data recovery, itself, would destroy the archaeological resource; however, it is an acceptable mitigation measure to minimize a potentially larger impact. Overall, impact is minimal.

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

TABLE 10.1-1 (Continued)

Impact Category	Adverse Impact	Potential Mitigation Measures	Unavoidable Adverse Impacts
4.2.1 Hydrologic Alterations	<p>Drainage pattern in construction areas would be altered.</p> <p>Potential for increased runoff overland and increased silt load to on-site streams.</p>	<p>Implementation of a site-specific construction Stormwater Pollution Prevention Plan addressing employee training; installation of silt fences, straw bales, slope breakers, and other erosion prevention measures; preventive maintenance of equipment to prevent leaks and spills; procedures for storage of chemicals and waste materials; spill control practices; revegetation; regular inspections of control measures; and visual inspections for discharges that may be detrimental to water quality.</p> <p>Maintain vegetative cover on land not in active construction.</p> <p>Route runoff to exiting sedimentation basins</p>	<p>Remaining impacts would be minimal. On-site streams were impacted during the construction of GGNS Unit 1. Construction of the proposed facility may incrementally increase the runoff to the streams; however, this would not be expected to change the current characteristics of the streams.</p>
4.2.2 Water Use Impacts	<p>Power block areas may require dewatering. Perched water level may be decreased; however, this effect would be localized and would not impact off-site ground water users.</p>	<p>Potential impact would be minimized through the use of tie-back walls or similar control technology. Dewatering wells would be installed in accordance with applicable standards published in MDEQ groundwater use and protection regulations.</p>	<p>Limited local depression of the perched water table during construction. This effect would not impact off-site ground water users. Impact is minimal.</p>

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

TABLE 10.1-1 (Continued)

Impact Category	Adverse Impact	Potential Mitigation Measures	Unavoidable Adverse Impacts
4.3.1 Terrestrial Ecosystems	<p>Loss of a maximum of approximately 145 acres of upland forest habitat and approximately 105 acres of upland field habitat. This represents approximately 35% and 66% of these habitat types within the GGNS site, respectively. The remaining construction space in upland areas, about 90 acres, would be in areas previously disturbed by the construction of GGNS Unit 1.</p>	<p>Actual construction area would be kept to a minimum. Land in temporary construction areas would be revegetated after construction, where practicable.</p>	<p>An estimated 400 acres of the 2100-acre GGNS site would be affected by the construction of a new facility. Approximately 125 acres of land would be altered by permanent structures (about 100 upland acres). Approximately two-thirds of this (125 acres of) land has been previously disturbed. The remaining land would be revegetated and allowed develop to a natural state, where practicable.</p>
	<p>Wildlife would be displaced from construction areas and would avoid these areas during active construction.</p>	<p>Scheduling of construction outside of critical periods can minimize impact to species sensitive to specific time or season.</p> <p>In general, however, wildlife would return to areas not directly disturbed by the permanent, new facilities constructed.</p>	<p>Minimal reduction in the carrying capacity of the site for wildlife due to the habitat permanently removed from production.</p>



GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

TABLE 10.1-1 (Continued)

Impact Category	Adverse Impact	Potential Mitigation Measures	Unavoidable Adverse Impacts
4.3.1 Terrestrial Ecosystems (Continued)	<p>Approximately 30 acres of bottomland palustrine, forested, seasonally flooded wetland would be disturbed. This is approximately 3% of this habitat type within the GGNS site property. The remainder of the bottomland area required for construction would be in areas previously disturbed for the construction of GGNS Unit 1 (e.g., heavy haul road, barge slip area).</p> <p>This impact would be temporary in some areas, since herbs and grasses regenerate quickly and water movement throughout the wetland would generally not be impeded or altered. In forested and scrub-shrub wetlands, this impact would be longer term due to the longer recovery period for these wetland types.</p>	<p>Disturbed area would be kept to a minimum. Much of the area required for construction in the floodplain has been previously disturbed.</p> <p>Areas disturbed for installation of the pipeline would be restored to their pre-construction elevation and contours. Excavated top soil would be segregated and replaced in the top of the trench allowing wetland characteristics to be restored after construction.</p> <p>Standard construction techniques for minimizing impacts would be implemented.</p>	<p>Approximately 25 acres of bottomland wetland would be permanently removed from productivity. This would be a minimal incremental impact. The construction of GGNS Unit 1 has already impacted some of this area.</p>

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

TABLE 10.1-2

UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS OF FACILITY OPERATION

Impact Category	Adverse Impact	Potential Mitigation Measures	Unavoidable Adverse Impacts
5.1.1 The Site and Vicinity	Vehicular traffic on access roads to GGNS would increase with the 155% increase in total staffing at GGNS. This would result in an increase in the number of traffic accidents.	Several road improvement and construction projects have been accomplished or planned for the GGNS area. These projects will help ameliorate traffic problems associated with the proposed new facility. In addition, flexible work hours and additional road improvements, such as traffic lights or turn lanes, could be instituted.	Facility workforce will add to road network traffic load with an associated increase in traffic accidents. Road improvements and flexible work schedules will mitigate this impact to a certain extent. Outage experience indicates that the road network has adequate capacity.

GGNS  
EARLY SITE PERMIT APPLICATION  
PART 3 – ENVIRONMENTAL REPORT

TABLE 10.2-1

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF ENVIRONMENTAL  
RESOURCES

Resource	Commitment
Land Use	A maximum estimated area of 125 acres would be occupied by permanent structures in support of facility operations and, therefore, would be considered not available to restoration until facility decommissioning. The actual area may be reduced, or may slightly increase, depending on the facility design.
Surface Water Use	A maximum of 85,000 gpm of water from the Mississippi River, representing approximately 0.2% of historic low flow, would be required during operation of the new facility. About one-third to one-half of this water would be returned to the river in the facility effluents. The remaining water would evaporate in the atmosphere, be lost as drift from cooling towers or otherwise be consumed in plant processes or as potable drinking water. The evaporated water would return to earth as precipitation.
Ground Water Use	<p>Approximately 180 gpm (240 gpm maximum peak usage) of water would be withdrawn from the Catahoula formation to support operational water needs in addition to the water withdrawn for GGNS Unit 1. This would likely require a new well in the Catahoula formation. This same well would first be used to provide potable water for construction of the proposed new facility, for which an estimated 350 gpm is required for dust control, potable and sanitary water needs, and landscaping needs.</p> <p>Dewatering may be necessary during operation of the proposed new facility to ensure perched ground water levels don't exceed design specifications. Specific dewatering requirements, dewatering well locations, and well design details would be provided when the facility design and layout are finalized. If permanent dewatering wells were required for the new facility, the design would likely be similar to those in use at the existing GGNS Unit 1 plant. The existing GGNS Unit 1 dewatering wells pump intermittently, only when the perched groundwater level exceeds a certain elevation. The withdrawal from the existing dewatering wells, as indicated in annual water use reports, is minimal.</p>
Terrestrial Ecosystems	A maximum of approximately 145 acres of upland forest habitat and approximately 105 acres of upland field habitat, representing approximately 35% and 66% of these habitat types, respectively, within the GGNS site boundary would be impacted during construction. A maximum of approximately 30 acres of bottomland wetlands would be impacted, representing approximately 3% of this habitat type within the GGNS. A total of approximately 125 acres of land would be occupied by permanent structures (100 acres upland, 25 acres bottomland). Approximately two-thirds of this 125 acres of land has been previously disturbed. The remaining land disturbed in construction would be revegetated and allowed develop to a natural state. This represents a small fraction of the total available upland forest, upland field and bottomland wetland habitat available in the region of the GGNS.