U.S. NUCLEAR REGULATORY COMMISSION RAS 12724
In the Matter of System Energy Resources
Docket No. 52-009-ESP Official Exhibit No. Staff 4
OFFERED by: Applicant/Licensee Intervenor
NRC Staff Other
IDENTIFIED on 11/19/02 Witness/Panel
Action Taken: ADMITTED REJECTED WITHDRAWN
Reporter/Clerk

Exhibit 4

Requested Information

Board made the following request for information:

"List and summarize (in separate tables) each statement made by SERI in its Site Safety Analysis Report (SSAR) and Environmental Report (ER) that constitute:

(i) commitments to address specific issues in the design, construction, and operation of the proposed plant(s);
(ii) planned compliance with current laws, regulations, and requirements;
(iii) commitments to perform certain activities and take certain actions at the COL stage, should it be granted an ESP license;
(iv) other statements made by SERI in its SSAR or ER, or in response to NRC Staff Requests for Additional Information related to future actions and activities by SERI, and how the impacts of those actions were considered in the Staff's analysis (e.g. FEIS, App. J, Table J-1)."

Methodology

SERI performed an electronic search of the Site Safety Analysis Report (SSAR), Environmental Report (ER), Emergency Planning information (EPI), responses to NRC Staff Requests for Additional Information, and Responses to DSER Open Items related to future actions and activities by SERI. The search was performed using search terms connoting a potential commitment to future action, per the Board's instruction. The raw data were then reviewed by cognizant ESP project staff, and any identified commitments and/or statements of planned compliance were categorized into one of the four categories listed above. Note that to the extent the four categories identified by the Board (above) overlap, SERI used its best judgment in assigning the most appropriate category. The results of SERI's review are provided in tables below. SERI believes that this approach is reasonable, results in a best-effort summary of the requested data, and is responsive to the Board's request.

Commitment Management

Commitments and statements regarding future actions and planned compliance with regulations are part of a broader structure that constitutes the "licensing basis" of an ESP and COL. As a result of industry and NRC efforts, the structure and recommended management practices were documented in NEI guidelines for managing NRC commitments (NEI 99-04)[1]. In SECY-00-0045[2] the NRC documented its review and acceptance of NEI 99-04 as an acceptable commitment management process. As discussed in SECY-00-0045, there are various levels of licensing basis information: (1) obligations or regulatory requirements that require prior NRC

1 GUIDELINES FOR MANAGING NRC COMMITMENT CHANGES (REV. 0), Nuclear Energy Institute (July 1999).

2 SECY-00-045, ACCEPTANCE OF NEI 99-04, 'GUIDELINES FOR MANAGING NRC COMMITMENTS', (February 22, 2000).

Template = SECY-027
SECY-02

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approval of proposed changes, (2) mandated licensing-basis documents, such as the updated Final Safety Analysis Report (FSAR), that licensees may change without NRC approval provided the change does not exceed criteria defined by regulations, and (3) regulatory commitments that are controlled by licensee and NRC administrative processes. SERI would adapt this mature approach of requirement and commitment management practices in its own program. The implementation of this program would include the review of the ESP application (*e.g.*, SSAR, ER, and responses to NRC Requests for Additional Information), as well as appropriate consideration of the ESP FSER and FEIS, ASLB findings, and the Permit to identify obligations and commitments and take appropriate actions, consistent with a program founded on NEI 99-04 and SECY 00-0045.

This listing of statements and commitments provided in Exhibit 4 was developed in response to the specific Board request. While SERI believes Exhibit 4 reasonably summarizes statements of commitments and planned compliance included in the ESP application, SERI plans to rely on the process described above in support of the COL application rather than this table. *See also* SERI responses to Board SER Inquiry No. 6 and EIS Inquiry 3(4).

Table 1
SSAR Statements

SSAR Section	SSAR Statement	Exhibit 4 Item
1.3.1.3	The values provided in the approved PPE along with the site characteristics described in the application will represent the "permit bases," against which any future design would be compared (i.e., at COL).	i
2.1.2	The exclusion area boundary (EAB) for a new facility consists of a circle of approximately 0.52 miles (841 meters) radial distance from the circumference of a 630 ft. circle encompassing the proposed power block location for a new facility. Thus the minimum distance to the exclusion area boundary from any individual new reactor site within the 630 ft. circle would be 0.52 miles (841 meters). The area within this EAB is wholly contained within the GGNS site property boundary.	i
2.1.2.2	For all practical purposes, SERI controls the surface rights, and SERI has authorized Entergy Operations to maintain control of ingress to and egress from the exclusion area and provides for evacuation of individuals from the area in the event of an emergency. Furthermore, SERI owns most of the mineral interests within the exclusion area. To the extent that third parties still own mineral interests in the exclusion area, it is extremely unlikely that such third party interests would ever be exercised so as to create an exception to Entergy Operations' control of the exclusion area. A similar arrangement would be made for exercise of authority over the area within the exclusion area for the new facility on the site property. Because the proposed exclusion area for a new facility is wholly contained within the GGNS site property boundary, SERI would have effective control over the exclusion area for a new facility.	i

Table 1
SSAR Statements

2.1.2.2	Entergy Operations will allow access to parts of the plant site property outside the [GGNS Unit 1] exclusion area for recreational purposes. Arrangements have been made for control of traffic on the county roads, a part of [Bald Hill Road] which is located within the exclusion area. These arrangements are implemented only during a declared emergency and are fully described in the Emergency Plan. The protected area is posted to ensure awareness of access restrictions by individuals. Similar arrangements would be implemented for operation of any new plant(s) on the GGNS ESP Site to the extent they do not interfere with operations or emergency planning. Appropriate arrangements with SERI and Entergy Operations, Inc. for control of ingress and egress to the new facility location and its exclusion area would be established.	i
2.1.2.3	Since SERI and SMEPA own, and Entergy Operations controls, substantially all of the minerals located within the exclusion area, SERI and Entergy Operations would attend any hearings and would have the opportunity to object to the drilling and/or the location of any potential well. As a practical matter, the owner or a lessee (or a potential lessee) of mineral interests would in all likelihood attempt to obtain a written consent and damage waiver from the surface owners of the property before commencing seismic investigations of the GGNS plant site. In addition, the mineral rights holder would also likely attempt to negotiate a well site agreement with the surface owners prior to seeking a permit from the State Oil and Gas Board to drill on the property. Both of these measures would be reasonable and prudent, and would be especially so in the case where the property includes a nuclear power generating station. These factors give SERI, as the owner, an additional, practical measure of control over the exclusion area [for both GGNS Unit 1, and the proposed exclusion area for a new facility on the ESP Site].	i

1-WA/2658631.3

Table 1
SSAR Statements

2.1.2.4	[GGNS Unit 1] Exclusion area control by Entergy Operations is not affected by these easements since (1) SERI and SMEPA are and will continue to be licensees, and (2) the switchyard agreement allows SERI to control future activities in the switchyard area and on the Entergy Mississippi, Inc. transmission easement within the exclusion area (SERI has transferred this right to Entergy Operations), and (3) arrangements have been made for control of traffic on the county road as described in the GGNS [Unit 1] Emergency Plan. Similar arrangements for traffic control through the exclusion area would be made for a new facility, unless it becomes necessary to relocate the road, in which case this becomes a non-issue.	i
2.1.2.5	Any permitted activities taking place within a new facility's exclusion area and unrelated to the new facility operation would be restricted while the facility is in operation.	i
2.1.2.6	The proposed exclusion area for a new facility is not traversed by a railway or waterway and, therefore, no arrangements would be required for these; however, the exclusion area is traversed by a county road. Agreements would be put in place such that local law enforcement authorities would block the road when notified that such a need exists, or the road relocated out of the exclusion area if required, as discussed below.	i
2.1.3.4	The definition of a low population zone (LPZ) as stated in 10 CFR 100 is: "the area immediately surrounding the exclusion area which contains residents, the total number and density of which are such that there is a reasonable probability that appropriate protective measures could be taken in their behalf in the event of a serious accident." The LPZ radius is 2.0 miles centered on the reactor for the existing GGNS Unit 1 plant (Reference GGNS UFSAR Section 2.1.3.4). The LPZ for a new facility, a 2 mile radial distance measured from the circumference of a 630 ft. circle encompassing the proposed power block location for a new facility will be essentially the same as for GGNS Unit 1. The center of the 630 ft. circle is approximately 1200 ft. west and 1000 ft. north of the GGNS Unit 1 reactor containment center.	i
2.1.3.4	The permanent population density within the LPZ radius is about 4.1 persons per sq. mile. The roads within the area will be the primary transportation routes for evacuation.	i

Table 1
SSAR Statements

2.2.2.4	Figure 2.2-4 shows the proposed location of the intake structure in the Mississippi River for a new facility on the GGNS site. This intake structure will be located near river mile marker 406 where the existing GGNS Unit 1 barge slip is located. Water from the Mississippi River would be withdrawn at this location for use as cooling tower makeup, service water cooling system makeup and other miscellaneous water uses, for a new facility at the GGNS site.	i
2.2.3.1.1	Based on an evaluation for free vapor cloud explosion, certain commodities (i.e., crude oil, gasoline, naphtha, acyclic hydrocarbons, benzene and toluene) were determined to pose some level of risk that would have to be further evaluated	i
2.2.3.1.1	The safe distance is calculated to be 1,658 feet (0.31 miles). Since the closest point of U. S. Highway 61 to GGNS site is 4.5 miles, no hazard to the plant due to an explosion on Highway 61 would be expected.	ii
2.2.3.1.2	It would be expected that, in similar fashion to current GGNS Unit 1 practices, hazardous materials stored on the ESP Site at a new facility would be effectively managed by administrative controls, and that the administrative controls in place for the GGNS Unit 1 hazardous materials storage and handling, would preclude adverse impacts to the operation of a new facility on the site.	i
2.2.3.1.2	These calculations indicated that control room personnel are not subject to the hazard of breathing air with insufficient oxygen inside the control room due to a release of hydrogen. A new facility would be located farther away from the hydrogen storage tank; thus, these conclusions are also valid for a new facility at the proposed location on the GGNS ESP Site.	i
2.2.3.1.3	The new construction areas would be cleared of trees, further minimizing the potential for forest fires near the new facility.	i
2.2.3.1.4	The proposed intake structure is located east of the river bank, and its embayment would be positioned out of the shipping channel of the river, minimizing the probability of a ship or barge colliding with the structure.	i

Table 1
SSAR Statements

2.2.3.1.5	While it is possible for spilled chemicals to be drawn into the proposed river intake, the severity is minimized since the chemicals tend to float on the surface of the water and the proposed intake screens would be located beneath the surface of the water. In the event of a spill in the vicinity of the intake structure, the river intake system could be shut down to minimize hazards to plant equipment and personnel. Appropriate independent safety-related systems would be in place to assure the safe shutdown of a new facility, in the event of a possible unavailability of raw water makeup from the river.	i
2.3.1.2.6	As an alternative, and as suggested in the ASCE publication "Snow Loads: A Guide to the Use and Understanding of the Snow Load Provisions of ASCE 7-02" (Reference 54), the given snow load can be increased to account for additional factors, including rain on snow. The load is calculated as: pf = (I) C100 pg + Crs where, pf = net roof load (psf) pg = 50-yr snow load (psf) I = importance (= maximum value of 1.2 in Table 7-4) C100 = multiplication factor for converting 50-yr to 100-yr loads (= 1.22 from SEI/ASCE 7-02 Table C7-3) Crs = additional rain-on-snow surcharge load (= 5 lbf/ft2 for <20 lbf/ft2 zones per SEI/ASCE 7-02 Section 7.10) This gives a total equivalent snow load of: pf = 1.2 * 1.22 * 5 lbf/ft2 + 5 lbf/ft2 = 12.3 lbf/ft2 The larger of these two methods produces a snow load of 16.0 psf, which will be used with extreme live loads to be considered for safety related roof structural design for the ESP facility.	iii
2.3.1.6	Any other regional meteorological or air quality conditions not discussed above, which need to be considered for design of safety related structures, systems and components of a new facility will be determined and evaluated as required by 10 CFR 52.	ii
2.3.2.2	The proposed new facility would utilize cooling towers, so that the vast majority of rejected heat would go to the atmosphere. The amount of heat rejected to the high volumetric flow of the Mississippi River would be relatively small, causing a concomitantly small impact on local meteorology.	i

Table 1
SSAR Statements

2.3.2.4	Site specific data was used for determination of atmospheric dispersion and diffusion estimates as discussed in Sections 2.3.4 and 2.3.5 of this report and is indicated for the UHS design basis. In general, however, given the size of the database from which to draw, regional rather than local meteorological and air quality conditions would be used for the design and operating bases of the ESP facility.	i
2.3.5.2	Joint frequency distribution tables were developed from the hourly meteorological data with the assumption that if data required as input to the XOQDOQ program (i.e., lower level wind direction and wind speed, and temperature differential as opposed to upper level wind direction and wind speed) was missing from the hourly data record, all data for that hour would be discarded. This assumption maximizes the data being included in the calculation of the χ/Q and D/Q values.	i
2.4.1.1	The Universal Transverse Mercator (UTM) Grid Coordinates for the center of the location of the power block area for a new facility is approximately N3,543,261 meters and E684,018 meters. The proposed location for the power block area for the new facility is west of the main plant access road (Figure 2.4-1). The grade elevation for a new facility will be established in consideration of requirements to provide flood protection for associated safety-related structures, systems and components.	i
2.4.1.1	Makeup (cooling tower makeup and other raw water needs) and normal service water for a new facility would be supplied from the Mississippi River via an intake located on the east bank of the river and on the north side of the existing barge slip (Figure 2.1-1).	i
2.4.1.1	Effluent from a new facility would be combined with that from the existing GGNS Unit 1 facility, and the combined effluent would be discharged into the river downstream of the intake such that recirculation to the embayment area and intake pipes would be precluded.	i
2.4.1.1	Emergency cooling water (ultimate heat sink) for a new facility would be provided by closed-cooling system(s) that utilize enclosed basins with mechanical draft cooling towers or similar heat removal mechanisms. This emergency cooling system would not be reliant on the river intake, with the possible exception of normal (non-emergency operation) makeup water supply.	i

Table 1
SSAR Statements

2.4.1.1	The plant yard for a new facility would likewise be graded such that runoff is directed away from buildings. The two streams, A and B, would be used for directing runoff away from new facility areas and buildings, to the maximum extent possible, and eventually to the Mississippi River.	i
2.4.2.2	Safety-related structures, systems, and components for a new facility would be designed to withstand the worst flooding caused by an appropriate combination of several hypothetical events, as required by GDC-2. The events to be considered would include: probable maximum flood (PMF) of the Mississippi River coincident with wind-generated waves (Section 2.4.3.6); seismic failure of upstream dams coincident with the U. S. Army Corps of Engineers design-project flood (DPF) (Section 2.4.4); ice flooding (Section 2.4.7); and PMF of the two small streams adjacent to the plant (Section 2.4.3.3). The elevation of the structures of a new facility would be well above the Mississippi River DPF, eliminating Mississippi River flooding concerns from the design of safety-related structures, systems and components. Therefore, the event which will control the facility flood design is the probable maximum precipitation (PMP) on the watersheds for the site (Section 2.4.2.3).	i
2.4.2.2	A similar evaluation, by the COL applicant, would be required for a new facility in addition to establishment of the final site grade, plant location and design and design of ESP facility and site drainage systems.	iii
2.4.2.2	All safety-related systems, structures and components (SSCs) for the new facility would be located above maximum flood elevation, or flood protection would be provided such that the requirements of GDC-2 and 10 CFR 100 would be met.	ii

Table 1
SSAR Statements

2.4.2.3	The effects of local intense precipitation on the GGNS Unit 1 site have been evaluated in the GGNS UFSAR (Reference 8). This information has been reviewed and is considered to be not directly applicable for the determination of maximum floodwater elevation for a new facility on the ESP site. Newer probable maximum precipitation (PMP) standards published since GGNS Unit 1 was licensed indicate higher levels of local intense precipitation for the site, and as noted in Section 2.4.1.1, the proposed location of the power block for the new facility is to the west the site access road and downstream of Streams A and B main discharge culverts under the access road. Therefore, final local PMP flood height determination for the ESP site will need to be determined after the plant design is finalized, exact location determined, and site grading and drainage has been designed. Sections of the GGNS UFSAR which discuss the GGNS Unit 1 PMP analysis are included below (material quoted from the GGNS UFSAR is presented in italics font). Updated PMP information as would be needed for evaluation of flooding concerns for a new facility on the ESP site is also presented.	i
2.4.2.3	Consistent with the GGNS UFSAR, the position regarding Regulatory Guide 1.59 (as described in UFSAR Appendix 3A) remains unchanged for the ESP facility; the PMF for the two local streams close to the plant site will be estimated based on the unit hydrograph method in accordance with Regulatory Guide 1.59 (Reference 8).	iii
2.4.2.3	Since the receiving water bodies (Streams A and B downstream from Culverts 1 and 9) are expected to be capable of accommodating PMP-event flows from the ESP site without flooding the site, the potential and extent of flooding from a local PMP event for the ESP site will be dependent upon facility design, final grade and drainage system design. Final ESP site drainage systems may employ a number of techniques including grading slopes to efficiently move runoff water, additional drainage channels, etc. However, given the basic topography, this assessment concludes that the ESP site power block area is favorably located for adequate site drainage. It is, therefore, reasonable to expect that a fully-effective drainage system can be designed at COL.	iii
2.4.2.3	The new facility construction area for the power block would be primarily located in Basin A and Basin B drainage areas, except for a small area located on the southwest corner of the proposed construction site.	i

Table 1
SSAR Statements

2.4.2.3	It is reasonable to expect that the PMP driven floodwater elevation of Streams A and B, at the locations adjacent to the ESP power block site, would be substantially less than that of the proposed ESP site grade of approximately 132.5 ft msl.	i
2.4.2.3	In general, the final graded ESP site with this configuration, taking full advantage of the current topography, would be provided with more than adequate runoff capability to the north and south with flow directed to Streams A and B.	i
2.4.2.3.2	The Basin A and B drainage areas would remain the same, the length of the longest watercourse would not be altered, and the overall slope would be unchanged in an ESP site analysis. Thus, the runoff model is considered representative of that required for a new facility in the proposed location on the ESP Site. However, the unit hydrograph shown in Figure 2.4-12 for the GGNS Unit 1 analysis would change due to the increase in the PMP values indicated in Section 2.4.2.3 above.	i
2.4.2.3.3.1	Finished grade for a new facility would be sloped away from buildings. A storm drainage system for a new facility would be designed to carry the 100-year runoff. Storm runoff for the new facility would be carried away from the plant area by a storm drainage system consisting of appropriate combinations of swales, open channels, subsurface system(s) of catch basins and pipes, and culverts. Runoff from a new facility would then be routed to streams A and B, and would subsequently drain to either Lake Hamilton or Lake Gin, as appropriate …	i
2.4.2.3.3.2.4	Similarly, with regards to maximum flooding considerations, the localized intense precipitation due to winter PMP at the plant site would not affect the design of any new safety-related facilities at the GGNS ESP Site.	i
2.4.3.5.1	The maximum PMF water surface elevation from a Mississippi River flood would not affect any safety-related structures, systems or components of a new facility at this location.	i
2.4.3.5.2	Given the PMP values determined for the ESP site, using HMR 52, and in consideration of (the lack of) definition the final site grade, plant design and design of ESP facility and site drainage systems, a similar evaluation for Stream A would be required, by the COL applicant, for a new facility on the ESP site.	i

Table 1
SSAR Statements

2.4.3.5.2	Given the PMP values determined for the ESP site, using HMR 52, and in consideration of (the lack of) definition the final site grade, plant design and design of ESP facility and site drainage systems, a similar evaluation for Stream B would be required, by the COL applicant, for a new facility on the ESP site.	i
2.4.3	Potential impact to a new facility relative to bank stability would be evaluated as required in the final design, …	i
2.4.10	Safety-related SSCs for a new facility would be located above maximum flood elevation, or flood protection would be provided such that the requirements of GDC-2 and 10 CFR 100 would be met.	ii
2.4.11.2	Makeup and service water for a new facility would be supplied by an intake located on the east bank of the Mississippi River on the north side of the existing barge slip. A new facility would require a maximum makeup flow rate of approximately 85,000 gpm of water …	i
2.4.11.2	…., the maximum expected withdrawal for a new facility would be approximately 0.2% of the minimum historical flow. Design details of the intake would consider the minimum river level for location of inlet screens.	i
2.4.11.2	… , emergency service water (the ultimate heat sink) for a new facility provided from closed-loop systems utilizing basins, which would not rely on the river intake for cooling capability, would be unaffected by the low river stage.	i
2.4.11.3	The owner of a new facility would be required to coordinate with the Corps of Engineers, and obtain permits from the Corps and/or appropriate regulatory agencies for construction of the embayment and intake structure when the final design of the embayment and intake structure and its exact location are defined. The design and placement of the embayment and intake structure would be in accordance with the Corps of Engineers guidance, MDEQ and EPA requirements, and good engineering practice.	ii
2.4.11.4	Makeup to the normal heat sink cooling towers, balance of plant cooling systems (e.g., plant service water), and other raw water makeup needs of a new facility would be supplied from an intake located on the east bank of the Mississippi River …	i

Table 1
SSAR Statements

2.4.11.4	The intake structure would include necessary intake screens, pumps, etc., to convey the river water to a system of clarifiers or other type cleanup equipment before its use in the facility.	i
2.4.11.4	Normal makeup flowrate to the plant would be approximately 50,320 gpm, and maximum expected makeup flow is approximately 85,000 gpm.	i
2.4.11.4	Using the most conservative minimum flow value at Vicksburg of 93,800 cfs (Section 2.4.11.3), the facility withdrawal would be about 0.2% of the minimum river flow. Intake and embayment final design would include consideration of sedimentation and littoral drift influence on the ability to provide the necessary facility makeup water.	i
2.4.11.4	The normal heat sink circulating water system for the new facility, if required, would be a closed-cycle type system coupled with either hyperbolic natural draft wet cooling towers or mechanical draft wet cooling towers.	i
2.4.11.4	Effluent from a new facility would be combined with that from the existing GGNS Unit 1 facility, and would be discharged into the river downstream of the new facility intake such that recirculation to the embayment area and intake screens of the new facility would be precluded.	i
2.4.11.4	Emergency cooling water for a new facility would be provided from separate closed-loop cooling system(s) which utilize storage basins with mechanical draft cooling towers, and which would not be reliant on the source of water from the river intake, except for normal (non-emergency operation) makeup.	i
2.4.11.4	The final location for the embayment and intake structure would be chosen such that there would be inconsequential interference, if any, with the pumping ability of the surrounding existing GGNS Unit 1 radial collector wells.	i
2.4.11.5	Makeup and non-emergency cooling water (e.g., plant service water) for a new facility would be provided via an intake on the east bank of the river.	i

Table 1
SSAR Statements

2.4.11.5	Emergency cooling (the ultimate heat sink) for a new facility would be provided from closed-loop cooling system(s) which utilize basins and mechanical draft cooling towers, and which would not be reliant on the source of water from the river intake for cooling.	i
2.4.12.1.3.1	Makeup (cooling tower makeup and other raw water needs) and normal service water for a new facility would be supplied from the Mississippi River via an intake located on the east bank of the river on the north side of the existing barge.	i
2.4.12.1.3.1	Ground water would likely be utilized for general plant water uses including potable, sanitary, fire protection, demineralized water, and landscape maintenance.	i
2.4.12.1.3.1	Since the existing GGNS Unit 1 facility ground water wells would not have adequate capacity for a new facility, the installation of additional wells (likely in the Catahoula formation) for these purposes would be necessary, if ground water is the desired source.	i
2.4.12.1.3.2	The installation of an additional well(s) would be required for construction purposes.	i
2.4.12.2.6	As stated in Section 2.4.1.1, makeup (cooling tower makeup and other raw water needs) for a new facility would be supplied directly from the Mississippi River.	i
2.4.12.3	A program to monitor and track radiological parameters and ground water levels for a new facility with specific well locations and well design details would be provided when the type of plant to be constructed and construction details are known.	i
2.4.13	It is conservatively assumed that the contaminants would move along fracture paths within these deposits at the same flow rate as in the adjacent terrace deposits.	i
2.4.13	The isotopic concentrations from a similar spill into the ground water from a new facility would be expected to be well below the maximum permissible concentration before they reach the Mississippi River.	i

Table 1
SSAR Statements

2.5	As recommended by RG-1.165, a site geotechnical investigation was performed to develop information on soil properties to support the ground motion Site Response analysis. These geotechnical investigations were performed following the methodologies provided in RG-1.132 and 1.138, although a full geotechnical evaluation of the site in compliance with these guides will be deferred until selection of the final plant design and footprint of the facility during the Construction and Operating License (COL) phase of the project.	iii
2.5.1.2.5	Because the Catahoula Formation claystone was encountered at a significant depth below the ESP Site (greater than 170 feet deep), unreasonably deep excavations extending well below the water table would be required to place foundations in this material.	i
2.5.1.2.5	Any excavation outside the structural walls of the plant would also be backfilled with engineered fill. All engineered fill would be compacted to a density that would preclude settlement or, should it be below the water table, liquefaction under dynamic loading conditions.	i
2.5.1.2.5.1	Quantitative determination of the overconsolidation ratio for materials underlying the proposed site location should be performed during the COL phase on the basis of additional field and laboratory testing.	i
2.5.2.3	During the COL phase additional borings, laboratory testing, and geophysical surveys will be performed to confirm the current base-case material properties as well as their variabilities throughout the site. If the COL phase investigations indicate differences in material properties that may have a significant impact on design motions, we will evaluate the need to perform additional site response analyses with the updated properties to develop revised design motions.	iii
2.5.4.1.2	During the COL phase additional borings, laboratory testing, and geophysical surveys will be performed to confirm the current base-case material properties as well as their variabilities throughout the site. The base case and additional COL borings will be used for foundation design.	iii

Table 1
SSAR Statements

2.5.4.1.4	These data show that the localized Vp velocity decrease probably is not the result of a soft or unusually weak soil horizon. In addition, most proposed foundation excavations will be near or below this zone, such that the zone will either be removed or can be over excavated and recompacted. Geotechnical investigations performed during the COL phase will provide additional verification of the soil properties within this low Vp velocity zone.	iii
2.5.4.4	Additionally, future plant structures would be founded below the loess.	i
2.5.4.5	It is not anticipated that the plant construction would significantly affect the site's static stability.	i
2.5.4.5.1	Where the average shear wave velocity exceeds 1000 feet per second, or if the bottom of the plant is located above this elevation, that the natural soils would be excavated to this elevation and replaced with engineered fill that has a minimum shear wave velocity of 1000 feet per second.	i
2.5.4.5.1	Detailed calculations of bearing capacity and settlement will be made during the COL phase of the project. Based on the known site conditions, the bearing capacity and settlement properties of the Upland Complex alluvium are expected to be suitable for a new nuclear power plant, and are not anticipated to provide any obstacles to construction.	iii
2.5.4.5.3	Design of the structure will take account of the fact that short-term lateral earth pressures will be increased by heavy compaction of the backfill. Should the plant be embedded below the water table, hydrostatic and dynamic loadings will be evaluated during the COL phase using currently accepted standards of practice.	iii

Table 1
SSAR Statements

2.5.4.6	ESP investigations show that average shear wave velocities are greater than 1000 fps below an elevation of about 97 feet, and that minimum shear wave velocities are greater than 1,000 fps below an elevation of 0 feet. Additional site investigations to be performed throughout the plant site in the COL phase will confirm the depth to reach a minimum shear wave velocity of 1,000 fps. These investigations shall include multiple methods to obtain shear wave velocity profiles (e.g., P-S suspension logging, downhole surveys, crosshole surveys) to permit a comparison between interval and average velocities measured by different techniques against the minimum velocity requirements for plant design. Soils underlying the elevation of the selected plant foundations that are found to have shear wave velocities below the design requirement will require removal and recompaction (with or without additives) and/or in situ improvement using methods such as cellular deep soil mixing or consolidation grouting to achieve the required shear wave velocity.	iii
2.5.4.6	The minimum required shear wave velocity at the foundation level for all example reactor types considered for the site is 1,000 feet per second (fps). Potential power plant foundation depths are in the range of about 35 to 140 feet (elevations 97 to -7 feet) below plant grade, depending on the type of reactor that is chosen. Additional site investigations to be performed throughout the plant site in the COL phase will confirm the depth to reach a minimum shear wave velocity of 1,000 fps. These investigations shall include multiple methods to obtain shear wave velocity profiles (e.g., P-S suspension logging, downhole surveys, crosshole surveys) to permit a comparison between interval and average velocities measured by different techniques against the minimum velocity requirements for plant design. Soils underlying the elevation of the selected plant foundations that are found to have shear wave velocities below the design requirement will require removal and recompaction (with or without additives) and/or in situ improvement using methods such as cellular deep soil mixing or consolidation grouting to achieve the required shear wave velocity.	iii
2.5.4.5.3	Design of the structure will take account of the fact that short-term lateral earth pressures will be increased by heavy compaction of the backfill. Should the plant be embedded below the water table, hydrostatic and dynamic loadings will be evaluated during the COL phase using currently accepted standards of practice.	iii

Table 1
SSAR Statements

2.5.5	Specific stability analyses will be performed during the COL phase to evaluate the stability of deep foundation excavations for future facilities at the proposed site. However, no unstable conditions or materials were found underlying the site that should cause unusual stability problems for excavations, and standard shoring techniques were successfully used to stabilize deep foundations through the loess and alluvial soils at the operating GGNS site	iii
2.5.5	It is likely that the future plant footprint will be sited at least 100 feet from the top of this possible slump feature, and the plant foundations would extend through the loess soils into underlying Upland Complex alluvium or old alluvium …	i
3.1.4.4	Floods in the river would not affect the ESP Facility, the location of which is proposed at a similar grade elevation as that of the existing GGNS Unit 1 facility, on the bluffs east of the river.	i
3.1.4.4	The ultimate heat sink for the ESP Facility would be provided from closed-loop cooling systems utilizing basin type reservoirs, and would not rely on the river intake for cooling capability. Therefore, the UHS would be unaffected by a low river stage.	i
3.1.4.4	Additional "nuclides of interest" which would require consideration in analyses at COL are discussed in Section 2.4.13.	iii
3.1.4.4	These data would be used as appropriate in the design of the ESP Facility to ensure that no hydrology related site parameters would pose an undue risk to the operation of the ESP Facility.	i
3.1.5	The nearest bank of the river is approximately 1.1 miles from the proposed location for the ESP Facility on the GGNS ESP Site. In addition, a new facility would be located on the bluffs to the east of the river.	i
3.1.5	An accidental release of toxic chemicals transported on U. S. Highway 61 would not endanger the safe operation of the ESP Facility at its proposed location on the ESP Site.	ii
3.1.5	Since the proposed location for the ESP Facility is very near to that of the existing GGNS Unit 1, no toxic hazard to the ESP Facility would be expected.	i

Table 1
SSAR Statements

3.1.6.1	Based upon the general location at the GGNS site on which the nuclear unit or units would be located; e.g., in the general vicinity of the GGNS Unit 1, there is sufficient land and distance to the site boundary and appropriate topography to implement the criteria of 10 CFR 73.55 relating to the development of a security plan.	i
3.1.6.1	It should be noted that existing commercial nuclear power plants, such as GGNS Unit 1, were designed to meet evolving 10 CFR 73.55 requirements, including effective changes in the DBT and revised DBT, on an "add-on" basis after completion of the initial physical design. Even given these circumstances, plants such as GGNS Unit 1 are capable of meeting the evolving NRC security requirements. For a plant which would be built in the future, security considerations (e.g., barriers, access, fences) would be incorporated as initial design requirements and inputs and integrated into the overall design as an important element, making it reasonable to conclude that such a facility will be able to meet NRC security requirements.	ii
3.1.6.1	Given the opportunity to design security into a new facility, the distance specified in Regulatory Guide 4.7 would be sufficient to satisfy the criteria of 10 CFR 73.55 although a larger distance could be used at the GGNS ESP site, and even a smaller distance could be accommodated.	ii
3.1.6.2	Safety-related structures necessary for the ultimate heat sink would not be located on an accessible, navigable waterway.	i
3.1.6.3	Initially, given the successful implementation of a security plan by Entergy Operations for GGNS Unit 1, there are no potential hazards in the site vicinity which would preclude the development of a security plan for the new unit or units. The new reactor or reactors will be sited at some distance from the existing GGNS Unit 1, and provisions will be made such that construction activities at a new facility will not adversely affect the ability of GGNS Unit 1 or any new operating unit to meet NRC security requirements. Similarly, the design of the security plan and defensive strategy will be such that during operation or other activities on site, the security plans of the units on site positively reinforce each other, or will be independent with regard to their individual ability to meet NRC security requirements and the design basis threat, as revised.	ii

Table 2
Environmental Report (ER)

ER Section	ER Statement	Exhibit 4 Item
1.1	Construction of a new facility on the site would result in additional alterations of the site; however, much of the new construction would be conducted in areas that were previously disturbed during construction of the existing facilities (Figures 2.1-1 and 2.4-3).	i
1.1	A new facility could have a maximum reactor thermal power level of approximately 8,600 megawatts thermal (MWt) with a maximum net electrical output of approximately 3,000 megawatts electric (MWe); final thermal power will be dependent on the reactor plant type selected for construction at the CP/COL phase.	i
1.1	The raw makeup water for the normal heat sink cooling tower(s) and other raw makeup water needs (e.g., for the service water cooling system, demineralized water makeup, etc.) would be taken from the Mississippi River as surface water via an intake structure.	i
1.1	Facility construction activities are expected to occur over a five to six year period, and would begin after obtaining a combined license (COL) or construction permit (CP); commercial operation would then occur after construction activities have been completed (and an OL obtained, if a CP had previously been received) and startup testing is completed.	i
1.1	The power block of the new facility would be located in relatively close proximity to GGNS Unit 1 which is currently licensed for commercial operation through 2024, without life extension.	i
1.1	No new transmission line rights-of-way are evaluated for a new facility at the GGNS ESP Site in this report; a new facility would be connected to the transmission system through the existing GGNS switchyard. When the specific facility design, the expected electrical output, the need for power, and primary market location(s) are established, the adequacy of the existing (at the time) T&D system to support the new facility can be determined. If, at that time, additional changes to the T&D system were warranted, the associated environmental impacts would be evaluated (see Section 3.7).	i

Table 2
Environmental Report (ER)

1.1	Conceptual provisions included in the arrangement of a new facility, to minimize impact on GGNS Unit 1, include: • The location of the new power block area and other construction areas would be chosen so as not to adversely impact the operation of GGNS Unit 1. • The grade elevation of the yard for the new facilities would be such that runoff during periods of maximum rainfall would not create flooding concerns for GGNS Unit 1. • The location of a new cooling tower or tower(s) would be selected considering fogging and icing, etc.	i
1.1	The raw makeup water for the normal heat sink cooling tower(s) and other raw makeup water needs (e.g., for the service water cooling system, demineralized water makeup, etc.) would be taken from the Mississippi River as surface water via an intake structure. GGNS Unit 1 utilizes a radial well system located at the shoreline of the Mississippi river. Removing surface water from the Mississippi River via an intake structure would not adversely impact the operation of the GGNS Unit 1 radial wells.	i
1.1	Power block equipment, systems or structures would not be shared between a new facility and GGNS Unit 1. The existing GGNS Unit 2 switchyard would be utilized to connect the electrical output of a new facility to the existing transmission system.	i
2.2.1.1	System Energy Resources, Inc. (SERI) has acquired and will maintain surface ownership of all the land within the GGNS plant site property boundary, with the following exceptions (Reference 12):	i
2.2.1.2	Furthermore, they would be prohibited from drilling any oil or gas well until a permit is issued by the State Oil and Gas Board following a notice and public hearing. Since SERI and SMEPA own, and Entergy Operations controls, substantially all of the minerals on the site, SERI and Entergy Operations would attend any hearings and would have the opportunity to object to the drilling and/or the location of any potential well.	i

Table 2
Environmental Report (ER)

2.2.2	This portion of the switchyard would be used, with modifications as required, for a new facility's switching equipment and connection to existing transmission line(s). The existing transmission lines would be utilized for a new facility as discussed in Section 3.7.	i
2.3.1	Plant makeup (cooling tower makeup and other raw water needs) for a new facility would be supplied from the Mississippi River via an intake structure located on the east bank of the river and on the north side of the existing barge slip.	i
2.3.1	Emergency cooling water (ultimate heat sink) for a new facility would be provided from closed-cooling systems which utilizes enclosed basins with mechanical draft cooling towers, or similar heat removal mechanisms, and would not be reliant on the source of water from the river intake, with the possible exception of normal makeup.	i
2.3.1	Effluent from a new facility would be combined with that from the GGNS Unit 1 facility, and the combined effluent would be discharged into the river downstream of the intake such that recirculation to the embayment area and intake pipes would be precluded.	i
2.3.1.1.1	[SERI] will be required to coordinate with the Corps of Engineers and/or other appropriate regulatory agencies and obtain permits for construction of the embayment and intake structure when the final design of the intake structure and its exact location are defined.	ii
2.3.1.1.1	The design and placement of the embayment and intake structure will be in accordance with the Corps guidance, MDEQ and EPA requirements, and good engineering practice.	ii
2.3.1.1.1	The final location and design of the embayment and intake structure would be chosen such that there would be inconsequential interference, if any, with the pumping ability of the existing GGNS Unit 1 radial wells.	i
2.3.1.1.2	The plant yard for a new facility would be graded such that runoff is directed away from existing site buildings, and away from buildings for a new facility.	i

Table 2
Environmental Report (ER)

2.3.2.1	Makeup to the normal heat sink cooling towers, balance of plant cooling systems (e.g., plant service water), and other raw water makeup needs for a new facility would be supplied by an intake structure located on the east bank of the Mississippi River at the location of the existing barge slip.	i
2.3.2.1	The intake structure would include intake screens, pumps, etc., to convey the river water to a system of clarifiers or other type cleanup equipment before its use in the facility.	i
2.3.2.1	Normal makeup flow rate to the new facility would be approximately 50,320 gpm, and maximum expected makeup flow is approximately 85,000 gpm. Figure 2.3.29 is a water use diagram that illustrates specific uses of this makeup water, and amounts required. Using the most conservative minimum flow value at Vicksburg of 93,800 cfs (Section 2.3.1.1.4), the facility withdrawal would be about 0.2% of the minimum flow.	i
2.3.2.1	Intake and embayment final design will consider the influence of sedimentation and littoral drift on the ability to provide the necessary makeup water.	i
2.3.2.1	Effluent from a new facility would be combined with that from the existing GGNS Unit 1 facility, and would be discharged into the river downstream of the intake such that recirculation to the embayment area and intake pipes would be precluded.	i
2.3.2.1	Detailed design of the discharge structure would include appropriate consideration of the river conditions at the location of the discharge.	i
2.3.2.1	The new facility owner would be required to coordinate with the Corps of Engineers and obtain permits from appropriate regulatory agencies for construction of the embayment and intake structure when the final design of the embayment and intake structure and its exact location are defined.	ii

Table 2
Environmental Report (ER)

2.3.2.1	Emergency cooling water for a new facility would be provided from separate enclosed cooling system(s) which utilize basins with mechanical draft cooling towers, and which would not be reliant on the source of water from the river intake, with the possible exception of normal (non-emergency operation) makeup water supply. Therefore, low river water conditions would not impact the ability of the emergency cooling water systems and the ultimate heat sink to provide the required cooling for normal operations, anticipated operational occurrences and emergency conditions.	i
2.3.2.1	The final location for the embayment and intake structure would be chosen such that there would be inconsequential interference, if any, with the pumping ability of the surrounding existing GGNS Unit 1 radial wells.	i
2.3.2.1	This lateral line is located at a depth of about (-) 40 ft. msl, which is well below the depth of excavation which would be required for a river intake (estimated at about 10 ft. msl).	i
2.3.2.2	Makeup (cooling tower makeup and other raw water needs) for a new facility would be supplied from the Mississippi River via an intake located on the east bank of the river and on the north side of the existing barge slip.	i
2.3.2.2	The expected maximum consumption of groundwater for these uses is approximately 3,570 gpm (Table 3.0-1). The installation of additional wells in the Catahoula formation for these purposes would be necessary.	i
2.4.1.2.3	Eagles nesting on site would be largely protected from shooting, development and habitat alteration, and other human disturbance that usually accounts for mortality and reduced breeding success elsewhere.	i
3.1.2	Building structures and site arrangement would be designed and constructed in a manner which is aesthetically pleasing, and if possible, consistent with existing architecture at the site.	i
3.2	Specific plant design characteristics would be described in the appropriate design documentation.	i
3.2	Design life for a new facility would be 60 years (Table 3.0-1), and initial operating life would be 40 years based on current regulations.	ii

Table 2
Environmental Report (ER)

3.3	The majority of raw water would be withdrawn from the Mississippi River via an intake structure located at the river shoreline (proposed location is adjacent to the existing barge slip for GGNS Unit 1).	i
3.3.1.1	Expected average blowdown from the NHS cooling tower(s) is 12,800 gpm, and maximum blowdown is given as 39,000 gpm in Table 3.0-1. This blowdown would be directed to an outfall that would discharge to the Mississippi River as shown in Figure 2.1-1.	i
3.3.1.2	For those plant designs that require it, a service water system (SWS) would be used to remove heat from balance of plant (BOP) auxiliary equipment.	i
3.3.1.2	For a once through open loop type cooling system, after its use in heat removal from the BOP equipment, the discharged SWS water would be routed to the NHS cooling tower(s) basin to supplement the makeup water requirements for the NHS cooling tower(s); any excess flow would be routed back to the Mississippi River. The maximum flow requirements for makeup water for the NHS cooling tower(s), 78,000 gpm, would bound the maximum flow requirements for a once through open loop type SWS (estimated to be less than half of the NHS requirements); therefore, the once through open loop type SWS would not require additional raw water usage above that required for the NHS.	i
3.3.1.2	For a closed loop type cooling system, the SWS cooling pond or tower(s) would require makeup water to replenish water losses due to evaporation, drift (in the case of cooling towers), and blowdown. Blowdown from the pond or cooling tower(s) would be routed to the NHS cooling tower(s) basin or mixed with the NHS cooling tower(s) blowdown. The flow requirements for makeup and blowdown flow for the closed loop type SWS would be negligible compared to the NHS cooling tower(s) makeup and blowdown requirements and are, therefore, considered bounded by the NHS cooling tower quantities discussed previously.	i
3.3.1.3	Blowdown would be directed to an outfall and discharged to the Mississippi River, combining with the NHS cooling tower blowdown before discharging to the river.	i

Table 2
Environmental Report (ER)

3.3.2.1	A makeup water system would supply the required raw water for the circulating water system (Normal Plant Heat Sink - NHS), the SWS, the Ultimate Heat Sink (UHS), the demineralized water system, the fire protection system and other miscellaneous raw water supply needs. The source of raw water for a new facility is an intake on the Mississippi River. Clarifiers, or other filtration equipment, would remove suspended solids from the Mississippi River water.	i
3.3.2.1	Clarified/filtered effluent would be then used as makeup to the various plant cooling systems. A polyelectrolyte (or similar additive) is expected to be utilized in the clarifiers to enhance flocculation and settling of suspended solids, as required.	ii
3.3.2.1	Waste sludge or solids from the treatment process would be disposed of according to current regulations in effect at the time of operation of the new facility.	i
3.3.2.2	A non-oxidizing biocide, if used, would be added to achieve a concentration at or below the allowable NPDES (environmental) discharge limits to prevent the interruption of circulating water blowdown flow. The circulating water blowdown flow would be controlled to maintain proper circulating water system conductivity and chemical content.	ii
3.3.2.2	Discharge of free available chlorine to the river would be minimized by controlling the addition of hypochlorite solution so that the free available chlorine concentration in the cooling tower blowdown would not exceed NPDES Permit limits. Chlorine residuals would be monitored to determine the optimum chlorine residual to be maintained and to ensure NPDES Permit limits are not exceeded in the discharge.	ii
3.3.2.2	The methods and chemicals required for the control of the NHS water chemistry and prevention of long-term corrosion and biological fouling are not known at this time, but would be in accordance with applicable regulations and permits authorizing such treatment at a new facility on the GGNS ESP Site.	ii
3.3.2.3	The water quality of the SWS would be controlled in order to minimize scaling, corrosion, and biological fouling.	ii

Table 2
Environmental Report (ER)

3.3.2.3	For a once through type cooling system, the discharge from the SWS would be directed to the NHS cooling tower basin(s) to supplement makeup for the NHS cooling tower(s). Any blowdown will be in strict accordance with NPDES Discharge Permit limits and requirements.	ii
3.3.2.4	The UHS cooling tower(s) will be provided with chemical treatment that prevents biological fouling, scaling and system corrosion.	i
3.4	The new facility would have various cooling systems.	i
3.4.1.1	The NHS will be comprised of a closed loop circulating water system, pumps, water basin and cooling tower(s).	i
3.4.1.1	The main condenser for each unit of a new facility would reject heat to the atmosphere at a rate of approximately 10.7 x 109 Btu/hr during normal full-power operation (Table 3.0-1). Water from the circulating water system (NHS) is pumped through the condenser and then to the cooling tower(s) where heat, transferred to the cooling water in the condenser, is dissipated to the environment (the atmosphere) by evaporation.	i
3.4.1.1	During the heat dissipation process, where some water is evaporated, an increase in the solids level in the NHS cooling tower(s) would result. To control solids levels or concentrations, a portion of the recirculated water must be removed, or blown down. In addition to the blowdown and evaporative losses, a small percentage of water in the form of droplets (drift) is lost from the cooling tower(s). Water pumped from the Mississippi River (Section 3.3) intake structure would be used to replace water lost by evaporation, drift and blowdown from the cooling tower(s). Blowdown water is returned to the Mississippi River via an outfall on the river shoreline (Section 5.3.2). A portion of the waste heat is thus dissipated to the Mississippi River through the blowdown process. The bounding quantity of NHS cooling tower blowdown for a new facility is 39,000 gpm.	i
3.4.1.1	During other operating modes, heat dissipation to the environment would be less than the bounding values for the full-power operational mode for the NHS.	i

Table 2
Environmental Report (ER)

3.4.1.2	For those plant designs that require it, a SWS would be used to remove heat from balance of plant (BOP) auxiliary equipment. The SWS would reject approximately 83 x 106 Btu/hr per unit to the atmosphere during normal plant operation and approximately 296 x 106 But/hr per unit during plant cooldown.	i
3.4.1.2	A once through open loop type cooling system would be comprised of heat exchangers and a continuous water source, i.e., the Mississippi River water intake structure. Treated river water would be circulated through the BOP loads, where it would remove the dissipated heat, and then be discharged to the NHS cooling tower(s) basin to supplement the makeup water requirements for the NHS cooling tower(s); any excess flow would be routed back to the Mississippi River. The maximum flow requirements for makeup water for the NHS cooling tower(s), 78,000 gpm, would bound the maximum flow requirements for a once through open loop type SWS (estimated to be less than half of the NHS requirements), therefore, the once through open loop type SWS would not require additional raw water usage above that required for the NHS.	i
3.4.1.2	A closed loop type cooling system would be comprised of pumps, heat exchangers, a water basin and cooling tower(s) or a pond. The cooling water in a closed loop type SWS would be circulated through the BOP loads and then through the cooling tower(s) or pond. The SWS cooling tower(s) or pond would dissipate the heat from the BOP loads to the atmosphere primarily through evaporation of water. The evaporation would increase the concentration of chemicals and solids in the SWS, and periodic blowdown to the Mississippi River or NHS cooler tower basin(s) would be required to maintain the desired concentrations. The SWS cooling tower(s) or pond would require makeup water to replenish water losses due to evaporation, drift (in the case of cooling towers), and blowdown. The flow requirements for makeup and blowdown flow for a closed loop type SWS would be negligible compared to the NHS cooling tower(s) makeup and blowdown requirements and are, therefore, considered bounded by the NHS cooling tower quantities discussed previously.	i
3.4.1.3	The UHS would reject approximately 411.4 But/hr per unit to the atmosphere during plant cool down.	i

Table 2
Environmental Report (ER)

3.4.1.3	A closed-loop UHS for the new facility would be comprised of pumps, heat exchangers, dedicated water basin and cooling tower(s). Water from the UHS basin would be pumped through the associated equipment or heat exchangers and then to the UHS cooling tower(s) where heat, transferred to the cooling water in the equipment or heat exchangers, is dissipated to the atmosphere by evaporation. Blowdown to the river would be used to maintain the concentration at the desired level. Blowdown flow from the UHS would be at a maximum of 1,700 gpm at a temperature of 95 °F (Table 3.0-1).	i
3.4.2.1	The NHS would be a closed-loop system consisting of a circulating water system and cooling tower(s) and the SWS (for balance of plant loads) would be either a closed loop or open loop system. Makeup water to the cooling tower(s) and supply or makeup water for the SWS will be withdrawn directly from the Mississippi River through an intake structure on the river shore, at or near the existing GGNS barge slip location (Figures 2.2-1 and 5.3-1). 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 (Figure 2.1-1).	i
3.4.2.1	The river water intake and makeup water system would be composed of three main parts: river intake screens and makeup water suction pipelines from the embayment, a dry pit pumphouse structure, and piping routed from the pumphouse structure to clarifiers or other filtration equipment at the plant site.	i
3.4.2.1	The embayment slopes would be covered by riprap, or other means, to minimize erosion by river currents and to protect the integrity of the embayment.	i
3.4.2.1	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 sized so that the average intake through screen flow velocity would be less than approximately 0.5 fps as required by the Clean Water Act, Section 316(b) (Reference 2). The screens would provide an effective means of minimizing organism mortality from impingement and entrainment.	i

Table 2
Environmental Report (ER)

3.4.2.1	The embayment would be configured to minimize the amount and rate of sediment deposition and littoral debris carried into the embayment. The base of each intake screen would be at an elevation that would give sufficient separation to the embayment dredged bottom such that dredging due to sedimentation would not be required frequently (*e.g.*, not more frequent than once per year).	i
3.4.2.1	A new facility would require a small amount of water withdrawal from the river relative to normal river flow.	i
3.4.2.1	Dredging would be required to form the embayment. The embayment bottom would be at approximately elevation 15 ft msl. The final embayment design and configuration, however, would be based on actual river conditions and final selected location. Entrance to a pumphouse structure will be located at or above the Mississippi River Project Design Flood level to protect the equipment housed and allow access in high water conditions.	i
3.4.2.2	An effluent (cooling tower(s) blowdown, excess service water return, etc.) discharge would be located downstream from the embayment and inlet screens to avoid recirculation of effluents into the river water intake. An outfall diffuser, located at the termination point of the discharge line, would be used to enhance distribution and cooling of the effluent, and to minimize thermal impacts to the river in the area of the discharge outfall.	i
3.4.2.3	Heat dissipation from the NHS, SWS and UHS would occur through the use of cooling tower(s) and blowdown and/or discharge to the Mississippi River via an outfall diffuser as discussed above.	i
3.4.2.5	The SWS would reject approximately 83 x 106 Btu/hr per unit, or group of modules, to the atmosphere during normal operation, and approximately 296 x 106 Btu/hr per unit, or group of modules, during plant cooldown.	i
3.4.2.6	The UHS would reject approximately 411.4 x 106 But/hr per unit to the atmosphere during plant cooldown. Blowdown flow from the UHS would be at a maximum of 1,700 gpm at a temperature of 95 °F.	i

Table 2
Environmental Report (ER)

3.5.1.2	There would be a total annual average release of 6,200 Ci/yr of tritium (in the form of tritium oxide) included with the bounding release activity. (Table 3.0-8)	i
3.5.2	Liquid radwaste system design will be such that water which is discharged to the environment shall result in radioactive releases which conform to the "as low as reasonably achievable" requirements of 10 CFR 50.34a.	ii
3.5.3	Gaseous radwaste system design, including ventilation systems exhaust systems, will be such that radioactive gases which are discharged to the environment from these systems shall result in radioactive releases which conform to the "as low as reasonably achievable" requirements of 10 CFR 50.34a.	ii
3.5.5	Radiation monitoring instrumentation will be provided at radioactive liquid and gaseous effluent release points.	ii
3.6.1	The chemical concentrations within effluent streams from a new facility would be controlled through engineering and operational/administrative controls in order to meet NPDES requirements at the time of construction and operation.	ii
3.6.1.1	The circulating water system would be operated so that the concentration of solids in the circulating water would typically be approximately four times the concentration in the make-up water (i.e., four cycles of concentration). The concentration ratio would be sustained through the use of blowdown of the circulating water from the cooling system(s) to the Mississippi River. Cooling tower(s) makeup water would replenish water lost through blowdown and evaporation. The addition of an acid (e.g., sulfuric) would maintain the required pH and would control scaling.	i
3.6.1.1	The types of chemicals which would increase in concentration due to the recirculation of blowdown water may include, but are not limited to the following: chromium, copper, iron, zinc, phosphate, and sulfates.	i
3.6.1.1	The makeup water would be withdrawn from the Mississippi River. Waste solids from these treatment processes would be either dewatered and transported to an approved onsite or offsite landfill.	i

Table 2
Environmental Report (ER)

3.6.1.1	Any liquid releases would be in compliance with an approved NPDES permit.	ii
3.6.1.3	To minimize undesirable slime and algae growths in the circulating water and plant service water systems, a biocide, most likely a sodium hypochlorite solution, would be added intermittently. The dosage of biocide would be adjusted to keep residuals in the blowdown within permissible regulatory limits.	i
3.6.2	A permanent sanitary waste system would be provided for the operational phase of the proposed project. The system would be designed solely to treat domestic waste. Industrial materials, such as chemistry laboratory wastes, 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 and would comply with future NPDES permit requirements.	i
3.6.2	Effluent discharges are regulated under the provisions of the Clean Water Act and the conditions of discharge for the plant would be specified in the NPDES permit.	ii
3.6.1.1	Any liquid releases would be in compliance with an approved NPDES permit.	ii
3.6.2	The chosen sanitary waste system design would incorporate state of the art sewage treatment and disposal technologies and would comply with future NPDES permit requirements.	ii
3.6.3.1	Gaseous effluent releases would comply with Federal, State, and local emissions standards. Discharges from the chemical drainage system would comply with applicable Federal, State, and local standards in place during operation of a new facility.	ii
3.6.3.2	The final design of building structures and drainage systems would accommodate oil and other chemical disposal for potential waste streams. Drainage systems would be routed to the appropriate treatment, collection, or discharge unit, so that quantities and concentrations of discharges and/or disposal of these wastes meets applicable Federal, State, and local regulations.	ii

Table 2
Environmental Report (ER)

3.6.3.2	Non-hazardous trash would be collected and disposed of at offsite approved landfills in accordance with applicable Federal, State, and local regulations. Hazardous Wastes would be treated and disposed of in accordance with all applicable Federal, State, and local regulations.	ii
3.6.3.4	Chemical wastes from laboratory drains, equipment decontamination, and chemical additives would be collected in chemical waste sumps or approved chemical storage units. Chemical drainage system wastes 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.	ii
3.6.3.5	The design of the storm water systems for a new facility would comply with relevant federal, state, and local storm water regulations. The Storm Water Pollution Prevention Plan would account for the project design chosen. Major changes to current drainage courses at the GGNS plant are not anticipated; however, any changes in drainage would be reviewed and approved by the Mississippi Department of Environmental Quality Office of Pollution Control, the regulatory agency that enforces storm water regulations at the GGNS site.	ii
3.6.3.5	Other non-radioactive waste (i.e. paper, metals, garbage, and other non-radioactive waste) would be disposed in accordance with applicable regulations.	ii
3.6.3.5	Non-radioactive effluents would be treated, controlled, and discharged or disposed as required to meet Federal, State, and local regulations and guidelines.	ii
3.7	The power transmission and distribution (T&D) system existing at the time of the new facility startup and operation will be relied upon to distribute the electricity generated by a new facility at Grand Gulf. In support of site selection evaluation work (Section 9.3), a sensitivity analysis of the T&D system was performed to assess transmission injection capability for the new potential electrical power generation at GGNS. This study concluded that the existing T&D system is adequate for at least an additional 1311 MWe of generating capacity, provided that certain modifications were accomplished.	i

Table 2
Environmental Report (ER)

3.7	The power transmission and distribution (T&D) system existing at the time of the new facility startup and operation will be relied upon to distribute the electricity generated by a new facility at Grand Gulf.	i
3.7	If, at that time, additional changes to the T&D system were warranted, the associated environmental impacts would be evaluated.	i
3.8.2.1	Since existing packaging and transportation regulations already address those items and these regulations would also apply to these new reactor technologies, no further discussion is needed for these two conditions.	ii
3.8.2.2.1	10 CFR 51.52(a)(5) allows for truck, rail, or barge transport of irradiated fuel. The gas-cooled reactor technologies being considered plan to allow for irradiated fuel shipment by truck. However, the actual mode of shipment will be determined by DOE and may include either rail or truck shipments.	ii
4.1.1	An estimated 400 acres of the 2100-acre GGNS site would be affected by construction of a new facility (Figure 2.4-3).	i
4.1.1	Some areas of the site proposed for the new construction have been previously developed or altered for use by the existing GGNS facility. New construction would have little impact in these areas.	i
4.1.1	Acreage not containing permanent structures would be reclaimed to the maximum extent possible.	i
4.1.1	Construction activities associated with a new facility would require a construction stormwater discharge permit and stormwater pollution prevention plan (SWPPP) under federal and state National Pollutant Discharge Elimination System (NPDES) regulations. These measures would minimize construction impacts to surface water thus resulting in no change to the potential uses of these waters.	ii
4.1.1	The influx of construction workers may result in minor traffic congestion on local roadways, however this would be temporary.	ii

Table 2
Environmental Report (ER)

4.1.1	The barge slip constructed for GGNS Unit 1 would be used to offload large equipment and materials for the construction of a new facility transported by river.	i
4.1.1	There would be no adverse impact to existing railway service in the area from new facility construction activities at the GGNS site.	i
4.1.1	The recreational area likely to be the most affected by construction on the GGNS site would be the Grand Gulf Military Park. There would be an increase in traffic, noise and dust from construction activities that may affect the park. However, peak park use is on the weekend, when construction activity would likely be reduced.	ii
4.1.1	Mineral resources within the county are mainly construction sand and gravel (Reference 3). These resources would not be affected by construction of a new facility.	i
4.1.1	There would be some impact from excavation and construction of the intake structure along the river bank in the flood plain areas, but the impact is expected to be small and temporary. Additionally, trenching from the intake to the proposed power block location on the bluffs east of the river would be required to lay supply and discharge piping from the new facility.	i
4.1.1	Construction activities to be conducted within a floodplain on the site would be the water intake structure and embayment along with other items that are a part of that water intake facility. This water intake will be located at or near the existing barge slip area.	i
4.1.2	Once the facility design is finalized, appropriate analyses of transmission and distribution system adequacy will be made.	i
4.1.3	Project related construction would occur wholly within the GGNS site boundary.	i
4.1.3	If previously unknown archeological resources are discovered, data recovery efforts would be initiated in conjunction with consultation with the MDAH.	ii

Table 2
Environmental Report (ER)

4.1.4.5	The acceptable noise level of 65 dB(A) would be reached at a distance between 177 feet to 3,155 feet from the source, considering the noise range above. Assuming a construction noise level of 101dB(A) at 50 feet from the source, then the expected worse-case noise level at point 5 (approximately 4,500 feet from the proposed area of the power block for a new facility would be approximately 62 dB(A), which is below the acceptable noise level of 65 dB(A) stated in NUREG-1555.	ii
4.1.4.5	Assuming a construction noise level of 101dB(A) at 50 ft from the proposed cooling tower location, then the expected worse case noise level at the nearest property line would be approximately 75 dB(A).	ii
4.1.4.5	[t]he noise levels during the construction of the cooling towers will have minimal impact on the surroundings. Construction noise levels during construction of a new facility at the GGNS ESP site will have minimal impacts on the surrounding populace.	ii
4.1.4.5	From Table 4.1-1, continuous noise levels from construction activities at 50 ft would typically range from approximately 69 to 98 dB(A). Using the above equation, a separation distance of about 2,400 ft would be required to reduce the maximum noise level to 65 dB(A).	i
4.1.4.5	Noise level measurements would commence only if the neighboring residents or the nearby community of Grand Gulf complained of the noise.	i
4.1.4.6	Complying with applicable OSHA noise regulations will ensure that the impact on construction workers is considered to be small.	ii
4.2.1.1	Construction of a new facility on the site would result in additional alterations of the site; however, much of the new construction would be conducted in areas that were previously disturbed during construction of the existing facilities (Figures 2.1-1 and 2.4-3).	i

Table 2
Environmental Report (ER)

4.2.1.1	Construction impacts would be reduced and effectively managed by development and implementation of a site-specific construction Stormwater Pollution Prevention Plan (SWPPP). SWPPPs typically address 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.	ii
4.2.1.1	Makeup water (cooling tower makeup and other raw water needs) for a new facility would be supplied primarily from the Mississippi River via an embayment, and associated intake structure, located on the east bank of the river and on the north side of the existing barge slip. Dredging would be required to form the embayment on the Mississippi River. A temporary increase in turbidity would occur in the Mississippi River near the site during construction and dredging activities. The additional turbidity from these construction activities would likely be quickly dissipated due to the relatively high flow velocity and the large volume of water in the river. Riprap, or other appropriate means, would be used to stabilize the banks of the embayment and the river shoreline around the embayment during and following construction. These construction activities would be done in compliance with Corps of Engineer requirements, and would not affect long-term water quality.	ii
4.2.1.1	Effluent (e.g., cooling tower(s) blowdown, waste water from plant processes, etc., as shown on Figure 2.3-29) from a new facility would be combined with that from GGNS Unit 1 facility, and the combined effluent would be discharged into the river downstream of the intake embayment.	i
4.2.1.1	The intake and discharge pipelines would be constructed in a trench extending across the bottomlands from the river to the proposed location of the power block for a new facility along the heavy haul road route (Figure 2.2-1).	i

Table 2
Environmental Report (ER)

4.2.1.1	The proposed outfall, located above normal river water level, would include a concrete drainage course to the river similar to that for the GGNS Unit 1 discharge structure. Therefore, hydrologic impacts of the discharge outfall structure construction would be less than that for the embayment construction.	i
4.2.1.1	Dewatering of the power block excavation would add to the volume of Stream A and/or Stream B, but this addition would be temporary in nature.	i
4.2.1.1	New construction would result in increased runoff and silt loads to Stream A due to heavy earth moving activity and loss of vegetative cover. Construction of a pipeline extending across Stream A from the proposed cooling tower(s) area to the power block area would involve disturbance of the stream channel; however, the effect would be temporary in nature.	i
4.2.1.1	Impacts would be reduced by use of SWPPP procedures. Discharge of runoff through the two existing sedimentation basins would minimize sedimentation downstream of the construction area.	ii
4.2.1.2	A new facility would be connected to the existing transmission system through the existing GGNS switchyard, which was designed and constructed to accommodate two identical units.	i
4.2.2.1	Dredging would be required to form the embayment for construction of the intake structure on the Mississippi River, and periodic maintenance dredging may also be required.	i
4.2.2.1	A temporary increase in turbidity would occur in the Mississippi River near the site during dredging activities, but dredging operations would be in compliance with Corps of Engineer and MDEQ requirements, and would not affect long-term water quality. This temporary effect would not have a significant impact on water use or water quality.	ii
4.2.2.1	Construction of the embayment and intake structure would not impair normal river traffic, so the embayment and intake structure would not have a significant impact on navigational uses of the river.	i
4.2.2.1	Construction impacts would be reduced by development and implementation of a Stormwater Pollution Prevention Plan.	ii

Table 2
Environmental Report (ER)

4.2.2.1	Water discharges would be monitored in accordance with applicable National Pollutant Discharge Elimination System (NPDES) requirements and state water quality standards at the time of construction; therefore, impacts to local streams should be minor.	ii
4.2.2.1	None of the construction for the proposed Mississippi River intake structure would occur upstream of Gin Lake.	i
4.2.2.1	Runoff that discharges to Hamilton Lake would first pass through sedimentation basins A and B, which would retain most of the sediments transported from the new construction areas. The sedimentation basins and other control measures, such as the use of silt fences or straw bales, would minimize the increase in silt reaching Hamilton Lake.	i
4.2.2.1	Therefore, the impact to recreational users of these lakes would be minimal.	ii
4.2.2.1	Dewatering to support construction would result in disposal of the pumped water to either to the two sedimentation basins, A and B, the local floodplain, or directly to the Mississippi river.	i
4.2.2.2	Specific dewatering requirements, dewatering well locations, and well design details would be done when the new facility design and layout are finalized. Construction standards for temporary construction dewatering wells and for permanent dewatering wells would be in accordance with applicable standards published in the MDEQ ground water use and protection regulations, and necessary permits would be obtained from the MDEQ.	ii
4.2.2.2	Excavation to this depth would require dewatering of the localized area.	i
4.2.2.2	The effects of construction dewatering would be localized and would not impact offsite ground water users. Current regulations state that the MDEQ permit board may deny a permit or reduce the allowable withdrawal rate if such use would interfere with existing permitted uses or is in conflict with the public interest (Reference 4). The MDEQ would conduct a review prior to issuance of permits for new dewatering wells.	ii

Table 2
Environmental Report (ER)

4.2.2.2	[E]xisting wells would not have adequate production to supply the continuous construction water needs for a new facility, and the installation of an additional well would likely be required for construction purposes.	i
4.2.2.2	The U. S. Department of Agriculture Rural Development Office (Mississippi Office) would initially screen the project and then would refer the matter to the EPA Sole Source Aquifer Program (Reference 8). During construction of a new facility, appropriate measures would be taken to prevent introduction of contaminants into the Sole Source Aquifer.	ii
4.2.2.3	Construction of the proposed embayment and intake structure on the east shore of the river would entail temporary loss of the edge habitat of the Mississippi River in the affected areas. Permanent alteration and habitat losses would occur in the area occupied by the embayment. Construction activities directly affecting the river would center on intake embayment construction. These activities would be expected to take place during low river levels, so river biota would be exposed to minimal direct impacts.	i
4.2.2.3	Construction of the trenches for the intake and discharge pipelines would directly affect the wetlands in the floodplain. However, the construction would be primarily along the existing haul road for GGNS Unit 1 so incremental impacts to the wetland would be minimal. The pipes would be buried, so there would be no permanent alteration of water flow patterns in the floodplain.	ii
4.2.2.4	Appropriate Corps of Engineers and MDEQ permits would be obtained for construction in the floodplain and in wetland areas.	ii
4.2.2.4	Water discharges would be monitored in accordance with applicable National Pollutant Discharge Elimination System (NPDES) requirements and state water quality standards at the time of construction.	ii
4.2.2.4	Construction standards for water supply wells would be in accordance with applicable standards published in the MDEQ groundwater use and protection regulations, and necessary permits would be obtained from the MDEQ.	ii

Table 2
Environmental Report (ER)

4.3	An estimated 400 acres of the 2100-acre GGNS site would be affected by the construction of a new facility	i
4.3	This temporarily impacted land would be revegetated and allowed to return to a wild state following construction.	i
4.3.1.1	Approximately 145 acres of upland forest and approximately 105 acres of upland fields would be affected by the construction of a new facility	i
4.3.1.1	The remaining construction space in upland areas, about 90 acres, would be in areas previously disturbed by the construction of GGNS Unit 1.	i
4.3.1.1	In forested areas contractors would clear the construction area of woody vegetation and then, where necessary, fill and grade the site to create a level surface. As was the case with the construction of GGNS Units 1 and 2[3], merchantable timber would likely be sold. Debris generated during clearing would be appropriately disposed.	i
4.3.1.1	Forested areas would not be isolated. Inspection of the aerial photograph (Figure 2.4-2) indicates that there would be sufficient forested areas surrounding the construction areas and the GGNS site in general to allow movement of wildlife through the remaining forests.	ii
4.3.1.1	The land would be cleared; however, the soil stratification may be minimally disturbed.	i
4.3.1.1	Approximately 100 acres of the upland area of the GGNS site would be permanently altered (i.e., for structures, parking lots, etc.) for a new facility. The remaining acreage disturbed by construction would be revegetated or reseeded and allowed to develop back into a stable ecological community. There are standard construction techniques that would minimize long-term impacts. When clearing upland fields that would not require extensive grading, the construction contractor could scalp vegetation off at ground level, leaving the plant rootstock intact.	i

[3] The original site layout was established for two nuclear units. Construction of the second unit was halted prior to its completion; however, the majority of the Unit 2 power block buildings were completed, along with the outer cylindrical concrete wall of the reactor containment, which is partially complete. Construction of the switchyard was essentially completed for the second unit.

Table 2
Environmental Report (ER)

4.3.1.1	The remaining acreage disturbed by construction would be revegetated or reseeded and allowed to develop back into a stable ecological community.	i
4.3.1.2	The primary impact to forested and shrub-scrub wetlands in the floodplain at the GGNS site resulting from construction of the intake and discharge water pipelines would be the long-term alteration of vegetation. Approximately 30 acres of bottomland palustrine, forested, seasonally flooded wetland would be disturbed during the construction of a new facility (Figure 2.4-3). This is approximately 3% of this habitat type within the GGNS site property. The remainder of the 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).	i
4.3.1.2	Construction would temporarily displace wildlife from the affected wetland areas	i
4.3.1.2	Only stumps and roots directly over the excavation would be removed.	i
4.3.1.2	Following construction, materials used to stabilize the areas would be removed.	i
4.3.1.2	Following initial seeding, the floodplain would be allowed to revegetate naturally with native herbaceous and woody plant species. Approximately 5 acres of this area would be left to return to a natural state. Approximately 25 acres would contain permanent structures (i.e., intake and embayment) or be required to be maintained as a pipeline route to the intake and outfall structures.	i
4.3.1.2	Regeneration of trees and large shrubs would be prevented by mechanical mowing, cutting, trimming, or herbicide application, as required. To minimize permanent alteration of floodplain vegetation, only limited vegetation maintenance would take place, namely selective cutting of trees within a specified distance from the pipelines, intake structure and embayment, and maintenance of a permanent corridor centered over the pipelines for safety, and to facilitate pipeline surveys.	i
4.3.1.3	Implementation of the site specific Storm Water Pollution Prevention Plan would minimize the potential for accidental spills.	ii

Table 2
Environmental Report (ER)

4.3.1.5	Alligators occur at GGNS and are routinely removed as a personnel safety precaution. This practice would be expected to continue.	i
4.3.2	To reduce the potential for surface water contamination, fuel and other potentially toxic materials would be stored away from waterways, thereby minimizing the chance of direct surface water contamination. A Spill Prevention, Control and Countermeasures Plan specific to the construction period would provide a mechanism for immediate response and cleaning of accidental spills. Such a plan would be prepared before construction begins.	i
4.3.2.1	Installation of the new cooling water intake and discharge structures and construction of the embayment would require construction on the river shoreline. The river would receive dewatering effluent from trenching in the floodplain, runoff from the bluff area via onsite streams and Hamilton Lake, and minor, localized turbidity during construction and maintenance of the water intake and discharge structures.	i
4.3.2.1	Like construction of the barge slip for Unit 1, construction of the intake and discharge structures would be restricted to periods when river water level was low (i.e., not during flood season). Soil overburden would be removed to a spoils site or otherwise disposed. The intake and discharge pipelines would be constructed within a trench excavated across the bottomlands to the plant site on the bluff.	i
4.3.2.1	The proposed intake and outfall structures would not be located near a backwater area and would not be on the inside of a large bend in river.	i
4.3.2.1	Construction would in no way preclude or conflict with continued use of this reach of the river by recreational or commercial fishermen.	i
4.3.2.2	Proper construction practices and the use of silt fences or hay bales would also help minimize sediment input to the lakes.	i
4.3.2.4	The existing sediment retention basins and the use of silt fencing or similar techniques to minimize the release of silt to the streams, would mitigate this impact.	i

Table 2
Environmental Report (ER)

4.3.2.4	Sediment retention basins A & B are considered modifications of Streams A & B and, therefore, are also classified as "waters of the United States." Waters of the United States are under the regulatory jurisdiction of the Corps of Engineers who would issue appropriately conditioned permits for work involving these waterways.	ii
4.4.1	Construction workers would follow standard construction safety precautions and procedures; thus, potential impacts to construction workers need not be discussed further.	i
4.4.1	Except for GGNS Unit 1 structures, no other industrial, commercial, or residential structures would be directly affected by the construction of a new facility.	i
4.4.1.1	As discussed in Section 4.1, noise on the site property and in the vicinity of the GGNS site was monitored during construction of GGNS Unit 1, and the impacts of construction noise were considered to be small and of a temporary nature. Noise levels at the site boundaries are expected to be below the regulatory guidance of 65 dB(A) stated in NUREG-1555 for construction on the ESP Site. A construction noise abatement and protection program will provide required mitigative measures for noise which may, on a short term basis, exceed this guidance. Noise protection and training would be provided to GGNS Unit 1 personnel in accordance with existing safety procedures for the site, as needed	i
4.4.1.1	Traffic on Grand Gulf Road will increase substantially during the peak construction period, and will be at its peak during the morning and evening shift changes. Noise in the general area will increase from this increased traffic but the increases will be temporary, and will only occur as indicated twice per day, during the week.	ii
4.4.1.1	Noise levels at the site boundaries are expected to be below the regulatory guidance of 65 dB(A) stated in NUREG-1555 for construction on the ESP Site. A construction noise abatement and protection program will provide required mitigative measures for noise which may, on a short term basis, exceed this guidance. People are more sensitive to changes in noise levels at night, so, if necessary, blasting, along with other excessively loud construction activities would be done during daytime hours.	ii

Table 2
Environmental Report (ER)

4.4.1.2	A number of controls would be initiated to keep air emissions within applicable government standards during construction.	ii
4.4.1.2.1	Dust control measures, including wetting unpaved roads and construction areas with water during dry weather, would be implemented at the site to control excessive dust resulting from vehicle traffic. Areas cleared for construction would be mulched and/or seeded in order to reduce wind-blown dust. The concrete batch plant would be equipped with a dust-control system that would be checked and maintained on a routine basis.	i
4.4.1.2.2	Open burning would utilize technology designed to increase the efficiency of combustion while reducing smoke levels, and would be conducted in compliance with applicable air permitting requirements established by the MDEQ and in coordination with applicable fire protection jurisdictions.	ii
4.4.1.2.3	Construction equipment burning gasoline or diesel fuel would be routinely inspected and maintained to prevent excessive exhaust emissions. Equipment found to have excessive emissions would be repaired or replaced as required to meet applicable air regulations and permits in place at the time of construction. Construction activities would be conducted in accordance with the best management practices available at the time of construction. Air emissions would be controlled, as necessary, to meet the requirements of applicable air regulations and permits in place at the time of construction.	i
4.4.2.3.4	Other injuries would be treated at one of eleven hospitals located in the contiguous Mississippi Counties, depending on capacity and ability to treat specific injuries. More serious injuries would be routed to medical centers more capable of handling severe injuries including River Regional Medical Center and Parkview Hospital.	i
4.4.3.2.2	Facility construction, including temporary construction areas, would be accomplished within the boundaries of the current GGNS site. No additional land must be procured beyond the current site, and no relocations or major alterations to local off-site roads as a result of construction of a new facility would be expected.	

Table 2
Environmental Report (ER)

4.5.2	Construction activities for a new facility, at the river, would primarily be upstream of the GGNS Unit 1 release point for liquid effluents.	
4.5.4	The TLDs located on the inner ring and those on the protected area boundary would also measure dose from potentially radioactive water storage tanks such as the Condensate Storage Tank (CST). Therefore the TLD readings indicated would include any dose related to gamma radiation emanating from the CST.	
4.5.4	The ESP site would be continually monitored during the construction period and appropriate actions would be taken as necessary to ensure that the construction workers are protected from radiation exposure.	i
5.1.1	The proposed location of the cooling towers would place them approximately 1000 ft from the nearest site boundary on the north side of the site property. Drift eliminators would be incorporated into the design of the cooling towers to minimize the potential for salt deposition. The bounding estimate of salt deposition from the operation of cooling towers would be approximately 8 lbm/100-acre-month (the detailed analysis of cooling tower drift is presented in Section 5.3.3.1.3).	i
5.1.2	A new facility would utilize the existing transmission system.	i
5.1.3	Historic resources would not be impacted during the construction of the facility.	i
5.1.4	No new noise source would be created along the transmission corridor as a result of the proposed action.	i
5.2.1.1	Makeup water (cooling tower makeup and other raw water needs) for a new facility would be supplied primarily from the Mississippi River via an embayment, and associated intake structure, located on the east bank of the river and on the north side of the existing barge slip.	i

Table 2
Environmental Report (ER)

5.2.1.1	The makeup water system would supply raw water for the circulating water system (Normal Plant Heat Sink) and the Ultimate Heat Sink, and possibly the demineralized water system, potable and sanitary water systems, and the fire protection system. Table 3.4-1 provides a breakdown of estimated plant water usage, including maximum and monthly average numbers. Figure 2.3-29 is a plant water use diagram.	i
5.2.1.1	A new facility would require a maximum flow rate of 85,000 gpm of water. This is a small amount of water relative to the normal river flow. The maximum withdrawal rate for a new facility would be approximately 0.2% of the minimum historical flow.	i
5.2.1.2	The additional of one new well with similar production rates as the existing wells would be adequate to meet the maximum expected peak usage of 240 gpm.	i
5.2.1.3	Effluent from a new facility would be combined with that from the existing GGNS Unit 1 discharge, and discharged into the river at a new location downstream of the embayment to preclude recirculation to the intake pipes. The discharge structure would be constructed to minimize erosion and scouring effects. The design of the discharge structure and the flow characteristics of the receiving water both affect dilution and distribution of the discharge heat and other effluent constituents	i
5.2.1.4	Natural drainage patterns would be maintained as much as is practicable. Appropriate permits would be obtained prior to modifications to the streams, as they are considered waters of the United States. Sedimentation Basins A and B would be maintained to continue to minimize the increase in the sedimentation rate to Hamilton Lake. Discharges to Hamilton Lake would be maintained at levels acceptable under future NPDES permit requirements. Discharges to streams [A and B] would be controlled in accordance with future NPDES permit requirements.	ii

Table 2
Environmental Report (ER)

5.2.2.1	Normal makeup flow rate to a new facility would be approximately 50,320 gpm, and maximum expected makeup flow would be 85,000 gpm. As discussed in Section 5.2.1, the maximum facility withdrawal would be about 0.2% of the minimum river flow. Intake and embayment design would include consideration of the amount and rate of sediment deposition and littoral debris carried into the embayment. The embayment would be designed to minimize the potential for scouring. Periodic dredging of the embayment would be necessary during plant operation.	i
5.2.2.1	Disposal of dredge spoils would be performed in a manner acceptable to the Corps of Engineers and the Mississippi DEQ.	ii
5.2.2.1	Operation of the embayment and intake would not impair normal river traffic; therefore, the embayment and intake structure would not have an impact on navigational uses of the river.	i
5.2.2.1	The operation of the new facility would have no impact on potable water supplies in the region surrounding the GGNS site.	i
5.2.2.1	Discharges to Stream A and Stream B from a new facility would be in accordance with future NPDES permit requirements, so the impacts would not be significant.	ii
5.2.2.1	The sedimentation basins would continue to prevent runoff of increased sediments to the lake. Continued NPDES monitoring would ensure that water discharged by a new facility meets future applicable water quality standards.	i
5.2.2.2	The final location for the embayment and intake structure would be chosen such that there would be inconsequential interference, if any, with the pumping ability of the surrounding existing GGNS Unit 1 radial wells	i
5.2.2.2	A proposed well no. 6 would be located about 1000 ft. north of the existing barge slip area, well outside of the area proposed for the embayment and intake structure (refer to the Site Safety Analysis Report, Part 2, Figure 2.4-40, of this application for the approximate location for well no. 6). Operation of the makeup water system for the new facility would have no impact on the water supply of the river; therefore, production of the radial wells would not be impacted by the new facility.	i

Table 2
Environmental Report (ER)

5.2.3	The U. S. Department of Agriculture Rural Development Office (Mississippi Office) would initially screen the project and then would refer the matter to the EPA Sole Source Aquifer Program (Reference 3). During operation of a new facility, appropriate measures would be taken to prevent introduction of contaminants into the Sole Source Aquifer.	ii
5.3.1	Makeup water for a new facility would be withdrawn directly from the Mississippi River. Although the specific design details have not been finalized for an intake, it is anticipated that an intake structure and embayment would be constructed on the river shore, at or near the existing GGNS barge slip location (Figures 2.2-1 and 5.3-1). The intake would consist of "screened" makeup water intake suction pipes supplying the makeup water pumps. Sections 3.3 and 3.4 provide a discussion of the proposed intake and the raw water usage requirements for a new facility.	i
5.3.1.1.1	The embayment would be located on the east bank of the Mississippi River near the existing GGNS barge slip. Dredging would be required to form the embayment; and rip-rap, or other appropriate means, would be used to stabilize the banks of the embayment and the river shoreline around the embayment. The final embayment design and configuration would be based on actual river conditions and location.	i
5.3.1.1.1	The embayment would be configured to minimize the amount and rate of sediment deposition and littoral debris carried into the embayment. The base of each intake screen would be at an elevation that would give sufficient separation between the screens and the embayment dredged bottom, such that dredging due to sedimentation would not be required frequently (e.g., not more frequent than once per year).	i
5.3.1.1.1	Screens would be located at the entrance to each suction pipe to minimize the uptake of aquatic biota and river debris. The intake screens would be sized so that the through-screen velocity is less than 0.5 fps, as required by the Federal Register 40 CFR Parts 9, 122, et al., "Regulations Addressing Cooling Water Intake Structures for New Facilities".	ii
5.3.1.1.1	The intake pumps discharge pipelines extending from the pumphouse structure would carry the makeup water to the plant site along the heavy haul road.	i

Table 2
Environmental Report (ER)

5.3.1.1.1	Entrance to a pumphouse structure would be located at or above the Mississippi River Project Design Flood level to protect the equipment and allow access in high water conditions. The pumphouse structure will house the pumps, motors and supporting system components as well as supporting equipment and components needed for operation and maintenance of the water intake system. Figure 5.3-2 shows an elevation view of the proposed intake, suction pipelines and intake screens. The intake pumps discharge pipelines extending from the pumphouse structure would carry the makeup water to the plant site along the heavy haul road. Piping would be buried beneath a soil cover for protection from physical damage and freezing.	i
5.3.1.1.1	The makeup water intake structure and the embayment would be located away from the main channel of the Mississippi River. The intake structure would be located so as to not impair normal river traffic. A barge slip located within the embayment would be used for delivery of plant equipment during plant construction.	i
5.3.1.1.1	The new facility will require a small amount of water withdrawal relative to normal river flow; makeup flow requirements are estimated at approximately 85,000 gpm which is less than 0.2% of river flow at extreme low flow conditions - approximately 129,000cfs (57.9 million gpm) per Reference 7.	i
5.3.1.1.2	Final design of the embayment, based on good engineering practice and requirements, would minimize the amount and rate of sediment deposition and littoral debris carried into the embayment. Disposal of dredge spoils from embayment construction and spoils from periodic dredging, if required, would be performed in a manner acceptable to the U.S. Army Corps of Engineers and the MDEQ, and would be in accordance with provisions in permits required for the activity. The base of each intake screen would be at an elevation that would give sufficient separation from the embayment dredged bottom such that dredging due to sedimentation would not be required more than once per year.	i

Table 2
Environmental Report (ER)

5.3.1.2.1	The proposed intake structure is based on a design currently in use at the River Bend facility in Louisiana. As with the intake structure at the River Bend facility, the intake velocity at the screens would be 0.5 fps or lower, which meets the current requirements of Section 316(b) of the Clean Water Act.	ii
5.3.1.2.1	Intake screens will would minimize the impingement and entrainment of adult fish.	i
5.3.1.2.1	The amount of water that would be withdrawn from the river, about 0.2% at extreme low flow conditions, and the low flow velocities at the intake screens in the embayment, would result in a minimal impact on the numbers of fish larvae in the GGNS site	i
5.3.2.1	The effluent discharge from the new facility would be directly into the Mississippi River, and would be located downstream of the intake embayment to avoid recirculation of effluents into the river water intake. For this ESP evaluation, it was assumed that the effluent outfall would be located approximately 500 to 600 ft downstream of the intake screens, and at approximately 30 ft above the low water reference plane established by the U.S. Army Corps of Engineers at el. 37.5 ft msl (Figure 2.3-21).	i
5.3.2.1	Actual mixed effluent discharge temperatures would be lower than 100°F	i
5.3.2.2	The potential effects of the discharge of heated water would be effectively minimized by the use of a closed loop cooling system with cooling towers. As stated above, the effluent would flow from a shoreline diffuser at the discharge location, into the river. The proposed diffuser would be a concrete structure extending above the river water line at normal river levels.	i
5.3.2.2	Thermal discharges from a new facility would be discharged to the Mississippi River and not to any wetlands in the floodplain.	i
5.3.3	The Normal Plant Heat Sink (NHS) that will be used to dissipate heat from the turbine cycle for the new facility will utilize cooling towers to dissipate the heat directly to the atmosphere.	i

Table 2
Environmental Report (ER)

5.3.3.1	The cycles of concentration for the NHS circulating water is expected to be a maximum of 4, which will result in the concentrations in the circulating water being 4 times that of river water. The heat dissipation system for the NHS for the new facility will use either natural draft cooling towers (NDCTs) or linear mechanical draft cooling towers (LMDCTs).	i
5.3.3.1	The heat dissipated by the SWS cooling tower during plant shutdown/cooldown would be orders of magnitude less than the heat dissipated by the NHS cooling towers, and the heat dissipated by the NHS cooling towers would decrease as the plant shuts down and would be zero when the plant is shutdown; therefore, the environmental impact that would be associated with SWS system cooling tower operating in conjunction with the NHS cooling tower, or alone, is bounded by the NHS cooling tower analysis. The environmental impact that would be associated with the UHS system cooling tower operating in conjunction with the NHS cooling tower, or alone, is bounded by the NHS cooling tower analysis.	ii
5.3.3.1.2	The plume study performed for the new facility on the GGNS ESP Site (Reference 16), showed no fogging would occur for the NDCTs option and, therefore, no resulting increase in icing would occur due to the operation of NDCTs. Because any icing would be confined within the site property boundary, no adverse impact on surrounding public lands or roadways would occur.	ii
5.3.3.1.3	The towers will use drift eliminators to minimize the amount of water lost from the towers via drift.	i
5.3.3.1.4	Estimates of the total contribution to surface precipitation from cooling towers, based on a 2,200-MWe station, would be only 0.4 inches annually (Reference 28). The analysis for a new facility (Reference 16) indicates that there would be maximum of only 0.04 in./year (83,915 lbm/100 acre-month) contribution to surface precipitation from operation of the LMDCTs (the impact of the LMDCT bounds that of the NDCT).	ii
5.3.3.1.4	This type of meteorological condition occurs infrequently at the GGNS site; therefore, there is no reason to expect that a new facility's cooling towers would significantly alter local meteorology.	ii

Table 2
Environmental Report (ER)

5.3.3.2	Prevailing winds, for the most part, would preclude mixing of the plumes from the tower locations.	ii
5.3.4.1	The operation of the cooling towers for a new facility would lead to significant thermal discharges to the atmosphere and thermal discharges to the Mississippi River that could result in the increase of thermophilic microorganisms within the cooling towers themselves.	i
5.3.4.1	Both GGNS Unit 1 and a new facility would be discharging thermal effluents into a "large river."	i
5.3.4.1	The risk to public health from thermophilic microorganisms resulting from thermal discharges to the Mississippi River at the GGNS site would be minimal.	i
5.3.4.1	Although no Occupational Safety and Health Administration (OSHA) standard presently exists for the exposure to microorganisms, a new facility would employ proven industrial hygiene principles to reduce worker exposure to the adverse impacts associated with microorganisms.	i
5.3.4.1	The operation of a new facility on the ESP Site would comply with all relevant OSHA regulations. Worker safety precautions, monitoring, and testing for microbial infections would be instituted, as required.	ii
5.3.4.2	The proposed location of the cooling towers would place them approximately 1000 ft from the nearest site boundary on the north side of the site property. The resulting operational noise level from the addition of a new unit or units would not significantly increase the noise level at the property line.	i
5.3.5	The Normal Plant Heat Sink (NHS) that will be used to dissipate heat from the turbine cycle for the new facility will utilize cooling towers to dissipate the heat directly to the atmosphere.	i
5.4	It is expected that the ESP site would be monitored during any new facility construction activities and appropriate actions taken as necessary to ensure that the construction workers are adequately protected and exposure is maintained ALARA.	ii

Table 2
Environmental Report (ER)

5.4.1.1	The release of small amounts of radioactive liquid effluents is currently permitted at GGNS, and would be expected to be permitted for the new facility at the GGNS ESP Site, as long as releases comply with the requirements specified in 10 CFR 20.	ii
5.4.1.3	Based on the proposed location of the power block at the new facility, the closest distance to the site boundary would be approximately 841 meters (2760 ft.).	i
5.4.1.3	Implementation of a radiation environmental monitoring program for the new facility, compliance with requirements for maintaining dose ALARA, and attention to design of plant shielding to ensure dose is ALARA, will result in doses to the public and to construction workers due to direct radiation being minimal.	ii
5.4.2.1	GGNS Unit 1 liquid radioactive effluent is mixed with cooling tower blowdown in a discharge basin, and is subsequently discharged into the Mississippi River at the barge slip. As discussed in Sections 3.4.2 and 5.3.2, discharge from the new facility would be combined with the discharge from GGNS Unit 1 before discharging either to the Mississippi River.	
5.4.2.1	The estimates for whole-body and critical organ doses from each of these interactions are presented in Table 5.4-8. These doses are within the limits given in 10 CFR 50, Appendix I and would only occur under conditions that maximize the resultant dose. It is unlikely that any individual would receive doses of the magnitude calculated because of little or no shoreline activities at or near the GGNS site, and very limited swimming (if any) in the river downstream of the site.	ii
5.4.2.1	Table 5.4-11A provides the estimated whole-body and critical organ doses for the identified gaseous effluent pathways. These doses are within the 10 CFR 50, Appendix I criteria and would only occur under conditions that maximize the resultant dose.	ii
5.5.1.1	Disposal would comply with the requirements of any Federal, State, or local regulations in effect at the time of facility operation.	ii

Table 2
Environmental Report (ER)

5.5.1.1	Solid waste generated at the site would not be burned, buried, or deposited on site. Therefore, increased solid waste generation would not impact terrestrial ecology, soils, or groundwater at the GGNS site. Solid wastes would be collected on a routine basis by a contracted vendor. Disposal of non-radioactive solid wastes would meet the requirements of any federal, state, or local regulations in effect at the time of facility operation.	ii
5.5.1.1	The solids generated from the treatment of the raw river water would either be returned to the river or collected by a contracted vendor and disposed of at an approved landfill. Disposal would comply with the requirements of any Federal, State, or local regulations in effect at the time of facility operation.	ii
5.5.1.2.1	The various liquid waste streams resulting from operation of a new facility would be discharged to the Mississippi River through the discharge outfall as described in Section 3.4.2.2.	i
5.5.1.2.1	As is the case with GGNS Unit 1, biocide usage at a new facility would be intermittent and limited. The choice of biocides for a new facility has not been made. However, if the biocide is chlorine, as it is with GGNS Unit 1, the low concentrations of chlorine in the effluent would further dissipate or be consumed by the Mississippi River water so that beyond the immediate vicinity of the discharge the effect of the biocide on the environment would be negligible.	i
5.5.1.2.1	Through monitoring of water quality, chemical and biocide use in the operation of a new facility would be reduced as much as possible. The discharge of these chemicals would be minimized through in-plant chemical and/or physical treatment.	i
5.5.1.2.1	Therefore, waste discharges from a new facility at GGNS would be subject to limits established by the MDEQ through the NPDES permitting process. Effluents released to the Mississippi River would comply with local, state, and federal limits, and would be protective of the water quality of the Mississippi River.	ii

Table 2
Environmental Report (ER)

5.5.1.2.2	The system to demineralize water prior to its use in the various systems in a new facility would likely consist of activated carbon filters and layered resin bed demineralizers (Section 3.6.1.4). During demineralization, it is anticipated that chemicals such as sulfuric acid and caustic soda would be used to regenerate resins. The typical waste products from this system would be wastewater and spent carbon and resin beds. The waste water would be adjusted to a pH value of between 6 and 9 and released to the Mississippi River through a designated outfall. Spent resin beds would most likely be collected by a contracted vendor and disposed of in an offsite licensed land fill.	i
5.5.1.2.3	A sanitary waste system would be provided for the operations phase of a new facility. A tertiary treatment process would be conducted on site, and the effluent would be tested and discharged to the Mississippi River. The chosen sanitary waste system design would incorporate state of the art sewage treatment and disposal technologies and would comply with an approved NPDES permit.	ii
5.5.1.2.3	Effluent discharges are regulated under the provisions of the Clean Water Act and the conditions of discharge for the plant will be specified in the NPDES permit. The pollution discharge limits established for the sanitary waste effluents would be protective of the water quality of the Mississippi River.	ii
5.5.1.2.4	Discharges from floor drains would be monitored, treated, and released in accordance with applicable federal, state, and local standards in place at the time of operation of a new facility. The final design of building structures and drainage systems would accommodate oil and other chemical disposal for potential waste streams. The treated effluent would be combined with the cooling tower blowdown and released to the Mississippi River as permitted by the NPDES in place at the time. Restrictions placed on the quality of the effluent by the future NPDES permit requirements would be protective of the river; thus, impacts to the river water quality and to downstream users of river water would be expected to be minimal.	ii

Table 2
Environmental Report (ER)

5.5.1.3	During and following precipitation events, water from roof drains would flow overland or via a storm drain system, combining with general site runoff, to either Stream A or Stream B, the two drainage features for the GGNS site. The water would flow through the sediment retention basins, continue down the streams to Hamilton Lake and eventually the Mississippi River. GGNS Unit 1 currently has a Storm Water Pollution Prevention Plan that regulates the discharge of storm water and is designed to be protective of the Mississippi River. This plan would be updated, or a new plan formulated for the operation of a new facility, and would serve to minimize potential impacts from storm water runoff.	ii
5.5.1.4	The constituents of the gaseous effluents from these systems would not be determined until a technology for a new facility is chosen.	i
5.5.1.4	Gaseous effluent releases would comply with future federal, state, and local emissions standards that would be protective of the air quality in the region of the GGNS site. Thus, impacts would be minimal.	ii
5.5.1.5.1	Chemical wastes from laboratories and other sources at a new facility would be collected and disposed of off site at licensed disposal facilities. These wastes would not be released to the environment, thus no impacts would be expected.	i
5.5.1.5.2	Waste petroleum products may include fuels, such as gasoline and diesel oil, and lubricating oils and greases. Waste petroleum products would be collected and stored on site in accordance with applicable federal, state, and local regulations in effect when a new facility would be operating. Waste petroleum products would be sent to an offsite licensed facility for recycling or disposal. These wastes would not be released to the environment, thus no impacts would be expected.	i

Table 2
Environmental Report (ER)

5.5.2.2	An inspection of these storage areas for compliance with applicable RCRA standards for storage methods, including an assessment of compliance with storage facility standards of 40 CFR 264 or 265 (interim status) would be performed regularly as described in 40 CFR 264.15 and 265.15. (Reference 2). Pursuant to the regulations regarding mixed waste and the issuance of a license to operate a new nuclear power facility at the GGNS ESP Site, the ESP Applicant would develop a mixed-waste minimization plan encompassing the elements of the regulations as discussed above to ensure impacts from mixed wastes are truly minimized. The plan would address elements such as: inventory identification and control, work planning to reduce mixed waste generation. Implementation of such a plan would be scheduled consistent with commencement of operation of a new facility	ii
5.5.2.3.1	Incremental effluents and doses to members of the public should be minimal and would be subject to the same regulatory limits and enforcement as LLW.	ii
5.6	As indicated in Section 3.7, the power transmission system to which GGNS is connected at the time of a new facility startup and operation would be utilized for up to at least an additional 1311 MWe generation capacity. When the specific facility design, the expected electrical output, the need for power, and primary market location(s) are established, the adequacy of the existing (at that time) T&D system would be determined. If, at that time, additional changes to the T&D system were warranted, the associated environmental impacts would be evaluated. Impacts of operation and maintenance of the existing transmission lines and corridors to which GGNS Unit 1 is currently connected are addressed in Reference 1.	i

Table 2
Environmental Report (ER)

5.8.1.1	No changes are proposed to the existing switchyard which would alter the existing GGNS switchyard noise levels. The expected noise level at survey point no. 5 from operation of a new facility's cooling towers would be approximately 48 dB(A). FER Section 5.6.1 discussed noise impacts for GGNS Unit 1, and indicated that at survey point no. 5 on Figure 2.8-1 the maximum sound levels from the Unit 1 NDCT and switchyard would be 47 dB(A) and 50 dB(A), respectively. This would increase slightly with the addition of noise from the newly installed GGNS Unit 1 Auxiliary Cooling Tower (mechanical draft cooling tower near the Unit 1 NDCT). Therefore, it is unlikely that any noise generated by operation of a new reactor unit or units would annoy or even be audible to the nearby populace.	i
5.8.1.3	The most visually obtrusive structures at a new facility would be the natural draft cooling towers and their associated plumes. The bounding cooling tower(s) height would be approximately 550 feet. The addition and operation of [such] structures would cause only minimal additional aesthetic impacts to the site vicinity.	i
5.8.1.3	Visibility issues related to the natural draft cooling towers are associated with potential meteorological phenomena, such as cloud formation, fogging, shadowing, and additional precipitation, that may result from operation of the towers. These phenomena would be very localized and would have no effect outside the GGNS site boundary.	i
5.8.2.3.3	A new facility at the GGNS ESP Site would have a fire protection system and onsite emergency response personnel. A new Emergency Plan would be prepared for the new facility at the GGNS ESP Site.	i
5.8.2.3.3	A new Emergency Plan would be prepared for the new facility at the GGNS ESP Site.	ii
5.8.2.3.5	Additional water and sewer treatment facilities would be constructed as part of a new facility to support future operations. Because a new facility would utilize onsite water and sewer services, the operation of a new facility at the GGNS ESP Site would not burden public utilities in surrounding communities.	i

Table 2
Environmental Report (ER)

5.8.3.2.2	Operation of the new facility would result in slight contributions to radiation dose to members of the public living in the vicinity of the site, comparable to that associated with natural radiation background levels.	i
5.8.3.2.2	The evaluation of postulated accidents is provided in Section 7.1 and demonstrated that radiological consequences of these accidents would meet the site acceptance criteria of 10 CFR 50.34 and 10 CFR 100 for the exclusion area boundary and low population zone boundary. In demonstrating compliance with these criteria, an adequate level of protection would be provided. Therefore, there would be no significant adverse health impacts to the public.	ii
5.9	Per NRC regulations, no detailed decommissioning plans are required at this time. Such plans would not be required until the holder of the operating license decides to permanently cease operations. Pursuant to 10 CFR 50.82, environmental impacts associated with site-specific decommissioning activities would be documented in the site's Post-Shutdown Decommissioning Activities Report.	ii
5.9	As noted by the NRC in NUREG-1555 (Reference 5), the 10 CFR 50.33(k) certification regarding financial capability to successfully decommission the facility is not required for ESP applications but would apply to the application for the combined license per 10 CFR 52.77.	ii
Table 5.10-1	Implementation of a radiological environmental monitoring program for the new facility, compliance with requirements for maintaining dose ALARA, and attention to design of plant shielding to ensure dose is ALARA, will result in doses to the public due to direct radiation being maintained within limits.	ii
6.1	The program would be divided into three phases: pre-application monitoring (combined construction and operating license (COL) application), pre-operational monitoring, and operational monitoring.	i

Table 2
Environmental Report (ER)

6.1.2	The pre-operational monitoring program is a continuation of the pre-application monitoring program, which would be conducted during the construction stages of a new facility. This monitoring program would begin at least one year prior to anticipated operation, and would be continued until the new facility became operational. Data from this monitoring program would be utilized to establish baseline temperature data for subsequently identifying and assessing any environmental impacts resulting from plant operations. The program would address the Mississippi River temperature data requirements, with respect to expected isotherm size and extent, as established by the NPDES permitting agency, depths and characteristics of the expected mixing zones, and time-temperature relationships at any required biological monitoring stations (Section 6.5).	ii
6.1.2	A discharge outfall would be utilized for the combined discharge from both GGNS Unit 1 and a new facility. Sampling locations would be defined to ensure the maximum predicted thermal plume area is bounded by the data collected. Temperature measurements would be collected at the surface and at depth intervals and at the frequency as required by the NPDES permit.	ii
6.1.3	The operational monitoring program is a continuation of the pre-operational monitoring program, would be utilized to identify actual changes in water temperature as a result of plant operation, and would conform to applicable NPDES permit requirements at the time of operation.	ii
6.2	A similar type program would be utilized to support the pre-operational and operational monitoring needs of a new facility. Any unique characteristics required of the program for a new facility (e.g., those brought on by a new or different reactor design) would be incorporated into the program sufficiently in advance of operation of a new facility, to provide adequate baseline information prior to plant operation.	i
6.3.2	Hydrological monitoring would be done to control anticipated impacts from site preparation and construction and to detect any unexpected impacts arising from these activities. Potential increases in turbidity in the local lakes and streams from construction on the site, and in the Mississippi River from construction of the embayment and intake would be monitored for unanticipated impacts from these activities.	i

Table 2
Environmental Report (ER)

6.3.2	Ground water levels would be monitored during construction to measure perched water levels, and to evaluate potential impacts to local ground water levels.	i
6.3.2	Construction impacts would be reduced by development and implementation of a site-specific construction Storm Water Pollution Prevention Plan (SWPPP). Water quality sampling and flow measurements would be conducted as required to meet construction NPDES permit criteria.	ii
6.3.3	Pre-operational hydrological monitoring would be conducted to establish a baseline for identifying and assessing hydrologic changes resulting from future plant operation. The program would consist of reconnaissance, field sampling, laboratory analysis, and data reduction and evaluation. This monitoring would include at least one year of data collection to ensure that temporal variations such as seasonal changes have been adequately monitored. Monitoring would focus on physical, chemical, and microbial components of the hydrologic systems on the site and in the Mississippi River as required. Data from ongoing monitoring programs for GGNS Unit 1 would be evaluated and used as appropriate to support this program. The monitoring would be used to evaluate: Alteration of surface water flow fields; Alteration of ground water flow; Impact of sanitary and chemical waste retention methods on water quality; Alteration of sediment transport; and Alteration of floodplains or wetlands. Bathymetric characteristics of the Mississippi River would be evaluated to establish conditions in the vicinity of the embayment.	i
6.3.4	Operational hydrological monitoring would be used to establish the impacts of operation of a new facility and to detect any unexpected impacts arising from plant operation. The monitoring would comply with applicable permitting agency requirements.	ii
6.4	The meteorological monitoring program will be the same throughout the pre-construction and operational phases of the project. The monitoring program will simply be a continuation of the ongoing meteorological monitoring program for the GGNS Unit 1 facility.	i

Table 2
Environmental Report (ER)

6.5	Environmental measurements and monitoring of terrestrial and aquatic ecology at the Grand Gulf Nuclear Station (GGNS) site will be divided into four phases: • Pre-application (CP/COL) Monitoring • Site Preparation and Construction Monitoring • Pre-operational Monitoring • Operational Monitoring	i
6.5.1.2	Additional pre-application monitoring program would be implemented as required at the CP/COL phase for a new facility. This program would begin at least a year prior to clearing and grubbing of the ESP site. This CP/COL monitoring program would consist of two phases. The first phase would include site surveys for plants and animals of special interest identified through consultations with various State and Federal wildlife agencies. Information obtained from these agencies for this ESP application (Section 2.4) would form the basis for this phase of this CP/COL pre-application monitoring program consultations. The agencies would be contacted to identify any changes in the lists of species of special interest, and their recommendations concerning the potential presence and need for protection of these species. A survey of existing literature for information on critical life history information such as spawning areas, nursery grounds, food habits, feeding and wintering areas and migration routes would be done to help assess the extent of potential impacts on these species. This phase would also include a general survey of habitat types in the final areas designated construction of a new facility, to determine if the conclusions reached in this ESP application remain valid regarding the environment of the ESP Site. This general survey would be designed to include all four seasons and would include a continuation of the environmental photography survey conducted over the site and surrounding areas prior to the initial construction of GGNS Unit 1. Photographic documentation would help identify changes in the type and extent of both aquatic and terrestrial habitats. The general survey of habitat types would provide ground truth information for aerial photographs of the site. Monitoring during the first phase would be prioritized according to the severity of the potential impacts identified in this ESP ER.	i

Table 2
Environmental Report (ER)

6.5.1.2	The second phase of this CP/COL pre-application monitoring program would only be implemented if the screening survey identified significant differences in the habitat types from those presented in the FER. This phase would include monitoring only those habitat types and species of interest identified in the first phase. The second phase would also include monitoring of physical and chemical parameters as necessary to fully assess the potential impacts on the ecological resources in the vicinity of the GGNS site from a new facility.	i
6.5.2	Site Preparation and Construction Monitoring is used when specific adverse impacts from site preparation and construction are predicted. Specific monitoring would be done, for example, if it is determined that significant adverse impacts would occur to aquatic species in the area proposed for construction of an embayment on the shoreline of the Mississippi River.	i
6.5.3	An evaluation would be made at during the construction phase of the project, based on monitoring and evaluations conducted previously, to determine the necessity of a pre-operational monitoring program. And, if possible, two or more consecutive years of monitoring would be conducted to provide a baseline against which future operational impacts may be judged.	iii
6.5.3	The pre-operational monitoring program would thus be designed to obtain additional information on the spawning areas, nursery and feeding areas, wintering areas and migration routes of these species	i
6.5.3	Potential impacts to commercial and sport fishing in the vicinity from intake and discharges from a new facility would be evaluated and appropriate monitoring conducted. And potential impacts from operation of cooling towers on the terrestrial habitat and vegetative growth would be considered in development of this program.	i
6.5.3	Any required NPDES permit monitoring provisions would be included in this program.	ii
6.5.4	An evaluation would be made, based on results of the pre-operational monitoring program (if such program was required) and final design of a new facility, to determine the necessity of such an operational monitoring program.	i

Table 2
Environmental Report (ER)

6.6	The chemical monitoring program would be divided into three phases: construction monitoring, pre-operational monitoring, and operational monitoring programs, each program building upon the methodology and data from the previous program(s).	i
6.6.2	If required by the Mississippi Environmental Quality Permit Board, MDEQ, the administrative agency responsible for the approval and enforcement of the site NPDES permit, a construction monitoring program would be instituted at the site in order to assess water quality changes resulting from construction of the proposed project. This data collected would be analyzed and compared with historical data collected in the pre-application monitoring program. Water quality sampling and flow measurements would be conducted as required to meet NPDES permit criteria during construction	ii
6.6.3	Pre-operational hydrological monitoring would be conducted to establish a baseline for identifying and assessing environmental impacts resulting from plant operation. Data from ongoing monitoring programs for the GGNS Unit 1 facility, and data collected during any pre-application and construction monitoring done, would be evaluated and used as appropriate.	i
6.6.3	The program would consist of reconnaissance, field sampling, laboratory analysis, and data reduction and evaluation. This monitoring would include at least one year of data collection to ensure that temporal variations such as seasonal changes have been adequately monitored. Monitoring would focus on physical, chemical and microbial components of the hydrologic systems on and adjacent to the site as required.	i
6.6.4	Operational monitoring would be used to establish the impacts of operation of the plant and detect any unexpected impacts arising from plant operation. This monitoring would be utilized to evaluate the impact of sanitary and chemical waste retention methods on water quality, and to assess the impact associated with alteration of sediment transport during operation of a new facility. The effectiveness of effluent treatment and control systems would be assessed as a part of the monitoring program, providing the ability to predict failures in or reductions of effectiveness of these systems.	i

Table 2
Environmental Report (ER)

6.6.4	Sampling locations, frequency, and parameter analysis would meet NPDES permit criteria applicable at the time of operation.	i
6.7.2	This monitoring would include additional pre-application monitoring when necessary to establish a baseline. Data would be collected at defined locations, times, and frequencies such that subsequent data collected during construction can be compared, and construction impacts assessed and mitigated as required.	i
6.7.3	It is anticipated that this monitoring would be consistent with existing GGNS Unit 1 monitoring programs, and would include a logical extension of the pre-application, and the site preparation and construction monitoring programs as appropriate.	i
6.7.4	The purpose of the operational monitoring program would be to identify and assess the magnitude of impacts resulting from continued plant operation. This information would also be used to assess the effectiveness of waste treatment systems and the quality of plant effluents, and to provide real time warnings of any failures in effluent treatment systems. Operational monitoring programs would be prescribed, primarily, by the requirements of the various permits required for operation of a new facility, such as the air permit and NPDES permit.	ii
9.1.1.1	A new facility would be constructed and operated if the market conditions were satisfied such that the project would meet regulations and represent a successful business undertaking.	i
9.2.2.6.1	The proposed project is expected to require about 125 acres.	i
9.2.2.6.1	In addition to the proposed project's use of 125 acres for permanent structures, up to 275 additional acres could be affected (temporarily) during construction of the proposed project. Land used temporarily during construction would be subject to standard mitigation procedures to minimize impact. Appropriate measures would also be taken to restore the land, and long-term impact is not expected.	i
9.3.1	The future decision, however, to proceed with new nuclear facility construction would only be made if appropriate national policy, energy demand, and marketplace conditions are met, and are consistent with the applicant's business goals.	i

Table 2
Environmental Report (ER)

9.4.2	As discussed in Section 3.4, the normal heat sink (NHS) for a new facility would be comprised of a closed loop circulating water system, including pumps, water basin, and cooling tower(s). Water from the circulating water system (NHS) would be pumped through the condenser and then to the cooling tower(s) where heat, transferred to the cooling water in the condenser would be dissipated to the atmosphere by evaporation, cooling the water before its return to the condenser. The main condenser for each unit of a new facility would reject heat to the atmosphere at a rate of approximately 10.7 x 109 Btu/hr during normal full-power operation (Table 3.0-1).	i
9.4.2	Therefore, half or more of the water would be lost to the atmosphere and must be replaced. In addition, this evaporation would result in an increase in the level of solids in the circulating water.	i
9.4.2	Water pumped from the Mississippi River (Section 9.4.2.1) intake structure would be used to replace water lost by evaporation, drift and blowdown from the cooling tower(s). Blowdown water is returned to the Mississippi River via an outfall on the river shoreline (Section 5.3.2). The bounding quantity of NHS cooling tower / circulating water system blowdown for a new facility is 39,000 gpm.	i
9.4.2	A new facility would have an intake structure to withdraw makeup water from the Mississippi River.	i
9.4.2	Makeup water for the heat dissipation system and the circulating water system, would be withdrawn from the Mississippi River via an embayment and intake on the east bank of the river.	i
9.4.2	The circulating water system for a new facility would be a closed loop system, utilizing wet cooling tower(s) for heat dissipation.	i
9.4.2	The thermal effluent from a new facility would be released to the Mississippi River through a new outfall structure located downstream of the existing outfall for GGNS Unit 1.	i
9.4.2	Construction of the proposed intake and embayment would require rework of the barge slip and the river shoreline around the barge slip.	i

Table 2
Environmental Report (ER)

9.4.2	As noted above, the circulating water system for a new facility would be a closed loop system, utilizing cooling tower(s) for heat dissipation. There would be a need for continuous makeup water to the closed loop circulating water system. The maximum makeup water flow to the cooling towers in the normal heat sink is 78,000 gpm (Table 3.0-1).	i
9.4.2	The Mississippi River would be used for makeup to the circulating water system.	i
9.4.2	Evaporation of water from the cooling towers in the circulating water system leads to an increase in chemical and solids concentrations in the circulating water, which in turn increases the scaling tendencies of the water. The circulating water system would be operated so that the concentration of solids in the circulating water would typically approximate four times the concentration in the makeup water (i.e., four cycles of concentration). The concentration ratio would be sustained through blowdown of the circulating water from the cooling system(s) to the Mississippi River and the addition of makeup water.	i
9.4.2	A non-oxidizing biocide, if used, would be added to achieve a concentration at or below the allowable NPDES (environmental) discharge limits. Discharge of free available chlorine is controlled so the free available chlorine concentration in the cooling tower blowdown would not exceed NPDES permit limits. Chlorine residuals would be monitored to ensure NPDES permit limits are not exceeded in the discharge.	ii
9.4.2	A surfactant-based bio-dispersant may also be added to the circulating water system, as required, to prevent scaling and deposition of iron oxides and suspended solids in the NHS condenser tubes.	i
9.4.2	Sulfuric acid (or similar additive) may be used to control pH in the system. The circulating water blowdown flow would be controlled to maintain proper circulating water system conductivity and chemical content.	i

Table 2
Environmental Report (ER)

9.4.2	Makeup water withdrawn from the Mississippi River may require pre-treatment before its use in the circulating water system and other systems. Such treatment could include chlorination and removal of suspended solids consisting of sedimentation, flocculation, coagulation, and sludge removal. Waste solids from the pre-treatment process would be either dewatered and transported to an approved onsite or offsite landfill or returned to the river, as allowed by site permits. Any liquid effluents from the pre-treatment process would be in compliance with an approved NPDES permit	ii
9.4.2	Mechanical treatment systems provide some assistance in maintaining main condenser/heat exchanger tubes clean; use of these systems would be evaluated during the final design of the new facility.	i
9.4.3	The power transmission and distribution (T&D) system existing at the time of startup and operation of a new facility at the GGNS ESP Site would be relied upon to distribute the electricity generated, for at least an additional 1311 MWe of generating capacity.	i
9.4.3	If, at that time, additional changes to the T&D system were warranted, the associated environmental impacts would be evaluated	i
10.3	The construction and operation of a new facility would further extend the short-term preemption of this land.	i
10.3	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.	i
10.3	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.	i
10.3	Impacts to the Mississippi River would be minor, with the most significant occurring during construction of a new facility.	i

Table 2
Environmental Report (ER)

10.3	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.	i
10.3	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 land occupied by the facility structures would not be available for any other use.	i

Table 3
Emergency Planning Information

EPI Section	EPI Statement	Exhibit 4 Category
1.1	Approved plans governing emergency preparedness and response activities are currently in place for the GGNS Unit 1 facility. It is expected that these plans and implementing procedures would be expanded and modified as needed to support the proposed new facility. Those implementation details would be developed in cooperation with participating agencies and organizations at the COL stage.	iii
2.1.1	The proposed new facility will be located on the site of the existing Grand Gulf Nuclear Station (GGNS), which is located in Claiborne County in southwestern Mississippi.	i
2.1.2	The area within this proposed EAB is wholly contained within the GGNS site property boundary. The exclusion area for the proposed new facility will include a majority of the GGNS Unit 1 exclusion area.	i
2.1.2	The boundary line of the exclusion area for the proposed new facility (as defined in 10 CFR 100) is also shown on Figure 2-3. The exclusion area boundary (EAB) for the proposed new facility consists of a circle of approximately 0.52 miles (841 meters) radial distance from the circumference of a 630 ft. circle encompassing the proposed new facility power block location. Thus the minimum distance to the exclusion area boundary from any individual new reactor site within the 630 ft. circle would be 0.52 miles (841 meters).	i
2.1.3	System Energy Resources, Inc. (SERI) controls the surface rights, and SERI has authorized Entergy Operations to maintain control of ingress to and egress from the GGNS Unit 1 exclusion area and provides for evacuation of individuals from the area in the event of an emergency. A similar arrangement would be made for exercise of authority over the area within the exclusion area for the new facility on the site property.	i

Table 3
Emergency Planning Information

2.1.3	Entergy Operations currently allows access to parts of the plant site property outside the GGNS Unit 1 exclusion area for recreational purposes. The site protected area is posted to ensure awareness of access restrictions by individuals. Similar arrangements would be implemented for operation of the proposed new facility on the GGNS site.	i
2.1.4	The exclusion area for the proposed new facility is not traversed by a railway or waterway and, therefore, no arrangements would be required for these; however, the exclusion area is traversed by a county road (see Section 2.1.1). Agreements are in place such that local law enforcement authorities would block the road when notified that such a need exists.	i
2.1.5	In defining the EPZs, such factors as organizational capabilities, method of implementation for various emergency plans and the availability of onsite and offsite emergency facilities and equipment will be taken into consideration.	i
2.1.5.1	The Plume Exposure Pathway EPZ boundary for the proposed new facility would be identical to that for the existing GGNS Unit 1 and would encompass portions of Claiborne County in Mississippi and Tensas Parish in Louisiana.	i
2.2.3.4	The current LPZ radius is 2.0 miles centered on the reactor for the existing GGNS Unit 1 plant (Ref. GGNS UFSAR Section 2.1.3.4). The LPZ for the proposed new facility, a 2-mile radial distance measured from the circumference of a 630 ft. circle encompassing the proposed new facility power block location will be essentially the same as for GGNS Unit 1.	i
2.2.4.1	Evacuations will be conducted in accordance with State and County/Parish Radiological Emergency Response Plans.	ii
2.2.4.1	In Tensas Parish, buses would be used to evacuate non-auto-owning permanent residents at the rate of 25 adults per bus.	i

Table 3
Emergency Planning Information

3.3.1.2	In all cases where additional fire support groups would be brought in to assist at the proposed new facility, the Claiborne County Fire Department Fire Chief would direct all offsite fire fighting personnel. In instances where offsite fire fighting assistance is needed to fight a fire involving radioactive materials, radiological information and assistance will be provided by knowledgeable members of the proposed new facility's Emergency Organization.	i
3.3.2.2	Federal, State and local agencies will be notified as required to provide assistance in evaluating the radiological hazard and providing implementation of appropriate protective actions in accordance with the Louisiana Peacetime Radiological Response Plan.	i
3.3.3	A determination by the station emergency organization, along with state and local support agencies, of the potential for reaching or exceeding the PAGs will be performed in accordance with dose assessment procedures in the event of a radiological release to the environment.	i
3.3.3	The applicant expects that suitable commercial arrangements would be made with one or more private sector radiological laboratories at the time of, or before, issuance of the combined operating license for the proposed new facility.	i
3.3.3	GGNS Unit 1 maintains an arrangement with the supplier of its nuclear steam supply system (NSSS) to provide technical support under both routine and emergency conditions. The applicant expects that similar arrangements would be made with the NSSS supplier for the proposed new facility.	i
3.3.3	The required capabilities of commercial radiological laboratories may be affected by the technology of the selected plant design. The applicant expects that suitable commercial arrangements would be made with one or more private sector radiological laboratories at the time of, or before, issuance of the combined operating license for the proposed new facility.	i

Table 3
Emergency Planning Information

3.5.1	In accordance with 10 CFR 50.72 the NRC Operations Center will be notified, by telephone, immediately after notification of the appropriate state and local agencies and not later than one hour after the declaration of one of the Emergency Classes.	ii
3.5.3	An Alert Notification System will be provided that meets the design objectives of NUREG-0654, Appendix 3. Because of the close physical proximity and common EPZ boundaries, the proposed new facility is expected to share the system used for GGNS.	ii
3.5.3	Additional alert notification details will be addressed in local and state emergency plans, the GGNS Emergency Public Information publication, and the Alert Notification System Final Report.	i
3.7.1	In conjunction with State and local agencies, the proposed new facility will provide written information addressing emergency preparedness to members of the general public who reside within the Plume Exposure EPZ.	i
3.9.2	The proposed new facility will have isotopic analysis capability available for onsite radiological analysis. The Mississippi State Department of Health Mobile Laboratory may be brought into the vicinity of the plant in the event of a Site Area Emergency or General Emergency and could be expected to be in place within 2 to 4 hours of notification.	i
3.9.2	Transportation for the offsite monitoring teams will be available using site vehicles, with normal deployment expected to be within approximately 90 minutes following notification.	i
3.10.1	Site evacuation instructions and routes will be specified in the evacuation announcement. Non-essential personnel will be expected to evacuate the property in the same vehicles that were used for initial access.	i

Table 3
Emergency Planning Information

3.11.1	The Emergency Director or Offsite Emergency Coordinator may also authorize the use of radioprotective drugs for thyroid protection. Emergency personnel would take a pre-measured dose of the drug (such as potassium-iodide (KI) tablets).	
3.11.2	To ensure effective implementation under emergency conditions, training on these procedures and lines of authority will be developed and conducted in accordance with Section 3.16 of this Plan.	i
3.11.2	The facility will maintain an onsite radiation protection program adequate to ensure compliance with the requirements of 10 CFR 20, Standards for Protection Against Radiation, and any specific facility license requirements.	ii
3.12	If medical treatment of the injured and/or contaminated personnel requires assistance or medical expertise beyond the capabilities of the local facilities, the patients would be transferred to a support hospital. The existing GGNS facility has an agreement with The Oschner Clinic to provide hospital and medical services for injured/ contaminated or overexposed personnel.	
3.13	Details related to Recovery and Reentry Planning and Post-Accident Operations will be provided at COL.	iii
3.14	Details related to exercises and drills will be provided at COL.	iii

Table 3
Emergency Planning Information

3.15	The initial training effort will be completed prior to that stage of facility construction and licensing that would require an active Emergency Plan. Personnel included in this training program will include: • Directors and coordinators of the response organizations • Personnel responsible for accident assessment • Radiological monitoring teams and radiological analysis personnel • Police, security, and fire fighting personnel • First aid and rescue personnel • Local support services personnel, including civil defense/emergency service personnel • Medical support personnel • Personnel responsible for transmission of emergency information and instructions • The on- and off-site Emergency Response Organizations, including those individuals subject to this training program, are discussed in Section 3.3 of this Plan.	i
3.15.2	A program will be developed to provide information on the Emergency Plan to all personnel (excluding visitors) coming into the proposed new facility for the first time and to all personnel participating in the periodic retraining program. This training will address applicable signals and alarms, evacuation routes and procedures, and response during an emergency.	i
3.15.5	Training conducted for the proposed new facility by outside organizations, such as that training conducted by outside technical specialists and other organizations, will be approved and conducted in accordance with facility procedures addressing such activities to ensure its adequacy and accuracy.	i

Table 3
Emergency Planning Information

3.15.5	Emergency response training at the proposed new facility will be developed and conducted in accordance with approved Training organization procedures. Training conducted for the proposed new facility by outside organizations, such as that training conducted by outside technical specialists and other organizations, will be approved and conducted in accordance with facility procedures addressing such activities to ensure its adequacy and accuracy.	i
3.16.1	The COL Licensee will appoint an appropriate Manager who will have overall authority and responsibility for the emergency planning effort.	i
3.17	Letters indicating arrangements executed between the Licensee/facility operator and Federal, State, and local government agencies having emergency preparedness support functions are included in Appendix A to this Plan. The agencies contacted are consistent with those having made arrangements for support of GGNS Unit 1; the applicant expects that similar arrangements would be made for the proposed new facility.	i

Table 4
DSER Open Item and RAI Responses

LETTER / RAI	DSER Open Item or RAI Response Statement	Exhibit 4 Item
CNRO-2004-00045 / E5.2-1 and E5.2-2 Section 5.2.3	There was no consultation with any agency concerning a CWA Section 404 permit. Since no construction activities were planned as a part of the ESP evaluation of the site, it is premature to enter into consultation at this time. The USACE expressed their agreement in a conversation concerning wetlands and the NRC site audit. Any consultation, including wetlands delineation is only good for a 2-year period, after which the process must be repeated. As stated in Section 1.2 of the ER, the consultations and permitting activities will take place at COL.	iii
CNRO-2004-00045 / E3.8-6 Section 3.8.1, p. 3.8-3	As part of its obligations under the Nuclear Waste Policy Act [Section 302(a)(l)] and per 10 CFR 961, the Department of Energy (DOE) will take title to, transport, and dispose of spent nuclear fuel. Thus, DOE is responsible for determining the transport mode.	ii
CNRO-2004-00045 / E2.3-5	Dredging would be required to form the embayment on the Mississippi River. A temporary increase in turbidity would occur in the Mississippi River near the site during construction and dredging activities. The additional turbidity from these construction activities would likely be quickly dissipated due to the relatively high flow velocity and the large volume of water in the river. Riprap, or other appropriate means, would be used to stabilize the banks of the embayment and the river shoreline around the embayment during and following construction. These construction activities would be done in compliance with Corps of Engineer requirements, and would not affect long-term water quality.	ii
CNRO-2004-00053 / RAI 17.1-4	During the second phase (COL phase) the data may be used to supplement additional information required to be collected during the COL phase (additional bore holes and testing will be required at COL). This COL data would be used to evaluate liquefaction potential, foundation bearing capacities, foundation settlement settlements and excavation design. The work performed for the COL phase, which will serve to further validate the original Eustis work, will require Part 21 requirements to be applied.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00062 / RAI 1.4-1	Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants." A regulatory position on Regulatory Guide 1.27 will be established at COL once the design for the ultimate heat sink is defined and finalized. Regulatory Guide 1.102, "Flood Protection for Nuclear Power Plants." Appropriate and required flood protection for safety-related structures, systems, and components identified in Regulatory Guide 1.29 will be established at COL once the exact facility design is defined and finalized. A regulatory position on Regulatory Guide 1.102 will be established at that time. Regulatory Guide 1.113 "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases." A regulatory position on this guide will be established at COL to support the final analysis of accidental and routine liquid releases. See also response to RAI 2.4.13-1.	iii
CNRO-2004-00062 / RAI 2.4.1-2	During excavation of the existing GGNS Unit 1 power block, the use of tie-back walls effectively restricted dewatering to a localized area. It is anticipated that dewatering would be required for construction of a new facility on the ESP site. Dewatering wells would be installed, if necessary, to support plant construction and operation. Therefore, specific well locations and well design details will be provided at COL when the plant design and layout are finalized.	iii
CNRO-2004-00077 / RAI 2.5.4-2	Excavations to develop a uniform plant grade elevation of about 134 feet in the ESP area would remove much of the fill underlying the upper pad area, but a 10 to 30 foot thick section of fill may remain under the eastern parts of the yard area. Additional borings performed during the COL phase will evaluate the character of the fill, and determine if it (and underlying/adjacent loess soils) require sub excavation and replacement to minimize settlements of appurtenant non-safety facility foundations and pavements.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00077 / RAI 2.5.4-10	In accordance with Regulatory Guide 1 .132 (and proposed revisions in Draft Regulatory Guide DG-1101) additional site exploration, laboratory testing, and geotechnical analyses will be performed during the COL phase of the project after a plant design has been selected to verify site conditions for foundation design geotechnical analyses and determination of embedment criteria. These borings and additional engineering analysis should include evaluation of deformation moduli for the subsurface materials for refined estimates of the influence zone related to the selected reactor and foundation configurations. Consolidation and triaxial shear testing will be performed on undisturbed samples from the foundation bearing level of the selected reactor to evaluate foundation bearing pressures and settlement potential. The COL investigations also should consider development of an instrumentation and monitoring program to measure actual construction-related soil movements.	iii
CNRO-2004-00077 / RAI 2.5.4-1	In accordance with NRC Regulatory Guide RG 1.132 and Draft Regulatory Guide DG-1101, additional subsurface exploration should be performed during the COL phase to verify site stratigraphy. The COL phase exploratory borings should be located based on the final location of the new facility, the results from the ESP study, and consideration of the locations of the existing borings to obtain information in areas currently lacking data and to optimize further characterization of important subsurface relationships.	iii
CNRO-2004-00077 / RAI 2.5.4-9	In accordance with Regulatory Guide 1.132 (and proposed revisions presented in Draft Regulatory Guide DG-1101), additional site investigations would be conducted during the COL phase of the project.	iii
CNRO-2004-00077 / RAI 2.5.4-11	In accordance with Regulatory Guide 1.132 (and proposed revisions in Draft Regulatory Guide DG-1101), confirmatory borings should be drilled at the site during the COL phase site investigations. These borings should include additional borehole velocity surveys to verify the velocity profile under the foundation footprint and to confirm the depth of the target foundation bearing strata that satisfy the selected plant's shear wave velocity design criteria. Based on the existing UFSAR and ESP data, we believe that the depth range to deposits exhibiting a shear wave velocity of 1,000 fps will not vary significantly from the results presented in the SSAR.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00077 / RAI 2.5.4-12	In accordance with Regulatory Guide 1.132 (and proposed revisions in Draft Regulatory Guide DG-1101), COL phase investigations would include additional borings and SPT testing throughout the selected power plant footprint area to increase the SPT data base for design of the plant. It is expected that selected COL borings would be performed with energy calibration equipment to allow accurate measurement and adjustment of the hammer blows for design-level geotechnical analysis (e.g., liquefaction analysis) and development of foundation and excavation design parameters. The COL borings should also include index borings at the ESP boring locations to allow calibration between these boring sets. The ESP borings are marked with steel stakes set in cement grout at the borehole locations, and also were surveyed for future reference purposes.	iii
CNRO-2004-00077 / RAI 2.5.4-13	The triaxial test results were not used as input parameters to calculate foundation or design criteria, which instead would be developed in the COL phase after a specific reactor is selected, in accordance with Regulatory Guide 1.138 (and proposed revisions in Draft Regulatory Guide DG-1109).	iii
CNRO-2004-00077 / RAI 2.5.4-3	The ESP site explorations, augmented by borehole data from the UFSAR, capture the three dimensional geometry of the strata, and variations in soil properties. The generally consistent, horizontal stratigraphy of the site provides a high level of confidence regarding characterization of the geologic and geotechnical conditions appropriate for the ESP study. The site stratigraphy would be verified by additional borings during the COL phase.	iii
CNRO-2004-00077 / 2.5.5-1-1	The potential hazard to the ESP site from slope failure and creep in the loess bluff was evaluated by examination of geologic cross sections, evaluation of embedment depths and positioning of ESP building foundations, and qualitative assessment of the bluff slope stability in relation to relative strengths of subsurface materials. No numerical slope stability analyses were performed, and are deferred to the COL phase when a final reactor design and layout are selected.	iii
CNRO-2004-00077 / 2.5.5-1-1	The design of the cut slope between the ESP PPBA and top of the loess bluff would be developed during the COL phase based on additional exploratory borings in the cut area and specific slope stability analysis.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2005-00003 / 13.3-75	The applicant is not aware of specific plans on the part of state/local agencies to address the expected, modest increases in population growth within the plume exposure pathway EPZ. However, given the above, these modest changes in population are not considered to represent significant impediments to developing future expanded emergency plans supporting a proposed new facility.	i
CNRO-2005-00003 / 13.3-60	Part 52 licensing process. Rather, the issues related to state/local plans discussed in RAI questions 13.3-60 through 13.3-72 should be deferred to the review at COL. It is understood, as indicated in the NRC letter transmitting RAI #6, that if any issues (represented in these RAI questions on state/local plans) pertain to the operating plant, they will be addressed separately by the NRC's oversight process.	iii
CNRO-2005-00003	Based on the specific content of the NRC Staffs requests in RAI 13.3-60 through 13.3-72, it is noted that the questions pertain to various issues within the state/local plans, such as consistency from state to local agency plans, clarity of authority to direct state/local agency actions in an emergency, and the adequacy of various programs and provisions that provide protective measures and emergency responses on the part of state/local emergency workers, etc. In addition, it is understood that the subject NRC questions stem specifically from the NRC and/or FEMA review of major features, given the RAls reference to specific major features in NUREG-0654 Supplement 2. While it is recognized that the NRC sees the need to conduct these reviews in support of certain major feature aspects (per NRC response to NEI Item B.3 and B.4, NRC letter referenced above), the applicant continues to believe that such reviews are inappropriate at the ESP stage.	iii
CNRO-2005-00003 / RAI 13.3-86	As discussed in the introductory notes to these responses (Item 2), the 1986 ETE, as supplemented by the 2003 ETE Study and information submitted in Part 4, Section 2.2 meets NRC guidance for use in demonstrating compliance with 10 CFR 52.17(b). The Study provided appropriate method and detail to show that the 1986 ETE conclusions remained valid. This information provides an adequate basis for concluding that, in regarding to evacuation, the essential elements of advance planning have been considered and that provisions have been made to cope with emergency situations.	ii

Table 4
DSER Open Item and RAI Responses

CNRO-2005-00003 / RAI 13.3-60	As discussed in that section, it is expected that current on and off-site plans and procedures would be expanded and modified, as needed, to support the proposed new facility. The state/local plans were referenced primarily to show that, given the current implementation of effective, approved emergency plans, there is even greater confidence (at the ESP stage) that the physical characteristics of the site are amenable to the development and implementation of any expanded or modified plans necessary to support the proposed future facility. This is further supported by recent correspondence (included in the ESP application) with each of the key state/local agencies involved in supporting the current operating unit. In this correspondence, the agencies indicate their intent to engage in future emergency planning discussions, as well as their understanding that there are no issues that might represent significant impediments to the development of those expanded, fully integrated plans.	i
CNRO-2005-00003 / RAI 13.3-60	As a practical matter, the implementation details of state/local plans to support the proposed new facility would not be finalized until COL. Those details would be subject to NRC review and the hearing proceedings at that time. Discussion, review, and resolution of issues at ESP would seem to present little benefit or savings to those review activities that would be required and expected at COL. Further, by its very nature, the ESP does not represent a commitment to construct, nor does the ESP applicant necessarily have any direct standing to engage with state/local agencies regarding any future planning issues involving a new facility.	iii
CNRO-2005-00033 / 2.5.4.3.5	The specific location of dewatering wells in relation to safety related structures is a design feature, and will be addressed at COL. Once the ESP facility design and location have been determined, a program to monitor ground water levels will be developed to assist in assessing dewatering needs, locating and designing dewatering wells, then measuring dewatering effects. This program would begin with pre-construction monitoring of ground water levels and would include the installation of additional exploratory borings throughout the planned excavation areas and facility footprint to obtain detailed information on ground water levels and locations of potential perched water zones.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2005-00033 / 2.4.12.3	The minimum required shear wave velocity at the foundation level for all example reactor types considered for the site is 1,000 feet per second (fps). Potential power plant foundation depths are in the range of about 35 to 140 feet (elevations 97 to -7 feet) below plant grade, depending on the type of reactor that is chosen. ESP investigations show that average shear wave velocities are greater than 1000 fps below an elevation of about 97 feet, and that minimum shear wave velocities are greater than 1,000 fps below an elevation of 0 feet. Additional site investigations to be performed throughout the plant site in the COL phase will confirm the depth to reach a minimum shear wave velocity of 1,000 fps. These investigations shall include multiple methods to obtain shear wave velocity profiles (e.g., P-S suspension logging, downhole surveys, crosshole surveys) to permit a comparison between interval and average velocities measured by different techniques against the minimum velocity requirements for plant design. Soils underlying the elevation of the selected plant foundations that are found to have shear wave velocities below the design requirement will require removal and recompaction (with or without additives) and/or in situ improvement using methods such as cellular deep soil mixing or consolidation grouting to achieve the required shear wave velocity.	iii
CNRO-2005-00033 / 2.5-7	Among the design-phase considerations for safety-related structures will be the potential for subsidence resulting from alterations to ground water levels. This consideration will take into account several factors affecting subsidence potential beginning with the geotechnical analyses described in SSAR 2.5.1 2.5.	i
CNRO-2005-00033 / 2.5-7	The specific location of dewatering wells in relation to safety related structures is a design feature, and will be addressed at COL. Once the ESP facility design and location have been determined, a program to monitor ground water levels will be developed to assist in assessing dewatering needs, locating and designing dewatering wells, then measuring dewatering effects. This program would begin with pre-construction monitoring of ground water levels and would include the installation of additional exploratory borings throughout the planned excavation areas and facility footprint to obtain detailed information on ground water levels and locations of potential perched water zones.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2005-00033 / 2.4.10.3	Therefore, the local intense precipitation floodwater elevation for the ESP site around the power block and other key structures and buildings will be determined at COL by the COL applicant. Flooding protection for safety related structures and equipment, if required, will be included in the final design for the new facility. As noted in the introduction to this response, the methodology for determining flow in Streams A and B during the local PMP event, as adopted from the GGNS Unit 1 UFSAR, remain valid for the ESP site. In general, for completeness of references and future use at COL, the SSAR will be clarified to annotate those elements of the local PMP analysis that are applicable only to GGNS Unit 1. And per the response to Open Item 2.4-5, the SSAR will be revised to reflect use of HMR 52 guidelines to determine site characteristic local intense precipitation levels. In summary, the SSAR Section 2.4.2 will be revised to indicate that the flooding analysis discussed in the text is specific to the GGNS Unit 1 site areas (to the east of the site access road), and the SSAR annotated to clearly indicate an analysis for flooding due to local intense precipitation will be required for the ESP site at COL (Sections 2.4.2, 2.4.3 and 3.1.4).	iii
CNRO-2005-00033 / Open item: 2.4-7	As described in response to DSER Open Item 2.4-6, a screening analysis was performed to identify additional "nuclides of interest" that should be considered for future analyses at COL to assess the consequences of postulated accidental liquid releases on the ESP site.	iii
CNRO-2005-00033 / Open item: 2.4-6	In response to the NRC DSER comment, an additional assessment has been conducted. This assessment consisted primarily of a screening analysis to identify "nuclides of interest" that should be considered in a more detailed accidental release analysis that would be required at COL. With these nuclides of interest identified, appropriate retention and retardation data is established, supporting the identification of site characteristics, as discussed in response to DSER Open Item 2.4-7.	iii
CNRO-2005-00033 / Open item: 2.4-7	COL phase investigations and testing will include additional exploratory borings throughout the planned building footprint area to obtain pre-construction information on soils and ground water.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00065 / E 3.8-14	In addition to the incident free results, the RADTRAN V runs also included accident results. Due to the preliminary nature of the gas-cooled reactor fuel design, it is premature to provide a meaningful comparison with NUREG-0170. The RADTRAN V runs were made with the gas-cooled fuel values in the Yucca Mountain FEIS. Specifically, the values for the high integrity high-temperature gas-cooled reactor spent nuclear fuel referred to as type 8 were used. As such, these runs provide a reasonable estimate of what the GT-MHR and PBMR results might look like. It is important to remember that the gas-cooled reactor spent fuel shipments are no different from other spent fuel shipments in that all shipments are required to meet NRC and DOT regulations. These regulations address design and performance standards for the casks and specify radiological performance criteria for both normal transport and severe accident conditions. Compliance with these regulations is mandatory and ensures that shipments will be conducted in a manner that results in minimal environmental impacts.	ii
CNRO-2004-00069 / RAI 13.3-1 1	The letter discussed in Section 3.3.2.1 of the application addresses the authority of the Governor of Mississippi as related to state agency implementation of the Mississippi Radiological Emergency Preparedness Plan for the existing facility. This letter was not intended to address state agency commitments to support emergency planning activities for the proposed new facility. The Letter of Agreement provided in Appendix A of Part 4 of the ESP application addresses the state's commitment to coordinate with the licensee to develop emergency plans to address the addition of new operating units at the Grand Gulf Site. This Letter of Agreement has been signed by the Executive Director, who is the appropriate authority for the commitment to participate in emergency planning activities.	ii
CNRO-2004-00069 / RAI 13.3-34	Part 4 of the application addresses NUREG-0654, Supplement 2 Evaluation Criteria H.l and H.2, to the extent that the applicant would make provisions for emergency facilities and equipment to support an emergency response as called for in the approved Emergency Plan.	ii

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CNRO-2004-00069 / RAI 13.3-40	Criterion J.2 of NUREG-0654, Supplement 2 requires that the applicant describe a mechanism for recommending protective actions to the appropriate authorities in accordance with EPA-400-R-92-001. As indicated in Section 3.10.2 and the response to RAI 13.3-39, the applicant intends to develop Protective Action Recommendations (PARs) consistent with EPA-400-R-92-001, which addresses both sheltering and evacuation. Section 3.10.2 also addresses the applicants proposed mechanism for communicating the PARs to the affected authorities.	ii
CNRO-2004-00069 / RAI 13.3-50	The procedures for issuance of dosimetry devices will address both plant personnel and offsite personnel required to enter areas within the protected area where monitoring of external doses is required. Section 3.1 1.3 of Part 4 will be revised to indicate that procedures for issuance of dosimetry devices will address both plant personnel and offsite emergency response personnel.	ii
CNRO-2004-00069 / RAI 13.3-51	Section 3.1 1.4 discusses the use of the facility's routine contamination action levels during emergency situations. For the existing facility, these action levels are established in procedures addressing radiation protection issues. The applicant expects that similar action levels for the decontamination of emergency workers, equipment and vehicles at, and/or from, the proposed new facility will be established in radiation protection procedures for the proposed new facility.	i
CNRO-2004-00069 / RAI 13.3-53	Backup medical facility personnel will receive training equivalent to that provided to the primary facility. This training will address acceptance of victims of radiation-related accidents for emergency medical and surgical treatment and observation, including evaluation and treatment of personnel who are radiologically injured/contaminated or who have received a radiation over-exposure or uptake. Section 3.12 of Part 4 will be revised to reflect the provision stated above for training of backup medical facility personnel.	i

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00069 / 13.3-6	The support provided by Federal agencies is described in Section 3.1.2 and 3.3 of Part 4. As discussed in RAI 13.3-1 0, Federal agency response to an emergency at the proposed new facility is expected to be in accordance with the Federal Radiological Emergency Response Plan (FRERP). These sections will be revised to indicate that Federal agencies are expected to respond in accordance with the FRERP.	ii
CNRO-2004-00069 / 13.3-9	The listing in Section 3.17 is not intended to be an exhaustive listing of all Federal, state, and local agencies having responsibility for emergency planning and response activities. The applicant expects Federal agencies, including the U.S. Army Corps of Engineers and National Weather Service, to respond in accordance with the Federal Radiological Emergency Response Plan. The applicant expects State and local agencies to respond in accordance with the respective Mississippi and Louisiana plans, which have been incorporated by reference in Section 1 .I.	ii
CNRO-2004-00069 / 13.3-10	The U.S. Nuclear Regulatory Commission (USNRC) and U.S. Department of Energy (USDOE) will be expected to respond to emergency conditions in accordance with the Federal Radiological Emergency Response Plan (FRERP). Sections 3.3.2.5 and 3.3.2.6 of Part 4 will be revised to specify that the USNRC's and USDOE's emergency response actions are established in the Federal Radiological Emergency Response Plan (FRERP).	ii
CNRO-2004-00069 / RAI 13.3-18	An emergency classification scheme consistent with NUREG-0654 or USNRC Regulatory Guide 1.101, as appropriate, will be established in the emergency plan when submitted in accordance with 10 CFR 52.79(d). Section 3.4 of Part 4 will be revised to reflect the applicant's intent to establish an emergency classification scheme consistent with NUREG-0654 or USNRC Regulatory Guide 1.101, as appropriate.	ii
CNRO-2004-00069 / RAI 13.3-19	An emergency classification scheme consistent with NUREG-0654 or USNRC Regulatory Guide 1.101, as appropriate, will be established in the emergency plan when submitted in accordance with 10 CFR 52.79(d). These schemes would include onsite and offsite monitoring results as bases for emergency classification. Section 3.4 of Part 4 will be revised to reflect the applicant's intent to establish an emergency classification scheme consistent with NUREG-0654 or USNRC Regulatory Guide 1.101, as appropriate.	ii

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00069 / RAI 13.3-40	Criterion J.2 of NUREG-0654, Supplement 2 requires that the applicant describe a mechanism for recommending protective actions to the appropriate authorities in accordance with EPA-400-R-92-001. As indicated in Section 3.10.2 and the response to RAI 13.3-39, the applicant intends to develop Protective Action Recommendations (PARs) consistent with EPA-400-R-92-001, which addresses both sheltering and evacuation. Section 3.10.2 also addresses the applicants proposed mechanism for communicating the PARs to the affected authorities.	ii
CNRO-2004-00069 / RAI 13.3-41	The Emergency Director may recommend to State and local officials the use of radioprotective drugs (such as potassium iodide) for thyroid protection of the general public and institutionalized people. The use of radioprotective drugs may be recommended when the dose to the thyroid is projected to equal or exceed 5 rem. Section 3.1 0.2 of Part 4 will be revised to describe this role of the Emergency Director regarding the use of radioprotective drugs. This is consistent with Criterion J.2 of NUREG- 0654, Supplement 2, which requires that the applicant describe a mechanism for recommending protective actions in accordance with EPA 400-R-92-001.	ii
CNRO-2004-00069 / RAI 13.3-7	The operating unit maintains arrangements with the NSSS supplier to provide both routine operational and emergency support. The applicant expects that similar arrangements would be made with the NSSS supplier for the proposed new facility. Such arrangements would be finalized before or at the time of the issuance of the COL. The applicant expects that similar arrangements would be made, as necessary, with private sector radiological laboratories to provide radiological monitoring and analyses services, such as analysis of reactor coolant and other in-plant media samples. Analysis of field monitoring team airborne and environmental samples collected is addressed in Section 3.9.2 and the response to RAI 13.3-36.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00069 / RAI 13.3-9	The listing in Section 3.17 is not intended to be an exhaustive listing of all Federal, state, and local agencies having responsibility for emergency planning and response activities. The applicant expects Federal agencies, including the U.S. Army Corps of Engineers and National Weather Service, to respond in accordance with the Federal Radiological Emergency Response Plan. The applicant expects State and local agencies to respond in accordance with the respective Mississippi and Louisiana plans, which have been incorporated by reference in Section 1.1. The Letters of Agreement included in Appendix A reflect the willingness of the responsible authorities in the affected states to enter into discussions that may lead to extending the scope of their plans to the proposed new unit(s). These revised plans would establish the responsibilities of the affected state and local agencies.	ii
CNRO-2004-00069 / RAI 13.3-15	The informal pact between the Port Gibson Fire Department and the Claiborne County Fire Department consists of an undocumented agreement established to ensure mutual support for fire-fighting activities. Both fire departments are available to support firefighting activities on a 24-hour/7-day per week basis for GGNS Unit 1. Should a new facility be constructed at the GGNS site, the applicant expects that the fire department arrangements would provide this same degree of support for the new facility. Both fire departments will be offered training as discussed in Section 3.15 of Part 4.	i
CNRO-2004-00069 / RAI 13.3-16	The affected ambulance services currently provide coverage 24 hours per day, seven days per week for GGNS Unit 1. Should a new facility be constructed at the GGNS site, the applicant expects that the arrangements for ambulance services would be expanded to provide this same degree of support for the new facility.	i

Table 4
DSER Open Item and RAI Responses

CNRO-2004-00069 / RAI 13.3-17	Vicksburg Regional Medical Center and Parkview Regional Medical Center have merged to form River Region Medical Center. Therefore, the hospitals providing backup (to Claiborne County Hospital) medical services are expected to be River Region Medical Center and the Oschner Clinic. The affected hospitals currently provide coverage 24 hours per day, seven days per week for GGNS Unit I. Should a new facility be constructed at the GGNS site, the applicant expects that the arrangements for medical support services would be expanded to provide this same degree of support for the new facility.	i
CNRO-2004-00069 / RAI 13.3-20	The applicant will establish an emergency classification scheme consistent with NUREG-0654 or USNRC Regulatory Guide 1.101, as appropriate.	ii
CNRO-2004-00069 / RAI 13.3-36	Both the applicant and the affected States will have the capability to perform environmental monitoring. Environmental samples collected by the applicant may be analyzed in the applicant's facilities, in Mississippi state facilities, or by a commercial analysis facility under contractual arrangements with the applicant.	i
CNRO-2004-00069 / RAI 13.3-40	Criterion J.2 of NUREG-0654, Supplement 2 requires that the applicant describe a mechanism for recommending protective actions to the appropriate authorities in accordance with EPA-400-R-92-001. As indicated in Section 3.10.2 and the response to RAI 13.3-39, the applicant intends to develop Protective Action Recommendations (PARs) consistent with EPA-400-R-92-001, which addresses both sheltering and evacuation. Section 3.10.2 also addresses the applicants proposed mechanism for communicating the PARs to the affected authorities.	ii
CNRO-2004-00069 / RAI 13.3-47	Criterion B.2 of Supplement 2 to NUREG-0654 indicates that the applicant should identify the services to be provided by local agencies for handling emergencies.	ii

Table 4
DSER Open Item and RAI Responses

CNRO-2005-00010 / 3.4	No Changes to Facilities, Procedures or practices. So that Company will be capable of Operating GGNS in accordance with the Operating License and other applicable regulatory requirements, System Energy agrees that it will not make any changes to facilities, procedures or practices that affect compliance with NRC regulations or commitments. It is further recognized that System Energy has obtained the agreement from MP&L that MP&L will not make changes to the switchyard and associated transmission lines and equipment which could affect offsite power supply to GGNS and that MP&L will not make any changes to its procedures or practices that affect compliance with NRC regulations or commitments without prior consultation with and written consent from System Energy or its designated agent. Company hereby agrees that, acting as System Energy's designated agent, it shall not unreasonably withhold consent to any such changes in facilities, procedures or practices as may be requested by MP&L.	i
CNRO-2005-00010 / 3.5	Concurrently with the execution of this Operating Agreement, System Energy and MP&L have entered into an Agreement on Switchyard Transmission and Interface, a copy of which is attached hereto as Exhibit, whereby MP&L has agreed that it shall provide GGNS with an assured source of offsite power in accordance with procedures to be agreed upon, from time to time, by the parties.	i
CNRO-2005-00010 / 7.1	With respect to GGNS, Company will provide Workers Compensation coverage in accordance with all applicable laws. Company will also, acting for itself or acting as System Energy's - agent, provide and maintain or cause to be provided and maintained, in the name of and on behalf of System Energy and Company, as their respective interests may appear, protection through insurance or otherwise covering Company's and System Energy's obligations to pay damages because of personal injury, death, or property damage, including, without limitation, protection through insurance or otherwise covering nuclear property and nuclear liability, and other insurance and financial protection in accordance with customary industry practice and as necessary to comply with all applicable laws and regulations. Company, subject to direction from System Energy, shall determine the coverage limits and deductibles for any insurance policies obtained pursuant to this Agreement.	ii

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CNRO-2005-00010 / 11.1	Safeguards Information relative to GGNS shall be controlled and protected in accordance with 10 C.F.R. 73.21.	ii
CNRO-2005-00010 / 11.2	Company and System Energy agree that, unless otherwise required by law, they will not permit any person to have access to Restricted Data, as defined in 42 U.S.C.§ 2014 until the federal office of Personnel Management shall have made an investigation and report to the NRC on the character, associations and loyalty of such person and the NRC shall have determined that permitting such person to have access to Restricted Data will not endanger the common defense and security.	ii
CNRO-2005-00015 /2.5.4-2	The level of geotechnical investigation performed for the Grand Gulf ESP application is considered appropriate to provide reasonably conservative dynamic soil and rock properties for use in the site response analysis and foundation assessment. Three borings and four Cone Penetrometer Test (CPTs) soundings, supplemented by twenty borings in the ESP site area performed for the existing Grand Gulf UFSAR, provide the basis for our estimation of soil properties at the site. This level of investigation provides reasonable assurance that the actual site conditions determined during the COL phase of site investigation will be consistent with the site subsurface model developed to support the ESP application as indicated in RS-002. During the COL phase, additional geotechnical borings and laboratory analyses will be performed in accordance with Regulatory Guides 1.132 and 1.138. As indicated in response to Comment 2.5.4-2 above, if the additional site investigations performed during the COL phase indicate differences in material properties that may have a significant impact on design motions, we will evaluate the need to perform additional site response analyses with the updated properties to develop revised design motions.	iii

Table 4
DSER Open Item and RAI Responses

CNRO-2006-00011 / A	The above referenced NRC RAI letter of February 2 (Reference 18) was provided as follow-up to discussions held with the NRC Staff on January 12, 2006 (Reference 17). To further clarify the nature of information required to resolve this issue, a conference call was held with NRC staff on February 2, 2006. It is SERI's understanding, based on discussions with the NRC Staff on February 2, that compliance with Regulatory Guide 1.91 (Reference 20), Position C.l, would require literal compliance with the stand-off distances computed from the Guide's Figure I, based on a ship-borne cargo of 5000 tons of equivalent TNT.	ii

Table 4
DSER Open Item and RAI Responses

CNRO-2006-00011 / I	Inspection of curves in Figures I-2a and I-Zb, in general, reveals no consistent trends over the 11 years, particularly for naphtha/solvents. However, since 2000 and 2001, a gradual increasing trend for gasoline and LNG was noted, while crude petroleum showed a decreasing rate. Given the lack of clear patterns in the data illustrated in Figures I-2a and I-2b, projections for the future would be inappropriate. However, at the same time, it recognized that river transportation information would be reviewed during the preparation of a COL application. The general intent to conduct such surveys was discussed by Entergy in its remarks to the ACRS in meetings held on May 16,2005 (Sub-committee, DSER) and December 8, 2005 (Full committee, FSER review). The expected process regarding time dependent qualities of site characteristics was addressed in some detail in the May 16 meeting. It was noted that at COL, a survey would be made considering safety margin and the potential for change in site characteristics. As considered required, selected site characteristics would be confirmed and/or adjusted as necessary to resolve any risk significant issues. A number of specific examples were suggested, including a survey of transportation systems in the site vicinity. In the December 8 meeting, similar remarks were summarized, in particular reference to potential changes in site meteorological conditions in the context of recent Gulf Coast hurricane experience. However, the same prudent and reasonable process would apply as well to other categories of site characteristics, such as potential changes in Mississippi River transportation properties. Reviews at COL would seek to identify new and significant information, important to the analyses and conclusions provided in or to support the ESP application. Relevant to this response, the review at COL would confirm that assumptions regarding the type of commodities, maximum barge size and shipping frequency remain bounding and that conclusions in the SSAR remain valid for use, as appropriate, at COL.	iii