[7590-01-P]

NUCLEAR REGULATORY COMMISSION

[Docket No. 50-416; NRC-2012-0105]

Entergy Operations, Inc.

Grand Gulf Nuclear Station, Unit 1

AGENCY: Nuclear Regulatory Commission.

ACTION: Final environmental assessment and finding of no significant impact; issuance.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC or the Commission) is considering issuance of an amendment to Facility Operating License No. NPF-29, issued to Entergy Operations, Inc. (Entergy, the licensee), for operation of the Grand Gulf Nuclear Station, Unit 1 (GGNS Unit 1), located in Claiborne County, Mississippi, in accordance with NRC's regulations. Therefore, the NRC has prepared this final environmental assessment (EA) and finding of no significant impact (FONSI) for the proposed action.

ADDRESSES: Please refer to Docket ID **NRC-2012-0105** when contacting the NRC about the availability of information regarding this document. You may access information related to this document, which the NRC possesses and are publicly available, using any of the following methods:

- **Federal Rulemaking Web site:** Go to *http://www.regulations.gov* and search for Docket ID **NRC-2012-0105**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-492-3668; e-mail: *Carol.Gallagher@nrc.gov*.

NRC's Agencywide Documents Access and Management System (ADAMS): You may access publicly available documents online in the NRC Library at *http://www.nrc.gov/reading-rm/adams.html*. To begin the search, select "ADAMS Public Documents" and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to *pdr.resource@nrc.gov*. The ADAMS accession number for each document referenced in this notice (if that document is available in ADAMS) is provided the first time that a document is referenced. Entergy Operations, Inc. (Entergy, the licensee), application for amendment is dated September 8, 2010, and supplemented by letters dated November 18, 2010, November 23, 2010, February 23, 2011 (four letters), March 9, 2011 (two letters), March 22, 2011, March 30, 2011, March 31, 2011, April 14, 2011, April 21, 2011, May 3, 2011, May 5, 2011, May 11, 2011, June 8, 2011, June 15, 2011, June 21, 2011, June 23, 2011, July 6, 2011, July 28, 2011, August 25, 2011, August 29, 2011, August 30, 2011, September 2, 2011, September 9, 2011, September 12, 2011, September 15, 2011, September 26, 2011, October 10, 2011 (two letters), October 24, 2011, November 14, 2011, November 25, 2011, November 28, 2011, December 19, 2011, February 6, 2012, February 15, 2012, February 20, 2012, March 13, 2012, March 21, 2012, April 5, and April 18, 2012 (two letters), April 26, 2012, May 9, 2012, and June 12, 2012. Portions of the letters dated September 8 and November 23, 2010, and February 23, April 21, May 11, July 6, July 28, September 2, October 10, November 14, November 25, and November 28, 2011, and February 6, February 15, February 20, March 13, March 21, April 5, April 18, 2012 (two letters), April 26, 2012, and May 9, 2012, contain sensitive unclassified non-safeguards information (proprietary) and, accordingly, have been withheld from public disclosure. The licensee's letters are publicly available in ADAMS at the accession numbers listed in the table below:

Document Date	*Accession No.*	*Document Date*	*Accession No.*	*Document Date*	*Accession No.*
9/8/2010	ML120660409	6/8/2011	ML111590836	11/14/2011	ML113190403
11/18/2010	ML103260003	6/15/2011	ML111670059	11/25/2011	ML113290137
11/23/2010	ML103330093	6/21/2011	ML111730235	11/28/2011	ML113320403
2/23/2011	ML110540534	6/23/2011	ML111750244	12/19/2011	ML113530656
2/23/2011	ML110540540	7/6/2011	ML111880138	2/6/2012	ML12039A071
2/23/2011	ML110540545	7/28/2011	ML112101485	2/15/2012	ML120470138
2/23/2011	ML110550318	8/25/2011	ML112370770	2/20/2012	ML12054A038
3/9/2011	ML110680507	8/29/2011	ML112410566	3/13/2012	ML120740083
3/9/2011	ML110730025	8/30/2011	ML112420169	3/21/2012	ML12082A025
3/22/2011	ML110820262	9/2/2011	ML112490050	4/5/2012	ML12097A055
3/30/2011	ML110900275	9/9/2011	ML112521284	4/18/2012	ML12109A308
3/31/2011	ML110900586	9/12/2011	ML112550495	4/18/2012	ML12109A290
4/14/2011	ML111050134	9/15/2011	ML112580223	4/26/2012	ML12118A145
4/21/2011	ML11112A098	9/26/2011	ML112690143	5/9/2012	ML12131A535
5/3/2011	ML111240288	10/10/2011	ML112840155	6/12/2012	ML12165A250
5/5/2011	ML111250552	10/10/2011	ML112840171		
5/11/2011	ML111320263	10/24/2011	ML112980113		

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

FOR FURTHER INFORMATION CONTACT: Alan B. Wang, Project Manager, Plant Licensing Branch IV, Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001; telephone: 301–415–1445; email: *AlanWang@nrc.gov*.

SUPPLEMENTARY INFORMATION:

I. Background

The NRC published a notice in the *Federal Register* requesting public review and comment on a draft EA and FONSI for the proposed action on May 11, 2012 (77 FR 27804),

and established June 11, 2012, as the deadline for submitting public comments. The NRC has received no comments regarding the draft EA.

II. Environmental Assessment

Plant Site and Environs

The GGNS Unit 1 site is located in Claiborne County, Mississippi, on the east bank of the Mississippi River at River Mile (RM) 406, approximately 25 miles south of Vicksburg, Mississippi, and 37 miles north-northeast of Natchez, Mississippi. The GGNS Unit 1 site consists of approximately 2,100 acres, comprised primarily of woodlands and former farms as well as two lakes, Hamilton Lake and Gin Lake. The land in the vicinity of GGNS is mostly rural. GGNS Unit 1 is a General Electric Mark 3 boiling-water reactor.

Identification of the Proposed Action

By application dated September 8, 2010, as supplemented, the licensee requested an amendment for an extended power uprate (EPU) for GGNS Unit 1 to increase the licensed thermal power level from 3,898 megawatts thermal (MWt) to 4,408 MWt, which represents an increase of approximately 13 percent above the current licensed thermal power and approximately 15 percent over the original licensed thermal power level of 3833 MWt. This change in core thermal power level requires the NRC to amend the facility's operating license. The operational goal of the proposed EPU is a corresponding increase in net electrical output of 178 megawatts electric (MWe). The proposed action is considered an EPU by the NRC because it exceeds the typical 7 percent power increase that can be accommodated with only

minor plant changes. EPUs typically involve extensive modifications to the nuclear steam supply system.

The licensee plans to make several extensive physical modifications to systems necessary to generate and/or accommodate the increased feedwater and steam flow rates to achieve EPU power levels during a refueling outage currently scheduled for 2012. In addition, there will be land disturbance involving installation of a new radial well system. The actual power uprate, if approved by the NRC, would occur following the refueling outage in 2012.

The Need for the Proposed Action

The proposed action provides GGNS Unit 1 with the flexibility to increase its potential electrical output and to supply additional electrical generation to the State of Mississippi and the surrounding region.

Environmental Impacts of the Proposed Action

As part of the licensing process for GGNS Unit 1, the NRC published a Final Environmental Statement (FES) in 1981, *Final Environmental Statement for the Operation of the Grand Gulf Nuclear Station Units 1 and 2 (NUREG-0777).* The FES provides an evaluation of the environmental impacts associated with the construction and operation of GGNS Units 1 and 2 (Unit 2 has since been cancelled) over their licensed lifetimes. The NRC staff used information from the licensee's license amendment request and the FES to perform its EA for the proposed EPU.

There will be extensive changes made to the steam supply system of GGNS Unit 1 related to the EPU action, but no new construction is planned outside of existing facilities. No extensive changes are anticipated to existing buildings or plant systems that directly or indirectly

interface with the environment. All necessary modifications would be performed in existing buildings at GGNS Unit 1 with the exception of the installation of a new radial well and additional cooling units being added to the auxiliary cooling tower. Modifications to the steam supply system of GGNS Unit 1 include the following: replacing the reactor feed pump turbine rotors; replacing the main generator current transformers, replacing the high pressure turbine; replacing the moisture separator reheater shell and internals; replacing the steam dryer; and other modifications to upgrade the plant service water heat removal system.

The sections below describe the non-radiological and radiological impacts to the environment that may result from the proposed EPU.

Non-radiological Impacts

Land Use and Aesthetic Impacts

Potential land use and aesthetic impacts from the proposed EPU include impacts from plant modifications at the GGNS site. The licensee states that any land disturbance activities, including those associated with EPU, are reviewed in accordance with Entergy procedures to ensure that necessary environmental protection measures are implemented during the project. Entergy states that these measures would include provisions to protect such things as threatened and endangered species, cultural resources, wetland areas, water quality, etc.

The licensee's analysis concluded that additional cooling tower make-up water is projected to be needed (~3,200 gallons per minute (gpm)) due to the increase in heat load generated as a result of the EPU, which will also results in an increase in water loss through evaporation, blowdown, and drift. A new radial well has been installed to ensure sufficient cooling water is available to support the higher EPU power level because GGNS's existing

radial wells have degraded over time and thus cannot perform at their design capacity. Activities to support the well construction include clearing and grubbing of trees, construction of a working pad using engineered fill, and excavation of trenches for supply piping to the plant service water header, discharge piping into the river, and electrical equipment feeders. The proposed working pad is designed to contain all the equipment needed for construction of the well and to provide an area for material laydown and parking. Activities conducted in wetland areas would be managed under a Section 404 permit issued by the United States Army Corps of Engineers (USACE). The remaining non-wetland areas would be managed under Mississippi Department of Environmental Quality (MDEQ) stormwater permitting program (Permit Number MSR15) and associated best management practices.

Improvements are also being made to the Heavy Haul Road, which connects the site to the barge slip area, to support activities associated with the installation of the new radial well and potential delivery of heavy equipment as discussed below. These improvements consist of refurbishing the existing road and road base in low areas or areas that have become washed out over the years. These refurbishment activities would occur within the plant site boundary with appropriate best management practices applied and in accordance with GGNS' National Pollutant Discharge Elimination System (NPDES) Permit MSR000883 and associated Stormwater Pollution Prevention Plan to control silt and erosion.

Entergy used the Port of Claiborne for delivery of new transformers and other heavy equipment associated with the proposed EPU. As such Entergy did not need to conduct any dredging activities in the existing barge slip area to accommodate delivery of such equipment.

While some plant components would be modified, most changes related to the proposed EPU would occur within existing structures, buildings, and fenced equipment yards housing

major components within the developed part of the site. Existing parking lots, road access, equipment lay-down areas, offices, workshops, warehouses, and restrooms would be used during plant modifications. Therefore, land use conditions would not change at the GGNS site. Also, there would be no land use changes along transmission line corridors, and no new transmission lines would be required.

Since land use conditions would not change at the GGNS Unit 1 site, and because any land disturbance would occur within previously disturbed areas, and those activities will be conducted in accordance with State and Federal permits to ensure the potential impacts are not significant, there would be little or no impact to aesthetic resources in the vicinity of GGNS Unit 1. Therefore, there would be no significant impact from EPU-related plant modifications on land use and aesthetic resources in the vicinity of the GGNS Unit 1 site.

Air Quality Impacts

Major air pollution emission sources at the GGNS site are regulated by the MDEQ in accordance with GGNS Air Permit 0420-00023. Nonradioactive emission sources at GGNS Unit 1 result primarily from periodic testing of diesel generators and fire water pump diesel engines, and operation of the cooling towers. There will be no changes to the emissions from these sources as a result of the EPU.

Some minor and short duration air quality impacts would occur during implementation of the EPU at the GGNS site. The main source of air emissions would come from the vehicles driven by outage workers needed to implement the EPU. However, this source will be short term and temporary. The majority of the EPU activities would be performed inside existing buildings and would not cause additional atmospheric emissions. Therefore, there would be no significant impact on air quality during and following implementation of the proposed EPU.

The licensee also evaluated the potential for an increase in particulate emissions that could occur as a result of the modification to the auxiliary cooling tower and the addition of two 60-gallon lube oil tanks associated with the new radial well pumps. These sources will result in some minor emissions of volatile organic compounds (VOC). By letter dated September 9, 2011 (ADAMS Accession No. ML112521284), the licensee informed the NRC that based on the determination that the modification to increase circulating water flow is not needed to support EPU conditions, the particulate emissions will not change significantly. In addition, the emission impact due to the lube oil tanks associated with the new radial wells is minor. Therefore, no change is required to the GGNS Air Permit 0420-00023 to the MDEQ prior to these activities occurring.

Upon completion of the proposed EPU, non-radioactive air pollutant emissions would increase slightly due to the modification of the auxiliary cooling tower and the addition of two 60-gallon lube oil tanks for the new radial well pumps but will be regulated in accordance with the GGNS Air Permit with MDEQ and there would be no significant impact on air quality in the region during and following implementation of the proposed EPU.

Water Use Impacts

Surface Water

The western boundary of the GGNS site is defined by the Mississippi River's eastern bank. At the site, the Mississippi River is about 0.5 miles wide at low flow and about 1.4 miles during a typical annual high flow period. The massive nature of the Mississippi River makes the liquid effluent discharges from the GGNS facility undetectable within the overall flow regime, and any changes in the quality are small and localized compared to the overall volume of water in the river. Hamilton and Gin are lakes on the GGNS site. These lakes are what remain of the

former river channel after the Mississippi River moved to the west. Hamilton and Gin lakes are relatively small (Hamilton Lake is approximately 64 acres, and Gin Lake is approximately 55 acres) and shallow with an average depth of 8 to 10 feet. There is no effluent discharged or water drawn from these lakes for plant operations.

Limitations and monitoring requirements for plant effluent discharges are specified in the NPDES Permit. Discharges directly to the Mississippi River are required to be monitored continuously. Modifications of the nonradiological drain systems or other systems conveying wastewaters are not required for the EPU, and biocide/chemical discharges would be within existing permit limits. Although it is estimated that blowdown (the release of liquid effluent to clean the water in the system) would increase slightly (~825 gpm) based on evaporation, the EPU is not introducing any new contaminants or pollutants and is not increasing the amount of those potential contaminants presently allowed for release by GGNS Unit 1.

Chemical and biocide wastes are produced from processes used to control the pH in the coolant, to control scale, to control corrosion, and to clean and defoul the condenser. These waste liquids are typically combined with cooling water discharges in accordance with the site's NPDES Permit MS0029521. Sanitary wastewater from all plant locations are regulated by GGNS NPDES Permit MS0029521, and flow to an onsite sewage treatment plant prior to discharge into the Mississippi River. Solids associated with treatment of the sanitary wastewater are placed in drying beds and then managed appropriately for eventual offsite disposal.

Surface water and wastewater discharges are regulated by the MDEQ via the NPDES permit. The permits are reviewed by the MDEQ on a 5-year basis. The current GGNS NPDES permit, which has been administratively continued by the MDEQ based on Entergy’s timely

submittal of the permit renewal application, authorizes discharges from 11 outfalls into the Mississippi River. None of the NPDES permit limits would require a modification to support or implement the EPU.

Total surface water withdrawals in Claiborne County are predominantly for agricultural use (livestock and irrigation), with no surface water usage reported for public supply, domestic self-supplied systems, mining, hydroelectric power, thermoelectric power, or industrial or commercial uses.

The nearest downstream user of Mississippi River water is the Southeast Wood Fiber company located at the Claiborne County Port facility, 0.8 miles downstream of the GGNS site. The maximum intake requirement for this facility is less than 0.9 million gallons per day (mgd). There are only three public water supply systems in the State of Mississippi that use surface water as a source, and none of these are located within 50 miles of the GGNS site.

Based on the above, the NRC staff concludes that the proposed EPU will not have a significant impact on surface water in the area of GGNS, and operation under EPU conditions would not cause a water use conflict with other surface water users in the GGNS area.

Groundwater

There are 16 groundwater wells currently used for withdrawal purposes at the GGNS site. Groundwater is used for domestic water, once-through cooling for plant air conditioners, and for regenerating the water softeners at the Energy Services Center.

There are currently four radial wells which supply water to the plant service water system. Since additional cooling tower make-up water is projected to be needed (~3,200 gpm) due to the increase in heat load generated as a result of the EPU, and an increase in water loss

through evaporation, blowdown, and drift, a new radial well was installed to provide additional water needed during EPU operating conditions. The new radial well was completed and made operational during the spring 2012 refueling outage. As previously discussed, the existing radial wells have degraded over time and thus cannot perform at their full design capacity. Although water being utilized for cooling tower make-up is projected to increase from current levels, the estimated EPU cooling tower makeup flow value of 27,860 gpm (62 cubic feet per second (cfs)) is less than the estimated 42,636 gpm (95 cfs) value identified in the GGNS FES; therefore, groundwater consumption remains lower than the value analyzed in the GGNS FES.

Public water supply wells in Claiborne County (excluding GGNS) are supplied by the Catahoula Formation with well depths ranging from 166 to 960 feet. Aside from GGNS Unit 1, the primary use of groundwater in Claiborne County is for public supply purposes with a small percentage used for domestic water, irrigation, and livestock. Within a two-mile radius of the plant site, essentially all groundwater is used for domestic purposes.

GGNS groundwater is supplied from the Mississippi River Alluvium (radial wells) and the Upland Complex (potable wells) aquifers. Residents within the vicinity of GGNS are served by CS&I Water Association which withdraws water from the Miocene aquifer. Since the GGNS withdraws groundwater from the Mississippi River Alluvium and Upland Complex aquifers, the Miocene aquifers, including the Catahoula Formation, are unaffected.

The impact to offsite groundwater users from the withdrawal of water by GGNS Unit 1 is limited by the recharge boundary created by the river, and thus, is not expected to extend to the west beyond the river. Based on estimates of the radius of anticipated drawdown of the GGNS radial wells, drawdown at the GGNS property boundaries would have minimal impact on potential offsite use in the Mississippi River Alluvium aquifer. This is a conservative estimate of

aquifer capacity impact, as aquifer recharge from sources other than the river (flooding and rainfall events) was not considered. GGNS's potable water wells are the closest wells withdrawing groundwater in the vicinity (although not from the Mississippi River Alluvium) and have operated to supply adequate water supply to the GGNS site without noticeable impact from the operation of the radial wells. There are no known withdrawals from the Mississippi River Alluvium aquifer other than GGNS Unit 1 between the Big Black River to the north, and Bayou Pierre River to the south.

Water rights and allocations of groundwater are regulated by MDEQ. Therefore, all existing GGNS Unit 1 groundwater withdrawals, including those from the radial wells, are regulated by a groundwater allocation permitting program. These permits were granted considering their identified potential impact on other uses in the area and considering those withdrawals in the recharge area of the Mississippi River Alluvium aquifer. Based on the above, there are no groundwater use conflicts between GGNS and other local groundwater users.

Approximately 40 percent of the GGNS site is bottomland, including forested, shrub, and emergent marsh wetlands. As stated above, the groundwater in the alluvium in the floodplain is in close hydraulic communication with the river. The groundwater contour figures reveal that the impact of the cone of depression surrounding the radial wells is dependent upon river stage. This impact is limited also by recharge to the alluvium derived from infiltration of precipitation, westward flow of groundwater across the terrace alluvium contact at the bluffs, and the flooding of the Mississippi River during high river stages. Thus, based on the localized influence of the drawdown zone surrounding the wells, the groundwater's hydraulic connection with the river, recharge from seasonal flooding and additional recharge from the Upland Terrace aquifer east of the bluffs, the impact of radial well groundwater withdrawal in the floodplain is of limited extent. Even though there is potentially greater impact to groundwater levels at the lowest river

stages than at higher river stages, the low river stages are generally temporary. Therefore, the impact of the radial wells on nearby wetlands is minimal.

Plant operation at the proposed EPU power level is not expected to cause impacts significantly greater than current operations. As previously discussed, groundwater withdrawals would continue to be lower than the values analyzed in the GGNS FES as a result of EPU and continued operational activities. The installation of an additional radial well is expected to reduce the per-well withdrawal rates without an increase in overall groundwater impacts. No major construction is planned, so additional groundwater withdrawals will not be required. Based on the above, the NRC staff concludes that the EPU will not have a significant impact on groundwater in the underlying aquifers, and operation under EPU conditions would not cause a water use conflict with other groundwater users in the GGNS area.

Aquatic Resources Impacts

The potential impacts to aquatic biota from the proposed action could include thermal and chemical discharge effects. GGNS does not have an intake structure that withdraws surface water directly from a body of water, therefore, no entrainment or impingement of organisms would occur.

GGNS uses groundwater from a series of radial wells to supply its plant service water system, as discussed in the Water Use Impacts section. The circulating water system is a closed system utilizing a natural draft cooling tower and a mechanical draft auxiliary cooling tower. The natural draft cooling tower is designed to operate alone or in conjunction with the auxiliary cooling tower to dissipate all excess heat removed from the main condensers. Additional cooling units will be added to the auxiliary cooling tower, as discussed in the Land Use and Aesthetics section. Makeup water, to compensate for drift, blowdown, and evaporation

losses from the cooling towers, is supplied from the plant service water system by means of the radial wells. A new radial well will be installed to handle the increase in heat load associated with the EPU, as discussed in the Water Use section.

The circulating water system is designed to supply the main condenser with cooling water at temperatures ranging from 2.8 degrees Celsius (°C) (37 degrees Fahrenheit (°F)) to 36.1 °C (97 °F) when the mechanical draft auxiliary cooling tower is not in service, and less than 32.2 °C (90 °F) with the natural draft and auxiliary cooling towers both in service. The licensee states that the auxiliary cooling towers remain in service year round, with the exception of a short period (i.e., hours) when they are taken out of service for cleaning. Therefore, water being supplied to the condenser is anticipated to be less than 32.2 °C (90 °F) year round.

Thermal effluents associated with cooling tower blowdown are combined with other plant effluents and discharged into the Mississippi River. The conditions associated with thermal discharges as outlined in GGNS's MDEQ NPDES permit state that the receiving water shall not exceed a maximum water temperature change of 2.8 °C (5.0 °F) and that the maximum water temperature shall not exceed 32.2 °C (90 °F), except when ambient temperatures approach or exceed that number.

GGNS is required by the MDEQ NPDES Permit to conduct thermal monitoring during the winter and summer months preceding the submittal year of the permit renewal application and include those results in the submittal. Based on previous years of operational experience, GGNS has not violated the thermal conditions outlined in the permit.

Based on the above, the NRC staff concludes that although the heat load would increase as a result of the proposed EPU, the thermal discharge associated with GGNS operations would continue to remain at or slightly below current operating temperatures due to

the additional cooling units being installed in the auxiliary cooling tower. As stated by the licensee, the auxiliary cooling towers operate in conjunction with the natural draft cooling tower year round. Consequently, the temperature of the cooling water being supplied to the condenser is not increasing, which ensures that the thermal conditions outlined in the GGNS MDEQ NPDES permit continue to be met. Therefore, the NRC staff concludes there would be no significant adverse impacts to aquatic biota from thermal discharges.

The plant service water system for GGNS is treated with sodium hypochlorite and biocides to control the pH in the coolant, to control scale, to control corrosion, and to clean and defoul the condenser. The liquid wastes produced from this process are combined with cooling water discharges in accordance with the site's MDEQ NPDES permit and discharged into the Mississippi River. Due to the additional cooling units being added to the auxiliary cooling tower, additional sodium hypochlorite injection will be needed to control biological fouling effectively. However, the liquid waste stream is dechlorinated with sodium bisulfite prior to being discharged to the Mississippi River. Consequently, effluent concentrations would be slightly higher but continue to be below the NPDES permit limits specified by MDEQ. The licensee has noted that it will maintain compliance with the MDEQ NPDES permit held currently by the plant as a function of the proposed EPU. Therefore, the NRC staff concludes there would be no significant adverse impacts to aquatic biota from chemical discharges.

As the delivery of transformers and other heavy equipment associated with the proposed EPU were made at the Claiborne County Port facility, no dredging activities were needed at the existing barge slip area.

Terrestrial Resources Impacts

The GGNS site is bisected by a prominent bluff line that runs parallel to the Mississippi River. Areas below the bluff line are seasonally flooded, except for two oxbow lakes which are permanently inundated and are considered wetland areas. Above the bluff line, the two prominent habitat types are upland field and upland forest with the vast majority upland forest. One small area of wetland has been defined on the north side of the plant as permanently flooded. Most of the previously developed areas are in upland habitat; however, approximately 400 acres of upland forest remains on-site.

The impacts that could potentially affect terrestrial resources include loss of habitat, construction and refurbishment-related noise and lighting, and sediment transport or erosion. Most of the activities associated with the EPU would occur on the developed portion of the site, would not directly affect any natural terrestrial habitats, and would not result in loss of habitat. As discussed in Land Use and Aesthetic Impacts section above, activities associated with installation of the new radial well would be managed in accordance with the Section 404 Permit and MDEQ's stormwater permitting program (Permit Number MSR15), as appropriate. Although there is no habitat present on the Heavy Haul Road, refurbishment activities associated with the road would be managed in accordance with the terms and conditions in State and Federal permits. Noise and lighting would not impact terrestrial species beyond what would be experienced during normal operations because refurbishment and construction activities would take place during outage periods, which are already periods of heightened activity. Based on the above, the NRC staff concludes that the proposed EPU would have no significant effect on terrestrial resources.

Threatened and Endangered Species Impacts

The licensee corresponded with the U.S. Fish and Wildlife Service (USFWS) during the preparation of the Environmental Report for the EPU to ensure that the proposed EPU would not adversely affect any species protected under the Endangered Species Act. The following Table 1 identifies federally listed and candidate species that are in the vicinity of GGNS Unit 1.

Table 1. Federally Listed Species in the Vicinity of GGNS Unit 1

Scientific	Name	Status[(a)]
Birds		
Picoides borealis	red-cockaded woodpecker	E
Sterna antillarum	least tern (interior pop.)	E
Clams		
Potamilus capax	fat pocketbook	E
Quadrula cylindrica cylindrica	rabbitsfoot	C
Fish		
Etheostoma rubrum	bayou darter	T
Acipenser oxyrinchus desoto	gulf sturgeon	T
Scaphirhynchus albus	pallid sturgeon	E
Mammals		
Ursus americanus luteolus	Louisiana black bear	T

[(a)] C = candidate; E = endangered; T = threatened
Data source: [FWS] U.S. Fish and Wildlife Service. 2011. Find Endangered Species Database. Available at <http://www.fws.gov/endangered/> (accessed 13 December 2011).

As discussed in the Land Use and Aesthetic Impacts section, the only EPU activities involving land disturbance is the installation of a new radial well and Heavy Haul Road improvements. These activities would be handled in accordance with the terms and conditions in State and Federal permits.

The licensee states that procedures are in place at GGNS Unit 1 to ensure that threatened and endangered species would be adequately protected, if present, during the outage and during plant operations. Any traffic and worker activity on the plant site during its 2012 refueling outage would be on the developed portion of the site and would not affect any federally listed species.

As stated above, the licensee consulted with the USFWS regarding threatened and endangered species in the vicinity of GGNS Unit 1. No issues were identified that would impact any of the federally listed species as a result of the proposed EPU. Therefore, the NRC staff concludes that the proposed EPU would have no significant impacts on any Federally listed threatened or endangered species for the proposed action.

Historic and Archaeological Resources Impacts

The licensee states that at the recommendation of the Mississippi Department of Archives and History (MDAH), a Phase I archaeological survey was conducted in 2007 on two onsite study areas. Eleven archaeological sites and eight isolated finds/small artifact scatters were identified during this survey. One historic site within the study area and located south of the plant in a wooded area, was identified as having the potential to be eligible for the National Register of Historic Places (NRHP). The remaining sites were determined to be ineligible for listing on the NRHP. The MDAH required no further actions from GGNS provided that no construction activities occurred in this specific area.

As discussed in Land Use and Aesthetic Impacts section, the only EPU activities involving land disturbance is the installation of a new radial well and Heavy Haul Road improvements. Entergy has a procedure in place, applicable to all of its power plants, for management of cultural resources ahead of any future ground-disturbing activities. This

procedure, which requires reviews, investigations, and consultations, as needed, ensures that existing or potentially existing cultural resources are adequately protected and assists Entergy in meeting State and Federal expectations.

As previously discussed, EPU-related plant modifications would take place within existing buildings and facilities at GGNS, except for the addition of the cooling units being added to the auxiliary cooling tower which will be installed on an existing foundation. Since ground disturbance or construction-related activities would not occur in any areas with the potential to be eligible for the NRHP, and that Entergy has procedures in place for management of cultural resources, the NRC staff concludes that there would be no significant impact from the proposed EPU on historic and archaeological resources in the vicinity of GGNS Unit 1.

Socioeconomic Impacts

Potential socioeconomic impacts from the proposed EPU include temporary increases in the size of the workforce at GGNS, and the associated increased demand for goods, public services, and housing in the region. The proposed EPU also could generate increased tax revenues for the State and surrounding counties.

Currently, approximately 690 full-time employees work at GGNS. During regularly scheduled refueling outages, the workforce is typically increased by additional 700 - 900 persons. Refueling outages usually last 25–30 days every 18 months, although GGNS plans to change to a 24-month refueling cycle in the future. Entergy estimates that operating at the proposed EPU power level would not affect the size of the regular workforce. The 2012 outage workforce will be larger than previous outages due to the EPU modifications but would be of short duration. Once EPU-related plant modifications have been completed, the size of the refueling outage workforce at GGNS would return to normal levels and would remain similar to

pre-EPU levels, with no significant increases during future refueling outages. Entergy expects most of the temporary workers expected for the EPU related work will temporarily reside in Claiborne County. This will result in short-term increases in the local population along with increased demands for public services and housing. Because plant modification work would be short term and temporary, most workers are expected to stay in available rental homes, apartments, mobile homes, and camper-trailers. The 2010 American Community Survey 1-year estimate for vacant housing units reported 783 vacant housing units in Claiborne County; that could potentially ease the demand for local rental housing. Therefore, the NRC expects that the temporary increase in plant employment for a short duration would have little or no noticeable effect on the availability of housing in the region.

The additional number of outage workers and material and equipment deliveries needed to support EPU-related plant modifications would cause short-term level of service impacts (restricted traffic flow and higher incident rates) on secondary roads in the immediate vicinity of GGNS. As EPU-related plant modifications would occur during a normal refueling outage, there could be noticeable short-term (during certain hours of the day), level-of-service traffic impacts beyond what is experienced during normal outages.

Nuclear power plants in Mississippi currently pay the Mississippi Department of Revenue a sum based on the assessed value of the plant. Based upon this assessment, nuclear power plants are then taxed 2 percent of its assessed value, or a maximum of $20,000,000. GGNS currently pays $20,000,000 annually to the Mississippi Department of Revenue. Tax revenue is distributed in proportion to the amount of electric energy consumed by the retail customers in each county, with no county receiving an excess of 20 percent of the funds. Ten percent of the remainder of the tax payment is then transferred from the Mississippi Department of Revenue to

the General Fund of the State. The increased property value of GGNS as a result of the EPU and increased power generation could affect future tax payments by GGNS.

Due to the short duration of EPU-related plant modification activities, there would be little or no noticeable effect on tax revenues generated by temporary workers residing in Claiborne County. In addition, GGNS is currently paying the maximum tax on the assessed value of the plant. Therefore, the NRC expects no significant socioeconomic impacts from EPU-related plant modifications and operations under EPU conditions in the vicinity of GGNS.

Environmental Justice Impacts

The environmental justice impact analysis evaluates the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from activities associated with the proposed EPU at GGNS. Such effects may include human health, biological, cultural, economic, or social impacts. Minority and low-income populations are subsets of the general public residing around GGNS, and all are exposed to the same health and environmental effects generated from activities at GGNS.

NRC considered the demographic composition of the area within a 50-mile (mi) (80.5-kilometer (km)) radius of GGNS to determine whether minorities may be affected by the proposed action. The NRC examined the distribution of minority populations within 50 mi (80.5 km) of GGNS using the U.S. Census Bureau (USCB) data for 2010.

According to the 2010 Census data using the University of Missouri's Circular Area Profiling System, an estimated 316,387 people live within a 50-mi (80.5-km) radius of GGNS. Minority populations within 50 mi (80.5 km) comprise 53.2 percent (168,166 persons). The largest minority group was Black or African-American (approximately 157,707 persons or 49.8

percent), followed by Hispanic or Latino (of any race) (approximately 6,115 persons or 1.9 percent). Minority populations within Claiborne County comprise 85.2 percent of the total population with the largest minority group being Black or African-American at 84.6 percent.

NRC examined low-income populations within Claiborne County using the 2006-2010 American Community Survey 5-Year Estimates. According to census data, approximately 35 percent of the population (3,186 individuals) residing within Claiborne County was considered low-income, defined as living below the 2010 Federal poverty threshold. Approximately 27.6 percent of families were determined to be living below the Federal poverty threshold in Claiborne. The 2010 Federal poverty threshold was $22,314 for a family of four and $11,139 for an individual. The median household income for Claiborne County was approximately $24,150, which is 51 percent lower than the median household income (approximately $47,031) for Mississippi.

Potential impacts to minority and low-income populations would mostly consist of environmental and socioeconomic effects (e.g., noise, dust, traffic, employment, and housing impacts). Radiation doses from plant operations after the EPU are expected to continue to remain well below regulatory limits.

Noise and dust impacts would be temporary and limited to onsite activities. Minority and low-income populations residing along site access roads could experience increased commuter vehicle traffic during shift changes. Increased demand for inexpensive rental housing during the EPU-related plant modifications could disproportionately affect low-income populations; however, due to the short duration of the EPU-related work and the availability of housing properties, impacts to minority and low-income populations would be of short duration and

limited. According to the 2010 census information, there were approximately 783 vacant housing units in Claiborne County.

Based on this information and the analysis of human health and environmental impacts presented in this EA, the proposed EPU would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations residing in the GGNS vicinity.

Non-radiological Cumulative Impacts

The NRC considered potential cumulative impacts on the environment resulting from the incremental impact of the proposed EPU when added to other past, present, and reasonably foreseeable future actions. For the purposes of this analysis, past actions include the construction and licensing of GGNS Unit 1. Present actions include operations and maintenance activities associated with operations under the current NRC operating license through the date of that license's expiration (November 1, 2024). Reasonably foreseeable future actions are discussed below.

Entergy submitted an application to the NRC for license renewal on October 28, 2011 (ADAMS Accession No. ML113080132). The NRC is currently in the process of reviewing this application and intends to publish a draft supplement to NUREG–1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," in December 2012. If the NRC grants Entergy a new license, that license would authorize Entergy to operate GGNS Unit 1 for an additional 20 years (through November 1, 2044). For purposes of this analysis, the proposed license renewal is considered a reasonably foreseeable future action. In its Environmental Report for the proposed license renewal, Entergy concludes that cumulative impacts during the proposed license renewal term would be small to moderate for land use and

ecological resources but that these impacts would be effectively mitigated. Cumulative impacts to air quality and socioeconomics would be beneficial and small to moderate in scale, and the impacts to the remaining resources areas would be small. However, the draft supplement to NUREG–1437 will document the NRC's independent National Environmental Policy Act (NEPA) analysis and consider potential cumulative impacts of the proposed license renewal.

Entergy submitted a combined license (COL) application to the NRC for an Economic Simplified Boiling Water Reactor (designated as "Grand Gulf, Unit 3") on February 27, 2008 (ADAMS Accession No. ML083570119). Entergy's COL application submission does not commit Entergy to build a new nuclear power unit; the application also does not constitute NRC's approval of the proposal. The NRC initiated a NEPA review as part of the review of Entergy's COL application. However, on January 9, 2009 (ADAMS Accession No. ML090130174), Entergy informed the NRC that it was considering alternate reactor design technologies and requested that the NRC stop its COL application review until further notice. The NRC suspended its review associated with the COL application (including the NEPA review) and, to date, has not resumed that review. The NRC was in the process of preparing an environmental impact statement (EIS) to evaluate the environmental impacts of the proposed Grand Gulf, Unit 3. However, because the review was suspended, the NRC did not publish the EIS. At this time, NRC does not consider licensing of Grand Gulf, Unit 3 to be a reasonably foreseeable future action because Entergy has not requested NRC to reinitiate its COL review to date. If in the future, Entergy submits a revised reactor design to the NRC for Grand Gulf, Unit 3, the NRC will evaluate the merits of that COL application and will decide whether to approve or deny the license after considering and evaluating the environmental and safety implications of the proposal. The environmental impacts of constructing and operating a new unit will depend on the unit's actual design characteristics, construction plans, and operations

procedures. These impacts, including cumulative impacts, would be assessed by the NRC in a separate NEPA document.

Previous to the COL application, the NRC issued an Early Site Permit (ESP) for Grand Gulf on April 5, 2007 (ADAMS Accession No. ML070780457). Entergy submitted its ESP application for the Grand Gulf site to the NRC on October 16, 2003 (ADAMS Accession No. ML032960373). The NRC published NUREG-1817, "Environmental Impact Statement for an Early Site Permit (ESP) at the Grand Gulf ESP Site, Final Report," in April 2006 (ADAMS Accession No. ML060900037), to document its NEPA analysis associated with the ESP application review. Chapter 7 of NUREG-1817 addresses cumulative impacts and concludes that impacts would range from small to moderate depending on the particular resource area, but that in several cases (land use, water use and water quality, terrestrial ecosystems, nonradiological health, radiological impacts of operation of non-light-water reactor designs, and decommissioning), information was not available to determine the level of impact. In these cases, the NRC noted that a future COL application would be required for the staff to determine the specific impacts based on proposed design characteristics, construction plans, and operations procedures. However, as discussed above, Entergy has requested that NRC suspend its COL application review, and thus, NRC does not have the information required to make determinations on the cumulative impacts that would result from a new reactor.

Non-radiological Impacts Summary

As previously discussed, the proposed EPU would not result in any significant non-radiological impacts. Table 2 summarizes the non-radiological environmental impacts of the proposed EPU at GGNS.

Table 2. Summary of Non-radiological Environmental Impacts

Land Use	The proposed EPU is not expected to cause a significant impact on land use conditions and aesthetic resources in the vicinity of the GGNS.
Air Quality	The proposed EPU is not expected to cause a significant impact to air quality.
Water Use	The proposed EPU is not expected to cause impacts significantly greater than current operations. No significant impact on groundwater or surface water resources.
Aquatic Resources	The proposed EPU is not expected to cause impacts significantly greater than current operations. No significant impact to aquatic resources due to additional chemical or thermal discharges.
Terrestrial Resources	The proposed EPU is not expected to cause impacts significantly greater than current operations. No significant impact to terrestrial resources.
Threatened and Endangered Species	The proposed EPU would have no effect on Federally threatened and endangered species.
Historic and Archaeological Resources	The proposed EPU would have no significant impact to historic and archaeological resources on site or in the vicinity of the GGNS.
Socioeconomics	The proposed EPU would have no significant socioeconomic impacts from EPU-related temporary increase in workforce.
Environmental Justice	The proposed EPU would have no disproportionately high and adverse human health and environmental effects on minority and low-income populations in the vicinity of the GGNS site.
Cumulative Impacts	The proposed EPU would not cause impacts significantly greater than current operations.

Radiological Impacts

Radioactive Gaseous and Liquid Effluents and Solid Waste

GGNS Unit 1 uses waste treatment systems to collect, process, recycle, and dispose of gaseous, liquid, and solid wastes that contain radioactive material in a safe and controlled manner within NRC and EPA radiation safety standards. The licensee's evaluation of plant operation under the proposed EPU conditions shows that no physical changes would be needed to the radioactive gaseous, liquid, or solid waste systems.

Radioactive Gaseous Effluents

The gaseous waste management systems include the ventilation systems of normally and potentially radioactive components, building ventilation systems, the off-gas system, and the mechanical vacuum pump system. The licensee's evaluation concluded that the proposed EPU is expected to increase the production and activity of gaseous effluents approximately 13 percent; however, the increase would be below the design basis values the system is designed to handle. The licensee's evaluation concluded that the proposed EPU would not change the radioactive gaseous waste system's design function and reliability to safely control and process the waste. The projected gaseous releases following implementation of the EPU would remain within the values analyzed in the FES for GGNS Unit 1. The existing equipment and plant procedures that control radioactive releases to the environment will continue to be used to maintain radioactive gaseous releases within the dose limits of 10 CFR 20.1302 and the as low as is reasonably achievable (ALARA) dose objectives in Appendix I to 10 CFR Part 50.

Radioactive Liquid Effluents

The liquid waste management system collects, processes, and prepares radioactive liquid waste for disposal. Radioactive liquid wastes include liquids from various equipment drains, floor drains, chemical wastes, and miscellaneous plant equipment subsystems, and alternative liquid radioactive waste processing equipment. Entergy is installing a condensate full flow filter (CFFF) – iron control system upstream of the condensate demineralizers to reduce the corrosion product loading on the demineralizer resins. The addition of iron control to the CFFF would prevent iron from being deposited on the demineralization resin. The amount of liquid waste generated by the condensate demineralizer system is expected to remain unchanged or even decrease. The licensee's evaluation shows that the proposed EPU implementation would not significantly increase the inventory of liquid normally processed by the liquid waste management system. This is because the system functions are not changing, and the volume inputs remain the same. The proposed EPU would result in a 13 percent increase in the equilibrium radioactivity in the reactor coolant which in turn would impact the concentrations of radioactive nuclides in the liquid waste disposal systems.

Since the composition of the radioactive material in the waste and the volume of radioactive material processed through the system are not expected to significantly change, the current design and operation of the radioactive liquid waste system will accommodate the effects of the proposed EPU. The projected liquid effluent release following EPU implementation would remain within the values analyzed in the FES for GGNS Unit 1. The existing equipment and plant procedures that control radioactive releases to the environment will continue to be used to maintain radioactive liquid releases within the dose limits of 10 CFR 20.1302 and ALARA dose standards in Appendix I to 10 CFR Part 50.

Radioactive Solid Wastes

The solid radwaste system is designed to provide solidification and packaging for radioactive wastes that are produced during shutdown, startup, and normal operation, and to store these wastes until they are shipped offsite for burial. Solid radwaste is processed on a batch basis and would increase slightly, resulting in an increase in batch processing. The licensee's evaluation concluded that the annual volume of solid waste is expected to increase from 152.83 cubic meters (m^3) at current licensed thermal power to 153.65 m^3 per year, or 0.82 m^3 per year. Although EPU implementation increases the amount of solid waste produced, the design capability of the solid radwaste system and the total volume capacity for handling solid waste are unaffected, and the system will be able to handle the additional waste without any modifications. The equipment is designed and operated to process the waste into a form that minimizes potential harm to the workers and the environment. Waste processing areas are monitored for radiation, and there are safety features to ensure worker doses are maintained within regulatory limits. The proposed EPU would not generate a new type of waste or create a new waste stream.

The licensee manages low level radioactive waste (LLRW) contractually with an offsite vendor and expects to continue to ship LLRW offsite for processing and disposal. Entergy currently transports radioactive waste to licensed processing facilities in Tennessee, including Duratek (owned by EnergySolutions) or Race (owned by Studsvik), where the wastes are processed prior to being sent for disposal at EnergySolutions in Clive, Utah.

Based on the above, the NRC staff concludes that the impact from the proposed EPU on the management of radioactive solid waste would not be significant.

Occupational Radiation Dose at EPU Power Levels

The licensee stated that the in-plant radiation sources are expected to increase approximately linearly with the proposed increase in core power level. To protect the workers, the licensee's radiation protection program monitors radiation levels throughout the plant to establish appropriate work controls, training, temporary shielding, and protective equipment requirements so that worker doses will remain within the dose limits of 10 CFR Part 20 and ALARA.

The licensee states that GGNS Unit 1 has been designed using an extremely conservative basis for water and steam radionuclide concentrations such that changes in actual concentrations as a result of EPU are well within the original design limits. Inside containment, the radiation levels near the reactor vessel are assumed to increase by 13 percent. However, the reactor vessel is inaccessible during operation, and because of the margin in the shielding around the reactor vessel, an increase of 13 percent would not measurably increase occupational doses during power operation. The radiation levels due to spent fuel are anticipated to increase by 13 percent. Expected increases in these values would occur primarily in fuel handling operations during refueling outages. However, a review of existing radiation zoning design concluded that no changes in the radiation zone designations or shielding requirements would need to be made as a result of EPU, and operation under EPU conditions would have no significant effect on occupational and onsite radiation exposure.

Based on the above, the NRC staff concludes that the proposed EPU is not expected to significantly affect radiation levels within the plants and, therefore, there would not be a significant radiological impact to the workers.

Offsite Doses at EPU Power Levels

The licensee states that normal operational gaseous activity levels may increase slightly. The increase in activity levels is generally proportional to the percentage increase in core thermal power, which is approximately 13 percent. However, this slight increase does not affect the large margin to the offsite dose limits established by 10 CFR Part 20, allowing GGNS to operate well below the regulatory limits even at the higher power level.

The sources of offsite dose to members of the public from GGNS Unit 1 are radioactive gaseous and liquid effluents and direct radiation. As previously discussed, operation at the proposed EPU conditions will not change the radioactive waste management systems' abilities to perform their intended functions. Also, there would be no change to the radiation monitoring system and procedures used to control the release of radioactive effluents in accordance with NRC radiation protection standards in 10 CFR Part 20 and Appendix I to 10 CFR Part 50.

Based on the above, the NRC staff concluded that the offsite radiation dose to members of the public from the proposed EPU would continue to be within the NRC and EPA regulatory limits.

Spent Nuclear Fuel

Spent fuel from GGNS Unit 1 is stored in the plant's spent fuel pool and in dry casks in the independent spent fuel storage installation. The current typical average enrichment of a batch of fuel at GGNS is approximately 4 percent by weight uranium-235. The additional energy requirements for the EPU are met by an increase in fuel enrichment, an increase in the reload fuel batch size, and/or changes in the fuel loading pattern to maintain the desired plant operating cycle length. The equilibrium core evaluated for the EPU has an average enrichment

well below 4.5 percent uranium-235 by weight. Entergy's EPU evaluation also considered a possible future change to a 24-month refueling cycle; the combination of the EPU and the longer cycle length could result in an increase in fuel bundle assembly size from 312 to about 380 assemblies. The maximum average burnup level of any fuel rod would continue to be less than 62,000 megawatt-days per metric tonne (MWd/MTU), and reload design goals would maintain the GGNS Unit 1 fuel cycles within the burnup and enrichment limits bounded by the impacts analyzed in 10 CFR Part 51, Table S-3 - Table of Uranium Fuel Cycle Environmental Data, and Table S-4 - Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor, as supplemented by NUREG-1437, Volume 1, Addendum 1, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report. Section 6.3 – Transportation Table 9.1, Summary of findings on NEPA issues for license renewal of nuclear power plants." Therefore, the NRC staff concludes that there would be no significant impacts resulting from spent nuclear fuel.

Postulated Design-Basis Accident Doses

Postulated design-basis accidents are evaluated by both the licensee and the NRC to ensure that GGNS Unit 1 can withstand normal and abnormal transients and a broad spectrum of postulated accidents without undue hazard to the health and safety of the public.

The NRC staff is reviewing the applicant's analyses to independently verify the applicant's calculated doses under accident conditions. The NRC staff's evaluation results will be contained in the safety evaluation that will be issued concurrently with the proposed EPU amendment, if so approved by the NRC staff. However, for the purpose of this EA, the NRC staff concludes that, based on the information provided by the licensee, the proposed EPU would not significantly increase the radiological consequences of postulated accidents.

Radiological Cumulative Impacts

The radiological dose limits for protection of the public and workers have been developed by the NRC and EPA to address the cumulative impact of acute and long-term exposure to radiation and radioactive material. These dose limits are codified in 10 CFR Part 20 and 40 CFR Part 190.

The cumulative radiation dose to the public and workers are required to be within the limits set forth in the regulations cited above. The public dose limit of 25 millirem (mrem) (0.25 millisievert (mSv)) in 40 CFR Part 190 applies to all reactors that may be on a site and also includes any other nearby nuclear facilities. Currently, there is no other nuclear power reactor or uranium fuel cycle facility located near GGNS Unit 1. However, as previously discussed, Entergy is considering the construction of an additional nuclear power reactor at the GGNS site. The NRC staff reviewed several years of radiation dose data contained in the licensee's annual radioactive effluent release reports for GGNS Unit 1. The data demonstrate that the dose to members of the public from radioactive effluents is within the limits of 10 CFR Part 20 and 40 CFR Part 190. To evaluate the projected dose at EPU power levels for GGNS Unit 1, the NRC staff increased the actual dose data contained in the reports by 13 percent. The projected doses for GGNS Unit 1 at EPU power level remained within regulatory limits. The NRC staff expects continued compliance with NRC's and EPA's public dose limits during operation at the proposed EPU power level and at the proposed new reactor, if it is constructed and operated. Therefore, the NRC staff concludes that there would not be a significant cumulative radiological impact to members of the public from increased radioactive effluents from GGNS Unit 1 at the proposed EPU operation and the proposed new reactor.

As previously discussed, the licensee has a radiation protection program that maintains worker doses within the dose limits in 10 CFR Part 20 during all phases of GGNS Unit 1 operations. The NRC staff expects continued compliance with NRC's occupational dose limits during operation at the proposed EPU power level and at the proposed new reactor, if it is constructed and operated.

Therefore, the NRC staff concludes that operation of GGNS Unit 1 at the proposed EPU power level and the proposed new reactor would not result in a significant impact to the worker's cumulative radiological dose.

Radiological Impacts Summary

As discussed above, the proposed EPU would not result in any significant radiological impacts. Table 3 summarizes the radiological environmental impacts of the proposed EPU at GGNS Unit 1.

Table 3. Summary of Radiological Environmental Impacts

Radioactive Gaseous Effluents	Amount of additional radioactive gaseous effluents generated would be handled by the existing system.
Radioactive Liquid Effluents	Amount of additional radioactive liquid effluents generated would be handled by the existing system.
Occupational Radiation Doses	Occupational doses would continue to be maintained within NRC limits.
Offsite Radiation Doses	Radiation doses to members of the public would remain below NRC and EPA radiation protection standards.
Radioactive Solid Waste	Amount of additional radioactive solid waste generated would be handled by the existing system.
Spent Nuclear Fuel	The spent fuel characteristics will remain within the bounding criteria used in the impact analysis in 10 CFR Part 51, Table S-3, and Table S-4.
Postulated Design-Basis Accident Doses	Calculated doses for postulated design-basis accidents would remain within NRC limits.
Cumulative Radiological	Radiation doses to the public and plant workers would remain below NRC and EPA radiation protection standards.

Alternatives to the Proposed Action

As an alternative to the proposed action, the NRC staff considered denial of the proposed EPU (i.e., the "no-action" alternative). Denial of the application would result in no change in the current environmental impacts. However, if the EPU were not approved for GGNS Unit 1, other agencies and electric power organizations may be required to pursue other means, such as fossil fuel or alternative fuel power generation, to provide electric generation capacity to offset future demand. Construction and operation of such a fossil-fueled or alternative-fueled plant could result in impacts in air quality, land use, and waste management greater than those identified for the proposed EPU for GGNS Unit 1.

Alternative Use of Resources

The action does not involve the use of any different resources than those previously considered in the GGNS FES.

III. Finding of No Significant Impact

On the basis of the details provided in the EA, the NRC concludes that granting the proposed EPU license amendment is not expected to cause impacts significantly greater than current operations. Therefore, the proposed action of implementing the EPU for GGNS Unit 1 will not have a significant effect on the quality of the human environment because no significant permanent changes are involved, and the temporary impacts are within previously disturbed areas at the site and the capacity of the plant systems. As discussed in the EA, if any new land disturbances are required to support the proposed EPU, those activities will be conducted in accordance with State and Federal permits to ensure the potential impacts are not significant.

Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

Dated at Rockville, Maryland, this 9th day of July 2012.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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