RAS 12491

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	
SYSTEM ENERGY RESOURCES, INC.	Docket No. 52-009-ESP
	ASLBP No. 04-823-03-ESP
(Early Site Permit for Grand Gulf ESP Site)	October 30, 2006

SYSTEM ENERGY RESOURCES, INC. COMMENTS ON NRC STAFF RESPONSE TO LICENSING BOARD'S ORDER OF OCTOBER 3, 2006

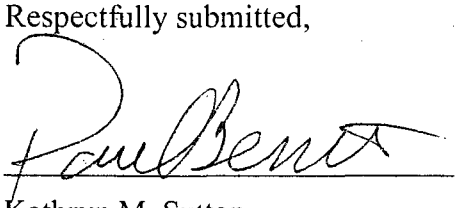
On October 3, 2006, the Atomic Safety and Licensing Board ("Board") in this proceeding issued an Order requesting, among other things, that the Nuclear Regulatory Commission Staff ("Staff") provide answers to ninety questions related to the Board's review of the Staff's Final Environmental Impact Statement ("FEIS"). The October 3 Order also stated that System Energy Resources, Inc. ("SERI") may file comments on the Staff's answers to the Board's questions within seven days after receipt of the NRC's Staff's answers. On October 23, 2006, the Staff submitted to the Board the "NRC Staff Response to Licensing Board's Order of October 3, 2006." In accordance with the Board's October 3 Order, SERI hereby submits its comments on the Staff's answers to the Board's questions on the FEIS. As suggested by the Board, SERI has integrated its answers into the electronic copy of Attachment A of the Board's Order immediately following the Staff's answers to each question propounded by the Board, as well as Attachment B to the NRC staff's response.

Template = SECY-049

SECY-02

SERI has no comments on Attachment C to the Staff's response.

Respectfully submitted,



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COUNSEL FOR SYSTEM
ENERGY RESOURCES, INC.

Dated at Washington, District of Columbia,
this 30th day of October, 2006

ATTACHMENT A

Grand Gulf ESP
EIS Inquiries

Inquiry No.	EIS Page	EIS Section	Inquiry
NA	NA	NA	**SERI Input – General Notes:** The following notes are offered in regard to additional information provided by SERI. 1. Additional comments or information are provided by SERI for each Inquiry listed in this table, following the Staff response. 2. Reference to "EIS" in the SERI Input refers to NUREG-1817, April 2006. 3. References to the Grand Gulf ESP application's ER are to the latest version SERI submitted to the NRC; *i.e.*, Revision 2 (included with ESP Application Revision 3, submitted March 8, 2006).
1	General	General	1. Given the Staff's experience with other EISs for ESPs, of what use will this permit, if approved, be to the Applicant (SERI), in light of the number of unresolved issues and the number of items deferred to the COL stage? 2. In order for the Board to have a better perspective of what is finalized by this EIS, please list and discuss the specific environmental impacts that the Staff believes have been resolved at the ESP stage and, accordingly, need not be addressed at the COL stage. **Response:** 1. The only other EIS for an ESP that has been completed to date is for the Exelon (Clinton) site. Just as with the Grand Gulf ESP EIS, the Staff had sufficient information to resolve the alternative site issue for Clinton, but certain issues at the proposed site, which required more than reconnaissance-level information, were unresolved for Clinton as well. A COL applicant referencing an ESP must determine whether there is any significant new information for resolved issues; however, if there is not any significant new information relating to such issues, further evaluation is not needed. Therefore, resolution of environmental issues prior to the preparation of a COL application reduces an applicant's financial risk. 2. See Attachment B. **SERI Input:** 1. SERI acknowledges that there are certain unresolved

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			environmental issues pertaining to construction and operation of a GGNS ESP facility. As described in SERI's October 23, 2006 brief on environmental issues, however, the number of unresolved issues is limited and only constitutes a small fraction of the total environmental issues considered and resolved in the ER and EIS. Further, for each discrete issue, the Staff made reasonable and supportable assumptions regarding the associated impact levels sufficient to support its conclusions and sufficient for the Board to conduct its NEPA review, including a comparison of impacts. The use of bounding assumptions complies fully with NEPA and is consistent with Council on Environmental Quality regulations. Also, as described in SERI's response to Board Inquiry No. 3 below, a COL applicant that references the GGNS ESP must establish, as part of the Part 52 COL application process, that construction and operation of the selected nuclear plant design is bounded by any assumptions made with respect to these unresolved issues and also provide information on any deferred issues. In addition, the Staff will conduct an independent review of these issues as part of its review of the COL application. Therefore, unless the Board finds that the Staff's assumptions with regard to these matters are unreasonable or unsupportable, the environmental review conducted by the Staff is sufficient and meets the requirements of NEPA. Further, SERI concurs with the Staff that the numerous environmental issues identified in Attachment B to the Staff's response (which is attached herein with SERI's comments) have been resolved by this ESP. These resolved issues will not be reconsidered at the COL stage unless there is significant new information that was not previously evaluated in the ESP. (See SERI response to Board Inquiry No. 3 below for a further discussion of the COL application process.) Accordingly, SERI believes that the benefits of the ESP process have largely been achieved in this application, even with the limited unresolved items. These benefits include the following: • Early resolution of siting issues prior to large investments of financial capital and human resources in new plant design and construction; • Early resolution of issues on the environmental impacts of construction and operation of reactors that fall within the plant parameters; • The ability to bank sites on which nuclear plants may

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			be located; and • The facilitation of future decisions on whether to construct new nuclear power generation facilities. EIS, at 8-2. 2. SERI has reviewed Attachment B. As noted in the Staff's response to Board Inquiry No. 86, an examination of the EIS reveals that only certain particular "sub-issues" under a given general resource area remain unresolved. SERI's suggested revisions to this list are included in Attachment B herewith; items added are in "Italics" font.
2	General	General	A separate PPE table is included in the SER (Table 1.3-1) and the EIS (Appendix I), with some overlap between these two tables. Why is there not a single PPE table for both the SER and the EIS so that all of the PPE parameters and their definitions are in one place? **Response:** Appendix I of the FEIS presents the PPE submitted by the Applicant in its ER. The listing is not a complete listing of plant parameters, but is a listing of the plant parameters that the Applicant considered relevant to the environmental review (ER page 3.1-1). Similarly, the PPE listing in the SSAR includes only those plant parameters relevant to the site-suitability evaluation (SSAR page 1.3-5). The Applicant states that the PPE tables in the two documents are different because of the different reasons for development of the ER and SSAR (SSAR page 1.3-5). Because the PPE tables in the SER and EIS are consistent where they overlap, the Staff saw no advantage in restating extraneous information that was not relevant to the specific safety or environmental review. **SERI Input:** As noted in the above Staff response, the ESP application does note that the PPE listings appearing in the SSAR and ER are different, providing only those parameters relevant to that particular review. While there are common aspects between the PPE parameters needed for safety and environmental reviews, the overall processes differ. The subject reviews are governed by different statues and regulations. Format/content on information and analyses, as well as NRC Staff review guidance, are established separately. The PPE development process began with single set of parameters to be used for the ESP application.

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			However, due to differences in regulations, format/content, analysis methods and criteria, and Staff review guidance, SERI decided that separate listings of relevant parameters would be provided in the SSAR and ER portions of the application.
3	General	General	There are numerous items in the EIS that are either characterized as unresolved and/or deferred to the COL stage. 1. What criteria was used to delineate an item as a license condition, COL action item, or merely one deferred to the COL stage? 2. Is there a comprehensive list of all of these items? If yes, please provide a copy. 3. If no list has been compiled, please explain how the Staff intends to: (A) ensure that each item is in fact performed at the COL stage; (B) ensure that a COL Applicant will not be able to improperly claim that a particular item was resolved at the ESP stage when in fact it was not. 4. Are there any license and/or regulatory processes in place to assure that all these items are in fact performed at the COL stage? **Response:** 1. The Staff would have recommended permit conditions if the Staff had determined that some future action by the holder of the ESP (or COL applicant referencing it) was *necessary to ensure compliance* with NRC regulations. By contrast, Staff identified COL Action Items in the Grand Gulf SER for specific matters that the Staff concluded that a future COL applicant *should address* in a facility Final Safety Analysis Report. In contrast, the FEIS does not identify any COL Action Items. The criteria for issues that were deferred in the Grand Gulf FEIS included whether the ESP application did not address the issue (*e.g.*, the benefits assessment) or whether the issue could not be resolved because 1) the ESP application did not provide sufficient information or 2) other information was not then available (without undue speculation) to allow the Staff to reach a conclusion on the impacts. 2. The Staff did not find it necessary to recommend any permit conditions relating to 10 CFR Part 51 compliance and it did not specify COL Action Items for the issues addressed

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			in the FEIS because the proposed action did not include direct site modification (*e.g.*, ground disturbing) activities or other indirect environmental impacts. Although there is no comprehensive list of environmental issues that will be deferred, Tables 4-3 and 5-17 of the FEIS list the construction and operational impacts that remain unresolved. 3. and 4. See response to Inquiry No. 20. **SERI Input:** 1. SERI has no additional comments or input. 2. SERI has no additional comments or input. 3. See response to Board Inquiry No. 4. below. 4. The following supplemental discussion is provided regarding regulations and administrative processes relevant to management and control, at the COL stage, of various environmental issues identified in the ESP EIS. a. Overall, pursuant to *proposed* 10 CFR 52.80, the COL application must contain a complete environmental report per § 51.50(c). Specifically, *proposed* § 51.50(c)(1) defines ER information requirements for a COL application referencing an ESP. • The demonstration required by *proposed* § 51.50(c)(1)(i) will compare the selected design with the surrogate design defined by the PPE parameters listed in the ESP application ER Chapter 3 (also shown in EIS Appendix I). This comparison will be provided in the COL application ER for NRC Staff review. • Pursuant to *proposed* § 51.50(c)(1)(ii) and (iii), the COL application ER must contain information to address those issues not resolved at ESP as well as any new, significant information related to those issues resolved at ESP. As a practical matter, "not resolved" would include those issues deferred (*e.g.*, need for power, EIS Section 1.1.3) and those issues explicitly identified in the ESP EIS as "not resolved" (*e.g.*, transmission corridor related impacts, EIS Section 4.1.2). • As required by *proposed* §51.50(c)(1)(iv), the COL application ER will describe the process used to identify new and significant information that would impact NRC conclusions in the ESP EIS. Pursuant to *proposed* § 51.50(c)(1)(v), the COL application ER would demonstrate that all environmental terms

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			and conditions that have been included in the ESP will be satisfied by the date of issuance of the combined license. b. Appropriate processes, including implementing administrative controls, will be established by the COL applicant to ensure that the COL application ER contains the necessary information, as discussed above. The development of this information would include consideration and review, as appropriate, of the ESP EIS for those issues that are resolved and not resolved. • As indicated in SERI comment to Board Inquiry on the SER, No. 6 B(1), a draft of the proposed Grand Gulf Early Site Permit has not been made available to SERI for review. However, any conditions described in the Permit would be included in the administrative processes developed to ensure a complete COLA ER, as appropriate. • As a part of a COL application development process, it is expected that the ESP EIS (including Appendix J, Tables J-1 and J-2) would be reviewed for assumptions to be considered in the review for significant new information. • Also, during the COL application development process, the ER and EIS will be reviewed for commitments to future actions. These commitments will be considered for impact to the COL ER, as well as incorporated into a commitment management system. The system would be developed at an appropriate time during the COL process. (See also SERI Input to Board SER Inquiry No. 6(B)(1) regarding management of commitments in the ESP application.) • The ESP ER and EIS, along with other appropriate sources, would be considered in the development of State, local, and federal permits, licenses, or other approvals required to support the construction and operation of the proposed new facility at the ESP site.
4	General	General	The EIS states that it "used its experience and judgment to adapt the review guidance in the ESRP and to develop assumptions necessary to evaluate impacts to certain environmental resources to account for . . . missing information [from the SERI ESP application]" (EIS at 3-4). 1. Has the Staff prepared a comprehensive list of all the

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			assumptions it has made with respect to either site characteristics or with respect to future actions by the Applicant? 2. Given the fact that depending on how these assumptions are ultimately resolved, there could be significant impacts to the environment, how does the Staff intend to assure that its assumptions are properly tracked, verified, incorporated, and corrected (as needed), during the COL process? **Response:** 1. The Staff has not prepared a comprehensive list of *all* the assumptions it has made with respect to either site characteristics or with respect to future actions by the Applicant. However, Table J-2 of Appendix J lists key assumptions used by the Staff in assessing the environmental impacts at the Grand Gulf ESP site. See the response to Inquiry No. 8 for a definition of "key assumption." 2. During its review of a COL application referencing an ESP, the Staff will use NEPA tiering principles and incorporation by reference to consider whether there is any significant new information regarding issues that were resolved in the ESP proceeding, including any significant new information related to an assumption. Where assumptions (*e.g.*, those enumerated in Appendix J) need to be verified, the Staff would conduct the verification at the COL stage in a manner similar to that employed during the review of the ESP application, *i.e.*, the Staff would review information provided by the applicant in its ER and during the Staff's audit, and perform an independent review of these matters, including obtaining and reviewing information from local, State, Tribal, and Federal authorities. **SERI Input:** 1. SERI has no additional comments or input. 2. Regarding treatment of assumptions listed in the ESP EIS, see SERI comments in response to Board Inquiry No. 3(4).
5	General	General	Please identify the parameters and environmental impacts for which the combined effects of GGNS Unit 1 and the GGESP facility are/will be considered. **Response:** The Staff considered the combined effects of GGNS Unit 1 and the proposed GG ESP facility for all relevant parameters and environmental impacts. For example, cumulative

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			impacts of severe accidents were considered by comparing the risks of severe accidents for new units at the site with the risk of a severe accident at the existing unit. The Staff determined that the risks associated with severe accidents at the units would be small compared to the risks associated with the existing unit. On the other hand, cumulative impacts of design basis accidents were not considered because: 1) the purpose of the design basis accident analysis is to compare predicted consequences (doses) with regulatory limits and guidance that pertain to individual reactors, and 2) the likelihood of simultaneous design accidents is small. **SERI Input:** As discussed in Chapter 7 of the EIS (EIS at 7-1) the impacts of the proposed action, as described in [EIS] Chapters 4 and 5, are combined with other past, present, and reasonably foreseeable future actions in the vicinity of the Grand Gulf ESP site that would affect the same resources impacted by the current GGNS regardless of what agency (Federal or non-Federal) or person undertakes such other actions. These combined impacts are defined as "cumulative" in Title 40 of the Code of Federal Regulations (CFR) 1508.7 and include individually minor but collectively significant actions taking place over a period of time. Thus, the combined effects of GGNS Unit 1 and the GGNS ESP facility are considered. Cumulative impacts, which include the combined effects of the proposed action and those of the existing GGNS facility where appropriate, were considered for issues such as air quality, water use and quality, terrestrial ecosystem, aquatic ecosystem, socioeconomics, historic and cultural resources, environmental justice, nonradiological health, and radiological impacts of normal operations. Additionally, combined impacts are discussed in the SERI response to Board Inquiry Nos. 22 and 52 for effluent discharges and maximum individual dose, respectively. Also monitoring programs, such as the REMP, would be common for all operating units on the site.
6	General	App. I	The PPE table in Appendix I is incomplete with respect to the guidance found in NEI-01-02, and with respect to the PPE tables found in other ESP SERs and EISs (*e.g.*, Clinton ESP) prepared by the Staff. Why does the Staff not utilize a consistent and uniform approach for establishing the PPE given that the PPE forms the basis for evaluating the acceptability of a particular plant design?

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			Response: The Staff does use a consistent process for evaluating ESP applications and any included PPE. *See* RS-002. However, this review guidance allows for consideration of site-specific factors as well as differences among the designs contemplated by different applicants. Accordingly, it is expected that variations between ESPs may result. Here, the Applicant was responsible for establishing the PPE as part of its basis for justifying the proposed action. Appendix I of the FEIS presents the PPE submitted by SERI in its ER. The listing is not a complete listing of plant parameters, it is a listing of the plant parameters that the Applicant considered relevant to the environmental review (ER page 3.1-1). Similarly, the PPE listing in the SSAR includes only those plant parameters relevant to the site-suitability evaluation (SSAR page 1.3-5). The Applicant states that the PPE tables in the two documents are different because of the different reasons for development of the ER and SSAR (SSAR page 1.3-5). **SERI Input:** As noted in SSAR Subsection 1.3.1.1, NEI-01-02 provided a generic template for the PPE development. Also as noted in SSAR 1.3.1.3, the initial PPE worksheet listing of parameters from which the final PPE was developed was based on NEI-01-02. That particular NEI guidance document was not finalized or endorsed by the NRC. (See NRC letter to NEI, dated November 20, 2001.) However, NEI-01-02 provides an effective starting point for continued, extensive discussions both within the industry and with the NRC, primarily during the ESP "pre-application" NEI-NRC interactions. The final form of the PPE in each of the three pilot ESP applications generally reflected the latest industry approach to PPE development and parameters. However, site-specific differences could lead to variations in PPE parameters. The types of technologies considered may differ from application to application. Site specific limitations, such as cooling water or land use considerations, could constrain the number of units, even if the technologies were identical. Such differences would likely result in variations in the bounding parameter values. Lastly, it is recognized that, while there was close coordination between the 3 ESP pilot applicants (through the NEI ESP Task Force), these were the first ESP applications developed under Part 52. The applications were being developed in parallel with the refinement of the PPE method and the NRC Staff's development of RS-002. Thus, some

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			variations in parameter listings, format, content, etc. could be expected. However, in the end, it should be remembered that the PPE for a given site and ESP application defines the surrogate design for evaluating site suitability and environmental impacts. Per Part 52, a COL applicant referencing the ESP must demonstrate that final design falls within the design parameters established in the ESP (via the surrogate PPE) for that specific site. If an ESP design parameter is not bounding, then a variance from the ESP would be requested and evaluated in the COL application.
7	J-2 to J-12	App. J	1. Table J-1: Please provide the reference section/page numbers for the ER, or the ADAMS accession number and date of the Applicant's RAI response, in which the Applicant's assumptions are initially stated? 2. Table J-2: Please provide the reference page numbers for the EIS, in which the Applicant's assumptions are initially stated? **Response:** 1. See Attachment C, which includes a reproduction of Table J-1 with a column added to include the reference section/page numbers for the ER. 2. See Attachment C, which includes a reproduction of Table J-2 with reference page numbers for the EIS added. It should be noted that Table J-2 lists key assumptions used by the Staff in assessing environmental impacts at the Grand Gulf ESP site. See the response to Inquiry 8, which explains the rationale behind listing key assumptions in Table J-2. **SERI Input:** SERI has no additional comments or input.
8	J-12 to J-16	App. J	Table J-2 does not appear to list all of the staff assumptions (*e.g.*, the Staff's assumptions regarding endangered species (EIS at 4-28)). Please explain the Staff's rationale for not including all documented Staff assumptions in Table J-2. **Response:** Table J-2 contains the Staff's key assumptions (*i.e.*, information beyond that presented in the ER or otherwise currently available). The definition of "key assumption" included the following three conditions: (1) the assumption was necessary to reach a conclusion regarding impact at the proposed site (including the comparison to alternative sites); (2) the assumption would warrant verification at the CP or COL stage to ensure that the ESP conclusion remains valid;

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			and (3) the NEPA process is the only mechanism by which verification of the assumption would be performed. Where an assessment would be made at the CP or COL stage to comply with other Federal statutes or regulations (such as the Endangered Species Act), assumptions for the ESP were *not* included in Table J-2. For this example, lists of endangered species in the vicinity of the proposed site would not be considered key assumptions because under the ESA, impacts on such species would be evaluated at the CP or COL stage. **SERI Input:** Regarding treatment of assumptions listed in the ESP EIS, Table J-2, see SERI comments in response to Board Inquiry No. 3(4).
9	General	App. J	Will the ESP license contain any assurance that the assumptions made by the Applicant – in response to Staff inquiries – will be tracked, verified, incorporated, and corrected (as needed), during the COL process? **Response:** See responses to Inquiry No. 4(2) and Inquiry No. 20. **SERI Input:** SERI has no additional comments or input.
10	2-18	2.4	Under the upland plain beneath the GGNS, the general geologic strata consists of 75' of loess over 40' of alluvial deposits of the Upland Complex over the Catahoula formation. In the lowland between the bluff and Mississippi River, the subsurface consists of 100 feet of Holocene alluvium over the Catahoula. 1. Is this description consistent with that provided in the FSSAR? 2. How does the Holocene alluvium transition to the Upland Complex? 3. What is the relationship between the Holocene alluvium and the Upland Alluvium, Old Alluvium, Young Alluvium, and New Alluvium discussed in the SER? **Response:** 1. Specific thicknesses cited in the FEIS are in agreement with the ranges cited in the SSAR and the figure. The final SSAR Section 2.4.12.1.2, Local Aquifers, Formations, Sources and Sinks, notes that thicknesses of geologic strata vary over the site. The SSAR states that the Pleistocene loess varies in thickness from 22 to 82 ft over the eastern

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			uplands area of the site. The SSAR also notes that the Pleistocene terrace deposits beneath the loess deposits vary in thickness from 0 to 151 ft. The SSAR reports that the alluvium thickness in the lowlands ranges from 95 to 182 ft. Figure 2.3-22 of the Environmental Report shows thicknesses of the different deposits in the vicinity of the proposed power block construction area as well as in the lowlands to the west of the bluff. 2. The transition from Holocene-age alluvial material located in the flood plain of the Mississippi River, to Pleistocene-age alluvial material of the Terrace deposit occurs along the Loess Hill bluff. Figure 2.3-22 of the Environmental Report shows this transition from lowland to upland. The alluvial material of the Terrace deposit is described as the Upland Complex in the SER. In the SER, the Upland Complex is further described as containing two layers of alluvial material with differing structural properties. 3. The Holocene Alluvium is part of the Mississippi Alluvial Valley deposit, is younger than the Upland Complex. The Holocene is found in lowlands to the west of the Loess Bluff. The Upland Young Alluvium and Old Alluvium are the two alluvial deposits identified in the Upland Complex. The Young Alluvium consists of light gray to brownish yellow sand to silt sand, and the Old Alluvium consists of green to dark gray stratified thinly bedded sands, silty clays and gravels. The age of the Upland Complex is Pleistocene and Pliocene. New Alluvium was not used in the SER, but it can be used interchangeably with the Young Alluvium with respect to the Old Alluvium inside the Upland Complex. **SERI Input:** SERI has no additional comments or input.
11	2-19	2.5	1. Does the monitoring of water for radiologic constituents include both surface and groundwater? If so, what are the temporal background, construction, and operational results to date? 2. Is there sufficient background data to quantify pre-development groundwater quality (prior to any site development), and existing operational groundwater quality data that might be representative of the "baseline" conditions for the ESP site? **Response:** 1. Yes. Both surface and groundwater are monitored under the Radiological Environmental Monitoring Program (REMP). The REMP includes 3 samples of surface water, 1 upstream,

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			1 downstream, and 1 downstream during a liquid radwaste discharge. These samples are submitted for a gamma isotopic and tritium analyses. Two samples of groundwater are taken at two different wells on an annual basis. These samples have both gamma isotopic and tritium analyses conducted on them. This monitoring is an operational program, and the results are reported annually in the Grand Gulf Nuclear Station Annual Radiological Environmental Monitoring Program Summary. The Staff reviewed the REMP reports for 2001, 2002, and 2003. See ADAMS Accession Nos. ML021200537, ML031120162, and ML041260549, respectively. 2. For the purposes of the ESP analysis, the Staff determined that the REMP for the operation of Unit 1 was also adequate for determining the baseline for comparison with the expected impacts to the environment related to construction and operation of the proposed new unit(s). **SERI Input:** 1) and 2): Refer to ER 6.3.1 for a detailed discussion of past and ongoing water quality programs for the existing GGNS plant and the site, as well as monitoring at various surrounding locations. Ground water sampling is done in the alluvial aquifer at the river, and potable water is sampled per Mississippi Department of Health requirements.
12	2-24	2.6.1.2	1. Is the Catahoula formation an unconfined or confined aquifer? 2. Are the aquifers in the loess and alluvium (*i.e.*, the Upland Complex) connected? If so, what data are available to ascertain whether the Upland Complex acts as a confined or unconfined aquifer? **Response:** 1. For the purposes of this EIS, the Staff assumed that the Catahoula formation was an unconfined aquifer. In the Applicant's ER, the description of aquifers underlying the site is more complete and better supported by data with regard to the Holocene Mississippi River alluvium and the Pleistocene terrace deposits than with regard to the Catahoula Formation of the Miocene series. For example, data on the total porosity, effective porosity, bulk density, storage coefficient, longitudinal dispersion coefficient and distribution coefficients for select analytes are reported in Table 2.3-15 of the ER for two alluvium materials and the terrace deposits. In contrast, no data on these aquifer material properties are presented for the Catahoula Formation. Permeability data on the Catahoula Formation are dominated by laboratory

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			consolidation test results and not field scale aquifer test results. While a single figure (Figure 2.3-22) showing potentiometric level in the Catahoula is described as presenting "the potentiometric level of the confined aquifer within the Catahoula Formation," there is no discussion of core evidence or field study results demonstrating the presence of a confining structure. Indeed, the ER states that "Water-bearing zones within the Catahoula receive recharge from percolation through overlying terrace of alluvium" implying the potentially permeable character of the upper Catahoula Formation in the immediate vicinity of the site. The USGS's Groundwater Atlas of the United States, (Segment 5, Arkansas, Louisiana, Mississippi, Hydrologic Investigations Atlas 730-F, U.S. Geological Survey, Reston, Virginia, 1998.) describes the coastal lowlands aquifer system that underlies southern Mississippi and Louisiana (including the Grand Gulf site) and extends to and into the Gulf of Mexico. Confining units that separate the Catahoula Formation from overlying aquifers are described as existing in that portion of the coastal lowlands aquifer system that lies "off shore from southwestern Louisiana..." The USGS noted that confining units generally are found to separate aquifers that contain saline water or brine and that these confining strata pinch out, or grade by facies change to more permeable strata as they extend updip into the shallower subsurface. The Grand Gulf site lies at the very most updip extent of the coastal lowlands aquifer system. The USGS notes that there is a general absence of widespread confining units. Therefore, without benefit of field studies to the contrary, the Staff conservatively assumed that the Catahoula Formation in the vicinity of the Grand Gulf site is unconfined, albeit less permeable at its interface with the terrace deposits than at depth. The Staff concludes in the EIS that the characterization of the Catahoula Formation presented by the Applicant is inadequate to resolve the impacts to groundwater water-use and groundwater water-quality. In addition to other hydraulic properties, aquifer tests will establish the degree of confinement of the Catahoula Formation prior to issuance of any COL. 2. For the purposes of this EIS, the Staff assumed that the aquifers were connected. The ER states that "Water-bearing zones within the Catahoula receive recharge from percolation through overlying terrace of alluvium." This implies the potentially permeable (not confining) character of the overlying formations in the immediate vicinity of the site. Since the Applicant was proposing to withdraw water from the Catahoula Formation and not from these overlying

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			formations other than for possible safety-related dewatering, consideration of the overlying formations is addressed primarily in the Staff's SER. **SERI Input:** SERI has no additional comments or input.
13	2-29	2.6.3.2	What is the site data to support the statement that the "water quality of the groundwater in the Catahoula formation does not appear to have been influenced by the construction or operation of the GGNS facility"? **Response:** In its ER, SERI presents water quality data for samples taken from the Catahoula aquifer as early as 1972 and more recently (1999, 2000, and 2002) from the three potable water wells at the GGNS site. The limited data set did not suggest a change in water quality in the Catahoula over this period. However, the Staff recognized that the aquifer could have changed without being detected, given the limited amount of data available. Therefore, the issue of groundwater quality remains unresolved. **SERI Input:** SERI has no additional comments or input.
14	2-29	2.6.3.3	1. Why has the existing thermal plume not been monitored sufficiently to calibrate the CORMIX model? 2. What evidence is there that the Clean Water Act § 316(a) monitoring would provide the calibration data when the historic monitoring has not? 3. Please explain how continuation of the existing monitoring program at GGNS could provide adequate thermal monitoring for a new plant when the program has not even provided sufficient data to date to calibrate the model? **Response:** 1. A detailed analysis would have been performed if the Staff determined that the thermal plume impacts could have been significant. The Staff conducted a conservative analysis using high river temperature and low flow (based on the PPE) and concluded that the thermal plume extent would not be significant. Therefore, in this case, the Staff found that there was no need for the Applicant to perform a detailed analysis. 2. The Staff determined that existing data were sufficient to support its conservative analysis and reach its conclusion on the thermal impacts; the Staff's analysis did not rely on either historic monitoring data or an expected need for future CWA

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			monitoring. However, the Staff noted that calibration and testing of a thermal plume model to observations in the Mississippi River during operation of GGNS Unit 1 would provide adequate confidence in the model to support a less conservative assessment of the impact of the thermal discharge of the ESP unit. In any event, the NRC does not have discretion in specifying nonradiological water quality monitoring requirements. *See* Tennessee Valley Authority (Yellow Creek Nuclear Plant, Units 1 and 2), ALAB-515, 8 NRC 702 (1978). All nonradiological water quality monitoring requirements are set by MDEQ. The MDEQ may elect to require further refinement of the bounding analysis performed by the Staff. In its 316(a) review, MDEQ may decide that monitoring data adequate to calibrate and test a thermal plume model, such as CORMIX, are required of the applicant. Such monitoring data might include time-series profiles of three-dimensional water velocity and water temperature data in the vicinity and downstream of the existing outfall for a variety of conditions. 3. The existing historic data are sufficient to perform a bounding analysis. The Staff performed its analyses of the thermal plume using bounding river conditions and bounding inputs from the applicant's PPE. To determine the bounding river conditions, the Staff considered Mississippi River discharge and upstream temperature conditions (Table 5-2 of EIS) based on (1) observed monthly average Mississippi River streamflow data collected between 1931 and 1998 near Vicksburg and (2) observed water temperature data maxima and minima between 1962 and 1979. The winter low-flow scenario (3115 m3/s) with the minimum ambient river temperature (1 C) produced the largest plume. Because a bounding analysis was performed, and because the extent of the resulting plume is larger than what could be reasonably expected to occur at any time during full-load operating conditions, the Staff found that the impact of the thermal plume on the Mississippi River would still be small and localized. If time-series profiles of three-dimensional water velocity and water temperature data had been collected near the existing outfall, a thermal plume model could have been calibrated and tested against field conditions for the existing GGNS Unit 1. Although the model was not calibrated against a detailed set of hydrodynamic and water quality data, the Staff found that the values computed by the bounding thermal plume analysis are suitable for the determinations made in the EIS. NEPA does not require the degree of conservatism employed

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			in the Staff's thermal plume analysis. If data sets were available, such as time-series profiles of three-dimensional water velocities and water temperature data, the Staff would likely have a basis to relax some of the conservatism in the bounding analysis described in the EIS and thereby reduce the size of the expected plume. However, the bounding analysis showed that the extent of the thermal plume would be small and localized and, therefore, the Staff determined that further refinement of the analysis was not warranted. **SERI Input:** SERI provides the following additional information regarding the need for calibration of the CORMIX software. SERI reported the following regarding the need for CORMIX "calibration" in ER 5.3.2.1: "The CORMIX 3 system, which is used for prediction of buoyant surfaces discharges, was used exclusively for this analysis. A comparison of actual thermal discharges at Point Beach Nuclear Power Plant and Palisades Nuclear Power Plant with the predicted values from CORMIX 3 showed that the CORMIX predictions provided adequate agreement with both the geometry of the flow and the surface temperatures ([ER 5.3] Reference 10)." Further, CORMIX software is used extensively for this type application, and there are numerous publicly available reports and papers indicating the software provides good agreement with actual data. Therefore, SERI did not believe it was necessary to "calibrate" the software for this ESP application analysis. The thermal monitoring program for the existing Grand Gulf unit is designed based on requirements set by MDEQ, as noted above, in the NPDES permit.
15	2-30	2.6.3.4	1. Please define "limited water quality baseline of the affected environment." 2. Are the existing or future baseline data adequate to allow discrimination in the future between existing impacts and any potential new releases from a new plant? **Response:** 1. Water quality data is limited by the frequency, the locations, and the suite of chemicals analyzed. Additionally, in this situation, quality control protocols used in the monitoring prior to construction of GGNS would not meet current standards. MDEQ may elect to require baseline monitoring to establish background conditions for the ESP plant. This could involve sampling both upgradient and

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			downgradient of the existing GGNS. 2. The Staff made no judgment with respect to the adequacy of the baseline determination. Here, the Staff was just describing the ongoing monitoring programs that could be used by MDEQ if it chose to do so. The Staff does not know what further data the MDEQ may ultimately require from the applicant. **SERI Input:** SERI has no additional comments or input.
16	2-31	2.7.1	Explain how the Army Corps of Engineers attempted to stabilize the eastern bank of the Mississippi in the Grand Gulf area and why the Staff believes that this will be successful? **Response:** The Army Corps of Engineers attempted to stabilize the eastern bank of the Mississippi in the Grand Gulf area by emplacement of revetments, as stated on page 2-31 of the FEIS. The emplacement of revetments is referenced to the ER in the FEIS, and the revetments were also observed by the Staff during the site audit, although the latter is not stated in the FEIS. The Staff believes that bank stabilization will be successful because revetments are a common and well-recognized method of performing successful bank stabilization along river and stream banks worldwide. **SERI Input:** As noted in the Staff response, a description of the revetments in the vicinity of GGNS is provided in ER section 2.3.1.1.1. In summary, the Corps of Engineers completed revetments along the east and west river banks, including the east bank that borders the GGNS site, to maintain the river channel. The Grand Gulf revetments in the two sections from approximately river mile 400.5 to 405.0 and 408.5 to 409.6 were completed in the 1960s and 1970s. The intervening section, which includes the river stretch near the GGNS site, was left unprotected to undergo erosion until it attained an acceptable alignment. The section on the east bank along the GGNS site boundary was completed in stages from the mid-1970s to the early 1980s, with a small gap at the existing GGNS barge slip. . . . The Corps of Engineers continues to evaluate the need for additional shoreline work, and would be expected to make improvements as considered appropriate. SERI will be required to comply with federal and state regulations during the design and construction of an embayment and intake structure, as discussed in the ER (Section 2.3.1.1.1, Page 2.3-3). It will be required to

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			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. The design and placement of the embayment and intake structure will be in accordance with the Corps guidance, MDEQ and EPA requirements, as well as good engineering practice.
17	2-76	2.8.2.4	The EIS states that 800 campers use the Warner-Tully Camp facility per year. What is the maximum capacity of the camp at any given time and how many days per year is the camp facility occupied? **Response:** The Warner-Tully Camp facility has an approximate capacity of 120. The YMCA conducts week-long "resident camps" with up to about 90 campers, plus counselors and adult Staff on site. It also rents out the facility to outside groups. It is a summer-only facility, with a season that now begins in June. The Staff does not have a complete picture of how many days a year the facility is occupied, since this varies significantly depending on the number and type of groups renting the facility. Over time, the facility has seen a slow decline in the number of campers served. In years past, the YMCA conducted 4 week-long resident camps, and rented out its facility at other times during the summer. During the most recent year, the facility conducted only 3 resident camps with only about 70 campers (plus adults and counselors) per session. In addition, there were an estimated 300 people in outside groups that rented the facility. The total attendance for the most recent year thus would have been somewhere between 500 and 600 persons using the camp rather than 800. **SERI Input:** SERI has no additional comments or input.
18	2-83	2.9.3	Explain the visual impact of the proposed cooling tower on the Grand Gulf Military Park. **Response:** The visual impact of the proposed cooling tower on Grand Gulf Military Park is expected to be SMALL for two reasons. First, like the existing natural draft cooling tower at GGNS, the additional cooling tower is expected to be masked by terrain and mature trees. From within the Park, the only vantage point from which the existing cooling tower can be seen is from the top of Park's observation tower. Even then,

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			it is largely masked by vegetation. Second, the plume from the tower, while expected to be evident to observers in the Park at times, would be at most an addition to the existing plume and would not significantly change the existing view. **SERI Input:** SERI has no additional comments or input.
19	3-1	3.0	The EIS states that "SERI's application encompasses construction and operation of one or more new nuclear units generating as much as 8600 MW(t) or 3000 MW(e) output. "Please clarify how this comports with the SER, which identifies a thermal limit of 4300 MW(t) or 2000 MW(e). The PPE also identifies a limit of only 4300 MW(e). **Response:** The Applicant and the Staff statements are consistent. In SAR Section 1.3.1.4, Grand Gulf Site Specific "Bounding Plant," SERI indicated that the site capacity "target" of 2000 MW(e) was only an initial step in PPE development, meaning that no less than an additional 2000 MW(e) was being considered for the Grand Gulf ESP site. Because the reactor types considered by SERI ranged up to 1500 MW(e), the Staff doubled the bounding number for each PPE value, where appropriate. In its SAR Table 1.3-1 and again in its ER Table 3.0-1, SERI represented that the "Composite Value" generally reflects the values corresponding to a plant that is twice the vendor's specified "standard size plant" and that the PPE bounding values were "driven" by a multiple of reactor units representing a total generation capacity that was either equivalent to or, in some cases, much greater than 2000 MW(e). Therefore, in some cases, the values were designated as unit specific (US) values that had to be doubled for the site; consequently, the value of 4300 MW(t) per unit was doubled to 8600 MW(t) for the site, so that the approximately 1500 MW(e) was doubled to about 3000 MW(e) to exceed the floor of 2000 MW(e) for the site. As a general matter, differences may exist between the Staff's EIS and its SER, or between the Staff's EIS and the applicant's ER. Differences between the Staff's safety and environmental reviews may result from the statutory and regulatory requirements for each review. The Staff's safety review is performed under the Atomic Energy Act and in accordance with the regulations in 10 CFR Part 52. The environmental review is performed under the National Environmental Policy Act (NEPA) as implemented in NRC regulations at 10 CFR Part 51. Whereas the safety review is focused primarily on protecting the health and safety of the

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			public, the environmental review considers a much broader range of impacts to the environment as a whole. The differences between the Staff's EIS and an applicant's ER may result from the Staff's independent assessment or from reliance on data, assumptions, or methods different from those presented by the applicant. **SERI Input:** As noted in the above Staff response, PPE parameter 17.3 in ER Table 3.0-1 is 4300 Megawatts Thermal (not MWe as noted in the Board Inquiry). This value is the bounding unit-specific thermal power output for all the reactor designs considered in the PPE and is associated with the ABWR. Reactor plant electric output (MWe) was used as a tool in the development of the PPE and used, as well, in the comparison of alternative energy sources. (See SERI input to Board Inquiry No. 67.) However, MWe is not a PPE listed parameter. As a matter of completeness, SERI provided the following clarifications on this topic in its responses to the Board's SER Inquiries Nos. 8 and 9: ASLB SER Inquiry No. 8(C): PPE values listed in SSAR Table 1.3-1 are based on the PPE development process described in SSAR Section 1.3.1.3. SSAR Table 1.3-1 lists those parameters relevant to the safety analyses. For each parameter, the most limiting value was selected. As described in the Staff response, the 2000 MWe value is a "target site capacity" and is discussed in detail in SSAR Section 1.3.1.4. The establishment of this value was an "initial step in PPE development" (SSAR, page 1.3-4). ASLB SER Inquiry No. 9: (A) SSAR Section 1.3.1.3 lists those designs considered in the development of the PPE. The ABWR is described as a reactor plant with power ratings of "4300 MWt plant, 1500 MWe." The 8600 MWt value is not explicitly stated in the SSAR. (B) Footnote 3 (SSAR page 1.3-5) indicates the largest LWR considered in the PPE "has a capacity rating of 1500 MWe per unit; thus, to meet the target site capacity of 2000 MWe, two units are required, resulting in a total site electrical capacity of 3000 MWe." While the 8600 MWt value was not explicitly stated in the SSAR, two ABWR units represent the largest MWt possible (of the plant types considered for the ESP) that would satisfy the target site capacity. This is

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			consistent with the Staff Response to 9(B). As discussed above, if the selected facility does not fall within this value, then a COL application referencing the ESBWR design shall include a request for variance. Thus, if the COL referenced a design having with greater than 4300 MWt per unit or 8600 MWt for twin units, a variance would be required.
20	3-6	3.2	The last paragraph on this page is not clear. Are Tables 4-3 and 5-17 complete summaries of the environmental impacts the Staff would assess during the COL stage? **Response:** No, Tables 4-3 and 5-17 list all of the environmental impacts of construction and operation that were addressed in the ESP application and reviewed by the Staff. The Staff did not identify any impacts of construction or operation that were not addressed in the application - *i.e.*, none of these impacts have been deferred. Some of the impacts that were addressed in the application remain unresolved (*e.g.*, water quality). Although this inquiry focused on the tables in Chapters 4 and 5, other aspects of the environmental impacts of the proposed action (*e.g.*, fuel cycle, transportation) are addressed in Chapters 6 and 7. Some of these issues remain unresolved, particularly the issues related to other than light-water-cooled reactors. In addition, as noted in Chapter 10, the issues of (1) irreversible and irretrievable commitments of resources and (2) the relationship between the short-term uses and long-term productivity of the human environment remain unresolved. See the responses to Inquiries 1 and 3 for additional information regarding issues that are resolved and unresolved. In the last paragraph on page 3-6 the Staff attempted to briefly summarize how it plans to handle the review of a combined license (COL) application that references an early site permit (ESP). When an ESP is issued, each issue will be either resolved, unresolved, or deferred. An issue is resolved if the Staff had sufficient information (either from the applicant or from other sources) to reach a conclusion on the level of impact resulting from plant construction or operation. An issue is unresolved if the ESP application did not provide sufficient information to allow the Staff (and, ultimately, the Board) to reach a conclusion on the level of the impact. Issues will be deferred if the ESP application, where so permitted by the agency's regulations, did not address the issue (*e.g.*, the benefits assessment). For the purposes of the Staff's review of a COL referencing an ESP, there is really no practical difference between an unresolved issue

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			and a deferred issue. The balance of this response addresses how the Staff will perform its review of a COL application referencing an ESP. Pursuant to 10 C.F.R. 51.70(b) and 51.90, the NRC is required to independently evaluate and be responsible for the reliability of all information used in the EIS, including an EIS prepared for a COL. In carrying out its responsibilities under 10 C.F.R. 51.70(b), the Staff may (1) inquire into the continued validity of information disclosed in an EIS for an ESP that is referenced in a COL application and (2) look for any new information that may affect the assumptions, analysis, or conclusions reached in the ESP EIS. The initial burden to assess newly identified information and those issues that were not resolved in the ESP proceeding (including unresolved issues) falls to the applicant. The applicant is required to provide information sufficient to resolve any significant environmental issue not considered in the ESP proceeding, either for the site or design, and the information contained in the application should be sufficient to aid the Commission in its development of an independent analysis (see 10 C.F.R. 51.45). Furthermore, the environmental report must contain any significant new information for issues related to the impacts of construction and operation of the facility that were resolved in the ESP proceeding. The Staff, in the context of a COL application that references an ESP, defines "new" in the phrase "new and significant information" as any information that was not considered in preparing the environmental report included in the ESP application or the ESP EIS and that was not generally known or publicly available during the preparation of the ESP EIS. This new information may include (but is not limited to) specific design information that was not contained in the application, especially where the design interacts with the environment, or where information that was in the ESP application has changed by the time of the COL application. Such new information may or may not be significant. See the NRC letter to NEI dated July 6, 2005, ADAMS ML051050031. **SERI Input:** Regarding the treatment of resolved, unresolved, and deferred items, see also SERI comments in response to Board Inquiry No. 3(4).
21	3-7	3.2.1.2	1. Why do the sources of water for the proposed facility include both a new well and the new intake on the Mississippi River? Wouldn't the intake serve all water needs?

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			2. What is the characterization of the sediments expected to be filtered from the Mississippi River, and is there any possibility that the sediments would require special handling and disposal? **Response:** 1. The Staff believes that there is adequate water supply in the Mississippi River to satisfy both demands. However, the Staff did not review the Applicant's motivation for proposing the design with reference to two separate water sources. Without a specific design, the potential need for two independent water sources cannot be evaluated. 2. The exact design of the water treatment facility is not specified at the ESP stage. Sediment filtration requirements would be dependent on the specific plant design (notably the cooling system design). Sediment returned in the discharge would be regulated by MDEQ through the NPDES permit process. **SERI Input:** (1) SERI offers the following clarifications to Board Inquiry No. 1 above. This information also was provided in SERI's responses to the Board's SER Inquiries Nos. 20 and No. 27. (A) Makeup water requirements for the new facility are indicated in the ER, Figure 2.3-29 (see SER at 2-68), and in the SER Appendix A.4. The normal heat sink maximum makeup requirement (blowdown and evaporation losses) is 39,000 gpm per unit, or a total of 78,000 gpm. Additionally, as shown in Figure 2.3-29 of the ER, an ultimate heat sink with cooling tower would require a maximum makeup of 1,700 gpm per unit, or 3,400 gpm total for the UHS for the site. Other (maximum) makeup requirements indicated on the ER Figure 2.3-29, and in Appendix A.4 of the SER, include 1890 gpm for fire protection, 1440 gpm for demineralized water makeup and 240 gpm for potable water. These miscellaneous water uses, plus the UHS makeup, together with the NHS makeup of 78,000 gpm total, equal approximately 85,000 gpm. From the application SSAR Section 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 slip (see Section 2.4.11 and Figure 2.1-1). Ground water would likely be utilized for general plant water uses including potable, sanitary, fire protection, demineralized

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			water, and landscape maintenance. The expected average consumption of ground water for these uses is approximately 1,310 gpm (Table 1.3-1). The expected maximum consumption of ground water for these uses is approximately 3,570 gpm (Table 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. [emphasis added]" As noted in the above quote ground water could be used as a source of some of the makeup; however, should the aquifer not be capable of supporting the needs for the new plant and the existing plant, other sources could be used; *i.e.*, the river intake. (2) As noted in ER 3.3.2.1, clarifiers, or other filtration equipment, would remove suspended solids from the Mississippi River water. 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. The final disposition of the wastes sludge has not been specified at this time. Possible disposal methods include release of the material back to the Mississippi River, or disposal in a land fill either on or off site. A final decision on waste sludge disposition will require coordination with MDEQ at the COL stage. Sediment sampling, other than for radiological parameters routinely conducted as part of the existing radiological environmental monitoring program for Unit 1, is not conducted.
22	3-10	3.2.2.2	The EIS states that "Effluent from the Grand Gulf ESP facility (including blowdown, excess service water, sanitary waste, filter process waste, radwaste effluent, and miscellaneous drain effluent) would be combined with the existing discharges from GGNS Unit 1 facility downstream from the embayment and intake." In the same section it states that "the maximum discharge from all sources would be 2630 L/s (41,700 gpm)." 1. It appears that the maximum discharge number is for the ESP facility only. Shouldn't the combined flow from GGNS Unit 1 and the ESP facility be considered? 2. Why is the maximum discharge (and its maximum temperature) not a PPE parameter? **Response:** 1. The combined flows from the ESP plant and the GGNS

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			were considered in the CORMIX analysis. The maximum ESP discharges provided in the PPE for all sources were combined with the monthly average blowdown of 11,200 gpm reported in the GGNS UFSAR. In the CORMIX analysis, all discharges were conservatively assumed to enter the river at the PPE value for the maximum blowdown temperature. 2. Appendix I of the EIS provides the PPE values for: 2.4.4 Blowdown Flow Rate 12,800 gpm expected (39,000 gpm max) 2.4.5 Blowdown Temperature 100 F **SERI Input:** 1. The PPE only applies to the new facility as it relates to the bounding design parameters against which the environmental impacts to the site are evaluated. As noted in the Staff response above, the combined flows were considered in the analysis for thermal plume in the Mississippi River. As stated in the ER section 5.3.2.1, an analysis of thermal plumes resulting from plant effluent discharges was performed for conditions of summer mean, summer mean low, summer extreme, summer extreme low, winter mean, winter mean low, winter extreme and winter extreme low (see Figures 5.3-4 through 5.3-11). For this evaluation, it was assumed that the effluent from the existing GGNS Unit 1 discharge is combined with that of a new facility into a common discharge. The effluent flow rate was assumed constant at approximately 52,900 gpm (3.3 m^3/s). This flow represents the total of the maximum expected cooling tower blowdown, plus other miscellaneous effluents, from the new facility of about 41,700 gpm (See ER Figure 2.3-29), plus the normal cooling tower blowdown flow for the existing GGNS Unit 1 plant of about 11,200 gpm. 2. Blowdown for the NHS is a PPE parameter as indicated in the Staff response above. The PPE presents design parameters applicable to the new facility only, and it does represent the "maximum discharge" for the new facility.
23	3-13	3.3	What is the basis for the Staff's assumption that the separate distribution line, which runs from the Port Gibson substation to the GGNS switchyard to provide offsite power to GGNS, will "be sufficient to service any new units at the ESP site without modification"? **Response:**

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			The Applicant did not provide detailed information about this line, which provides service to the GGNS. However, although unstated in the FEIS, the Staff considers it likely that offsite power transmission service was sized for the originally planned 2 units at Grand Gulf and that some excess capacity exists. **SERI Input:** The EIS statement that the distribution line from the Port Gibson substation provides offsite power to the Grand Gulf station is correct. However, a clarification is appropriate regarding it's relationship to a new unit or units at the ESP site. The station currently is serviced by three transmission lines: two 500-kv lines and one 115-kv line (the subject line from Port Gibson, Mississippi). As noted in the Grand Gulf Unit 1 UFSAR (Section 8.1.2), the 115-kv line provides a backup source of power to the safety related busses, thus providing independent offsite power supplies capable of carrying safety function loads. The role of the 115-kv line for a new facility will not be established until a specific reactor technology is selected. The selected reactor design will define the off-site power supply needs to meet regulations regarding safety and plant operations. The existing 500-kv lines would be used to carry generated power to the grid from all units, to the extent that they have the capability; the final grid injection power would also be dependent on the reactor design selected and the number of units sited. SERI notes that the 115 kV line likely will need upgrades to support a new plant. A final determination regarding the capability of the 115 kV line would be made at the COL stage, based on the reactor design combined with the needs for Grand Gulf Unit 1.
24	4-2	4.1.1	Why have the Mississippi River sediments not been characterized to indicate potential handling problems with either the water treatment sludge or dredged material? **Response:** The Applicant did not address the potential impacts of dredging, except to acknowledge the possible increases in turbidity. However the Staff, in its evaluation of potential land use impacts of dredging, did identify that there were potential impacts related to disposition of dredge spoils (FEIS at page 4-2 and 4-3). The Staff also recognized that the Applicant did not provide sufficient information to permit resolution of those issues. Consequently, the Staff concluded that the significance of land use issues was unresolved, in part because of the lack of information related to dredging and the disposition of spoils. More detailed information would be

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			required should an application for a limited work authorization, CP, or COL be submitted. **SERI Input:** See response to Board Inquiry No. 21(2), above, regarding characterization of Mississippi River water quality.
25	4-3	4.1.1	Why is the impact of rail service classified as an unresolved issued, when it seems it should be a "non-issue"? The Applicant did not evaluate the use of rail service in its ESP application, and the Staff assumed that it would not be restored. **Response:** In its response to RAI 4.1-1, the Applicant states: "The Environmental Report does not propose, project or evaluate possible changes to rail service. Many variables could affect potential future construction material transportation modes, including the degree to which modular construction methods are to be used. Although not evaluated for the ESP, the Environmental Report does not preclude future consideration and evaluation of rail service." The Staff interpreted this response as an indication that, at the time of a COL application, an applicant might determine that reconditioned rail service is needed. Therefore, the Staff determined that the issue should not be resolved at the ESP stage because not enough information was provided in the Application to analyze potential Land Use impacts (among other potential impacts). **SERI Input:** SERI has no additional comments or input.
26	4-5	4.1.2	Why doesn't the Staff consider the impacts from a new or wider transmission line rights-of-way a fundamental site condition that should be characterized as a basic part of an ESP application? **Response:** The Staff considers the characterization of impacts related to new or wider transmission line rights-of-way to be important. However, the ER at page 1.1-1 indicates that the Applicant's general intention is that a new facility be operated as a merchant plant. Therefore, at FEIS page 3-13, the Staff assumes that the new facility would be a merchant plant. The process for connecting a merchant plant to the grid, including determination of the point of interconnection and transmission line routes, is set forth in the FERC standard interconnection procedures and agreement described in 18

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			CFR 35.28(f). These procedures are lengthy and are likely to be expensive. The Applicant has not initiated this process; therefore, the Applicant is not in a position to specify transmission line routing or rights-of-way widths. As a result, the Staff has not resolved issues associated with transmission line rights-of-way (*e.g.*, FEIS Section 4.1.2 at page 4-5, FEIS Section 4.4.1.5 at page 4-18). **SERI Input:** SERI has no additional comments or input.
27	4-8	4.3.2	1. Why did the Staff not require additional hydraulic testing of the aquifer as a fundamental site parameter that needs to be quantified for an ESP? 2. If the transmissivity of the aquifer is extremely low, couldn't the impacts be LARGE, and not small or moderate as indicated in the EIS? 3. Is there any data to show that there is even minimal withdrawal capacity at the ESP site, so as to assure that this characteristic is not a fatal flaw in selection of the site? **Response:** 1. Activities during construction would include excavation, installing impermeable subsurface structures, and installation of fill. These activities would alter the subsurface environment. The Staff concluded that characterization of the subsurface would be incomplete prior to a detailed design including: specific locations, depths, and fill properties of structures; details of possible dewatering systems; and specific details of surface drainage systems. 2. The Staff concluded that extremely low transmissivities would be self limiting. Drawdown in a pumping well is limited by the depth of the well and the depth of the formation. Of greater concern was that even modest drawdowns might result in water quality impacts to a sole source aquifer. In Section 4.3.3 of the EIS, the Staff concluded that the impacts could be LARGE "if the proposed withdrawal were to induce degradation of water quality of the sole source aquifer." 3. Based on the Staff's review of limited piezometer data in the Catahoula, the Staff was unable to state that the Catahoula could not support the additional withdrawal associated with operation of the ESP plant. However, the GGNS plant currently operates three wells that pump water from the Catahoula. The Staff reviewed groundwater use data for 2001 and 2003 provided by SERI to MDEQ. The groundwater withdrawals reported in 2001 averaged 118 gpm annually. However, in the ER the Applicant reports that

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			during refueling outages two of the three wells operate at near full capacity. Each of the three wells is rated near 500 gpm. In the ER, 1310 gpm is stated as the expected average groundwater use of the ESP plant. Although this data is insufficient to resolve the Catahoula water withdrawal capacity, this data suggests that there is minimal withdrawal capacity at the ESP site, so as to assure that this characteristic is not a fatal flaw in selection of the site. **SERI Input:** 1. SERI has no additional comments or input. 2. See SERI input on Board Inquiry No. 41 below. Regulatory safeguards are in place, with which SERI must comply, to protect the aquifer. 3. SERI has no additional comments or input.
28	4-10	4.3.3	1. What will happen to the dredged spoils, and will any characterization testing be performed to assure minimal water quality impacts as a result of the disturbance? 2. Why was the Applicant not required to perform additional water quality testing of the aquifer as a fundamental site parameter that needs to be quantified for an ESP? 3. If the induced water quality is of such poor nature that the aquifer would be irreparably harmed with additional pumping that is required for the ESP plant, couldn't the impact be LARGE? **Response:** 1. Pursuant to the Clean Water Act, dredging activities are regulated by the U.S. Army Corps of Engineers as part of the Section 404 permit process. The Corps may require additional characterization of sediments that would result from dredging for a specific plant design. Pursuant to Section 401 of the Clean Water Act, any COL applicant referencing the ESP for the Grand Gulf site would be required to provide a certification from the State of Mississippi that the proposed facility would not conflict with the state's water management plans. 2. The Staff concluded that until a specific design is presented by a COL applicant, additional water quality testing at the site would not adequately resolve the impacts of groundwater use and quality. Therefore, the Staff will review the adequacy of the data on subsurface hydrologic characterization, including groundwater quality, at the COL stage. 3. Yes. In Section 4.3.3 of the EIS, the Staff concluded that

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			the impacts could be LARGE "if the proposed withdrawal were to induce degradation of water quality of the sole source aquifer." **SERI Input:** 1. and 2: SERI has no additional comments or input. 3. See SERI Input to Board Inquiry No. 41.
29	4-15	4.4.1.3	Because temporary construction areas in forest habitat would be restored, the Staff assumes that the impacts would be temporary and would therefore be SMALL. What is the basis for this assumption? **Response:** Temporary construction areas (*e.g.*, material lay down areas), estimated to require 109 ha (270 ac), would be located in previously disturbed areas and upland fields where possible, and only as a last resort in forested/wetland areas. Reforestation/restoration of any forests/wetlands impacted by use as temporary construction areas would be undertaken as soon as possible following termination of use, which could feasibly last from months to several years. Reforested/restored forests/wetlands would likely be recolonized by the species that were displaced during temporary use. Such impacts are considered SMALL relative to permanent habitat loss, which precludes future use by wildlife. For example, permanent loss of 109 ha (270 ac) of forest/wetland habitat would be considered a MODERATE impact. **SERI Input:** SERI has no additional comments or input.
30	4-17 to 4-18	4.4.1.4	1. What procedures are in place to assure that the Applicant will perform the botanical survey prior to disturbing any upland or bottom land on the ESP site? 2. Why isn't this classified as a COL action item or a proposed license condition? **Response:** 1. The plant species of concern that could potentially occur on the Grand Gulf site and along the existing transmission line rights-of-way are state-listed species (identified in section 2.1.1.1). There are no state statutes (*e.g.*, comparable to the federal Endangered Species Act) or regulations that would necessitate a botanical survey to locate and avoid potential impacts to the species. However, the NRC has recommended that areas to be disturbed undergo a botanical

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			survey. Because this is a suggestion based solely on good resource management and is not required by statute or regulation, there are no procedures in place to ensure performance of a botanical survey. A botanical survey would be conducted solely at the discretion of the licensee. 2. As noted in the above in the response to Inquiry 30(1), performance of a botanical survey is only a suggestion based solely on good resource management and is not required by statute or regulation. A botanical survey would be conducted solely at the discretion of the Applicant, and, therefore, is not appropriately designated as either a permit condition or COL Action Item. **SERI Input:** Entergy has established procedures, applicable to all of their nuclear sites, for completing an environmental review and evaluation prior to starting any new construction or ground disturbance activities. The checklist includes, but is not limited to, potential impacts on wetlands, federal or state protected species, archaeological resources, air emissions, etc.
31	4-18	4.4.2	1. What is the estimated acreage of benthic macroinvertebrates and shoreline habitat that will be disturbed during ESP construction? 2. If this has not been estimated, why not? Shouldn't this be considered a fundamental site parameter that needs to be quantified for an ESP? **Response:** 1. The Applicant did not provide enough information to estimate the acreage of benthic macroinvertebrates and shoreline habitat that will be disturbed during ESP construction. Please see the response to Inquiry No. 32 for more information. 2. The acreage of benthic macroinvertebrates and shoreline habitat is not considered to be a fundamental site parameter that has to be quantified further than the qualitative information provided by the Applicant and reviewed literature. This is in accordance with 10 CFR § 51.71(d). As with most construction impacts, the Staff considered that the impacts to the aquatic ecosystem would be localized and temporary and found that many could be mitigated. Further detail on the analysis is provided in the Staff's response to Inquiry No. 32. **SERI Input:** SERI has no additional comments or input.

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32	4-18 to 4-20	4.4.2	1. How can the impact to aquatic ecosystems be designated without first quantifying to some degree the acreage of aquatic impact? 2. What assurances are in place that impacts to aquatic ecosystems could be mitigated, since the size of the impact is unknown? 3. The EIS states that the Staff expects SERI will develop and implement plans for the possible widening of the transmission rights-of-way that will have minimal impact on Bayou Pierre and the crystal darter (EIS at 4-20). What is the basis for this expectation, and how will it be enforced at the COL stage? **Response:** 1. While the exact acreage of impacted area was not provided by the Applicant, the Applicant did provide information that could be used to estimate an impact, and more information will be acquired during the CP or COL phase that will further quantify the impact. The Staff's finding that the overall impacts to aquatic resources from construction would be small is based on its determination that: 1) the proposed construction area is an area that has been disturbed by on-going activities and erosion control (including activities in the existing barge slip, riprap and articulated concrete maps); 2) when the area was last surveyed, the shoreline and river substrate were not considered to be high quality habitat for macroinvertebrates; 3) impacts to these areas from the construction can be minimized using best management practices; and 4) during the CP or COL phase, the process for acquiring a dredging permit and complying with the Endangered Species Act would ensure a construction process that would further minimize impacts to the aquatic resources. 2. See response above with respect to general aquatic resources. Mitigation for impacts to T&E species will be determined through federal-to-federal consultation in compliance with the ESA at the CP or COL phase. Compliance with the Clean Water Act and obtaining a dredging permit (Section 404) would also result in best management practices that would minimize impacts. 3. The crystal darter is a state-listed species, and as with the botanical survey addressed in response to Inquiry No. 30, these activities will be conducted solely at the discretion of the Applicant. **SERI Input:**

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			SERI has no additional comments or input.
33	4-21 to 4-22	4.4.3.1	1. What procedures are in place to assure that the Applicant will survey the Mississippi River for potential nest trees, bald cypress, and nesting eagles during the reproductive season? 2. Why isn't the requirement to perform the survey a COL action item or a proposed license condition? **Response:** 1. The surveys for potential nest trees/nesting eagles are based on inclusion of the species in the U.S. Fish and Wildlife Service (FWS) consultation letter to NRC (FEIS pages 4-21 & 4-22, 4-67 (reference FWS 2004a). The NRC will reinitiate consultation with FWS at the CP or COL stage (FEIS section 4.4.3.3). The outcome of that consultation will determine whether or not the surveys recommended as part of the ESP review should be performed. 2. Because the NRC will reinitiate consultation with the FWS at the CP or COL stage and the outcome of that consultation will determine whether or not the surveys recommended as part of the ESP review are needed, it is unnecessary to require surveys as a COL Action Item or a proposed license condition. **SERI Input:** SERI has no additional comments or input.
34	4-23	4.4.3.1	If the Franklin transmission line right-of-way is expanded, what procedures are in place to assure that the USFS Homochitto National Forest is in fact contacted prior to any forest clearing, so that it could ascertain the proximity of the red-cockaded woodpecker. **Response:** As stated above in the response to Inquiry No. 33, the NRC will initiate consultation with the FWS at the CP or COL stage (FEIS section 4.4.3.3). The outcome of that consultation will determine whether or not the USFS Homochitto National Forest should be contacted. **SERI Input:** SERI has no additional comments or input.
35	4-25	4.4.3.1	1. What systems are in place to assure that, prior to disturbing any upland or bottomland forested wetland or upland hardwood forest, a survey is conducted to determine the use of the area by bears and if denning bears are present, that construction activities will be

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			prohibited from December to April? 2. Given the potential prohibition on construction, shouldn't the potential for denning bears be ascertained to some degree at the ESP stage? 3. How will the prohibition against harvesting actual or candidate den sites/trees be captured at the COL stage? How will this prohibition be implemented in the field to assure success? **Response:** 1. As stated above in the responses to Inquiry Nos. 33 and 34, the NRC will initiate consultation with the FWS at the CP or COL stage (FEIS section 4.4.3.3). The outcome of that consultation will determine whether or not the surveys recommended as part of the ESP review should be performed. The prohibition of construction activities to protect denning bears, if present, would be embodied in a FWS Biological Opinion. 2. No. No construction would be authorized pursuant to the proposed ESP. Thus, no potential threat to bears would arise unless and until construction activities commence under a CP or COL. Whether or not an applicant will pursue the project and, if so, when construction would commence (up to 20 years after issuance of the ESP), are both unknowns. Given this uncertainty and because bear use of an area may vary in time (*i.e.*, if they are using the area now, they may not be using it when construction begins, and vice versa), it would be of limited utility to begin to ascertain use at the ESP stage. 3. Should an applicant referencing a Grand Gulf ESP apply for a CP or a COL, the NRC would consult with the FWS regarding the potential impacts of construction and operation of one or more new nuclear facilities on the Louisiana black bear, as described in Part 1 above. Should the biological opinion issued by the FWS at that time contain terms and conditions that are deemed necessary to protect the Louisiana black bear, then it might be appropriate to so condition that permit or license. **SERI Input:** 1. If SERI decides to submit a COL application for the Grand Gulf ESP site, it will, as required by law, enter into informal consultation with the FWS concerning potential impacts on protected species. FWS provides information about the possible presence of protected species in areas of potential disturbance and may include recommendations

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			for surveys or mitigation measures to minimize potential impacts. If the FWS concludes that a protected species may be harmed by activities, then SERI would enter into formal consultation, requiring the preparation of a Biological Assessment of the protected species that includes potential impacts and mitigation measures. The FWS would then prepare the Biological Opinion, which would include potential protective measures, as necessary. 2. SERI has no additional comments or input. 3. See the response to part 1 above. Additionally, compliance with any Federal permit or condition would be referenced in the ER supporting a COL application.
36	4-26 to 4-27	4.4.3.1	What procedures are in place to assure that: 1. If the Franklin transmission line right-of-way needs widening, SERI will work with the appropriate Federal and State agencies and the transmission line owner to develop plans to mitigate impacts to the bayou darter; and 2. SERI will survey intake and discharge structure locations for fat pocketbook mussels, and relocate any species found? **Response:** 1. Assuming that a new facility at the Grand Gulf ESP site would be a merchant generator, if the Franklin transmission line right-of-way were to be widened, then the specific actions needed to accomplish that task would involve SERI, the transmission line owner, the NRC and State and Federal agencies (including FERC, as discussed in Section 3.3 of the FEIS). FERC and NRC would prepare an EIS and both would consult with FWS in compliance with the Endangered Species Act to determine if the specifics of the action before them (in the case of FERC, to widen the right-of-way; in the case of NRC, authorization for construction and operation of one or more new nuclear facilities on the Grand Gulf ESP site) would impact a threatened or endangered species, such as the bayou darter. This process would involve either informal or formal consultations between NRC and FERC (perhaps separately or perhaps as cooperating agencies) and FWS, based on the specific actions before each agency. If formal consultations were determined to be required, NRC and FERC would prepare a biological assessment(s) of the potential impacts of each of the actions on the bayou dater. FWS would prepare a biological opinion(s) and determine what actions are necessary to address potential impacts. Then NRC would work with SERI, and FERC would work with

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			the transmission line owner, to implement any of those actions. 2. SERI has not surveyed for the fat pocketbook mussel. This species was added by FWS after the ER was prepared and in response to a letter by NRC. As discussed in Section 2.7.2.2 of the FEIS, the mussel has been found both upstream and downstream of the ESP site. Therefore, the mussel is probably along the shoreline of the site. At the CP or COL phase, NRC will consult with FWS in compliance with the Endangered Species Act to determine if the changes at the site for the intake and discharge structure will impact the mussel. The procedure will be similar to that mentioned above in response to inquiry 36 part 1 for the bayou dater. The most likely action would be to look for the mussel at the time when shoreline construction takes place, and any mussels that are found in the area could be picked up and relocated to an area that would not have construction activity. **SERI Input:** 1. SERI has no additional comments or input. 2. SERI would like to clarify a statement in Staff Response 2 above. SERI did not survey the GGNS site for the fat pocketbook mussel for the purposes of the ESP. If SERI decides to submit a COL application, then informal consultation with the FWS will take place. At that time, SERI would survey for the mussel to determine if it is present in the area to be disturbed by construction in the river, as appropriate. Relocation of specimens of the mussel is one of several potential mitigation measures; however, any proposed mitigation measure must be approved by the FWS.
37	4-28	4.4.3.3	While the impact of construction on federally listed species would be small, and additional mitigation would not be warranted beyond that identified in the EIS, how will the many mitigation requirements be identified in the ESP license and tracked at the COL stage? **Response:** It is not necessary to incorporate mitigation requirements for federally listed species into the ESP license, since there would be no construction under the ESP, and hence no need for mitigation. As stated above in the responses to Inquiry Nos. 33, 34, and 35, the NRC will initiate consultation with the FWS at the CP or COL stage (FEIS section 4.4.3.3). The outcome of that consultation will determine the actual mitigation requirements to be implemented, and these would be embodied in a FWS Biological Opinion, which could be

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			referenced in the COL. **SERI Input:** Commitments to future actions, including commitments to implement mitigation measures, would be identified in SERI's reviews of the ESP ER and EIS as part of the COL application preparation process. See SERI comments in response to Board Inquiry No. 3(4). See also SERI response to Board Inquiry No. 35 regarding consultation with the FWS at COL.
38	4-30	4.5.1.1	The EIS states that mitigation measures to control fugitive dust would be prepared prior to construction. How will this commitment be captured at the COL stage? **Response:** Table J-2 of Appendix J indicates that the Staff relied on the use of "dust control measures during construction and operation" in reaching its conclusion with respect to air quality impact during construction. During its review of a COL application referencing a Grand Gulf ESP, the Staff would consider whether there is any significant new information regarding mitigation measures to control fugitive dust. **SERI Input:** As noted in ER Section 4.4.1.2.1, dust control measures of various types would be implemented during construction. In some cases, as appropriate, design features of certain equipment may be used to control dust. This commitment to future action would be captured and managed as part of a commitment management system, as required. See SERI comments in response to Board Inquiry No. 3(4).
39	4-32	4.5.1.5	The Staff concludes that "the overall physical impacts of construction on workers and the local public, buildings, roads, and aesthetics would be SMALL as long as the mitigative actions, such as noise, dust, and traffic control identified by SERI are undertaken." It appears that SERI has not yet drafted these control plans, and has only identified the issues. 1. If that is correct, what is the basis for the Staff's conclusion that these plans will be adequate? 2. Once plans are drafted by SERI, how will the commitments noted above be captured at the COL stage? **Response:** 1. Since SERI has not selected a facility design or a construction plan for the proposed facility the Staff chose to

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			rely on SERI's identification of potential physical impacts, as well as on its statements in the Application that relevant regulations applicable to dust, noise, and pollution would be adhered to, and that control plans would be put in place. The Staff relied on these representations and assumed that a COL applicant would adhere to these commitments. 2. Table J-1 of Appendix J lists several statements that Staff relied in reaching its conclusion regarding the overall physical impacts of construction. During its review of a COL application referencing a Grand Gulf ESP, the Staff would consider whether there is any significant new information regarding these statements that would impact this conclusion. **SERI Input:** 1. SERI would like to add the following information in response to this inquiry. It is our understanding that SERI is not required to have control plans in place at the ESP stage for noise, dust, and traffic control impacts that may occur during construction of the reactor. SERI would also like to point out that the construction of a nuclear plant is similar to other large construction projects, in that Best Management Practices, widely accepted by the construction industry, can adequately control noise, fugitive dust, and pollution. These practices are not dependent on the facility design. 2. See SERI comment in response to Board Inquiry No. 3(4).
40	4-41	4.5.4.4	Please clarify if there is sufficient wastewater treatment capacity to handle the large construction force. If not, how this will be handled? **Response:** Whether there is sufficient wastewater treatment capacity to "handle the large construction workforce" depends on where construction workers decide to live. First, as reported in section 4.5.4.4 of the EIS, the new facility, like GGNS Unit 1, would use an independent onsite water supply and water and sewer treatment facilities, so Port Gibson water and sewer services would not be directly burdened by construction of a new facility at the Grand Gulf ESP site. Second, it is expected that the short-term influx of construction-related population would not over-burden local sewer and water utilities in surrounding communities because the construction workforce would be spread over a large geographic area. The construction workforce likely would concentrate in larger population centers such as Vicksburg, Natchez, and Clinton/Jackson because of the services available in these

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			developed, more populous areas, and these areas have adequate wastewater treatment facilities and plans for continuing expansion. However, if the construction workforce distributed itself geographically in the same way as the operations workforce at the existing GGNS, then Port Gibson would gain 918 additional residents. The existing wastewater treatment system in Port Gibson has a capacity of 275,000 gpd and serves 95% of the residents (1748 people). It is at about 90% of capacity (247,500 gpd), so usage is about 142 gallons/day/capita. The addition of 918 new residents at this usage rate would more than exhaust existing spare capacity in the treatment system, so it would be necessary to add system capacity at an earlier date than would otherwise be expected. **SERI Input:** SERI notes that costs incurred by local utilities for increased water usage and sewer treatment supplies would be offset by revenues paid by the new users, increased commercial retail demand, property sales, and income tax revenues generated by the in-migration of construction workers (ER Section 4.4.2.3.5). At Claiborne County's current average property tax rate of 65.01 mills and an assessment ratio of 15 percent of true market value for non-residential property (SERI 2004a), the tax yield would be about $29 million per year; a large beneficial impact. During the assumed construction period of 5 years, about $6 million in tax yield would be added to the base each year. If the new facility were not exempt, then this tax base would instead go to the State. However, based on the current law, at least $7.8 million per year of the tax yield would be returned to the county, which also would be a large beneficial impact. (EIS 4.5.3.2 at 4-36)
41	4-41	4.5.4.4	How will the Staff ensure that the Catahoula formation will not be impacted by the withdrawal of too much water? **Response:** The Catahoula aquifer beneath the Grand Gulf site has been designated by the EPA as a sole source aquifer. Projects that receive federal financial assistance and have the potential to contaminate a designated sole source aquifer are subject to EPA review. Additionally, prior to issuance of a COL for the site, the Staff would recommend conditioning the license on the COL applicant obtaining a Section 401 certification from the MDEQ to ensure that the project does not conflict with any state water management programs.

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			However, at the ESP stage the issue of water use and water quality remains unresolved. An applicant for a CP or COL referencing an ESP for the Grand Gulf ESP site would need to provide additional information on the ability of the Catahoula aquifer to sustain the proposed withdrawals in order for the Staff to make a significance determination with respect to this resource. **SERI Input:** As noted in the response to Board Inquiry No. 21(1), the source of water can be from the Mississippi River should an adequate supply not be available from the ground water aquifers on the site, or if excess pumpage from the ground water would create an adverse impact on water quality. SERI would like to add that all new wells to be installed in Mississippi, thus on the Grand Gulf site, regardless of the aquifer, must be permitted by the MDEQ. As part of this permitting process, the MDEQ looks at the overall impact to the target aquifer of the additional withdrawal as well as the potential effects on other users of the aquifer. In addition, SERI is required to perform an annual water use survey, for all existing wells, for the MDEQ. (ER Sections 4.2.2.2 and 5.2.3 provide a discussion of agencies regulating groundwater withdrawal: the MDEQ issues withdrawal permits; the EPA has delegated review of sole source aquifer issues to the USDA Rural Development Mississippi office.)
42	4-42	4.5.4.4	How will the Staff ensure that Port Gibson's water and sewer system will not be significantly and negatively impacted by the influx of residents due to the additional plant? **Response:** In preparing this EIS, the Staff was required to consider the potential environmental impacts of construction and operation of one or more power reactors and disclose the result of its analysis. First, the proposed action (issuance of an ESP) will not result in these impacts, as the Applicant did not seek authorization to conduct plant construction activities or even site preparation activities that could be authorized with an ESP. Second, construction issues (such as those referenced in the Board's question) that would entail consideration of mitigation would become ripe at the time an applicant elects to reference a Grand Gulf ESP in a COL application. For example, if actions during the intervening period did not result in improvements to the water supply system (the Staff assumed expansion to meet normal demand) or if the residential population placed additional demands on the system and, thus, reduced the operating margin, then the

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			direct impact of additional residents and their demands would need to be mitigated. Just as the Staff considered the current and projected information to draw its ESP conclusions, it would consider at the COL stage whether circumstances have changed the basis for its conclusion of "small" impacts with respect to public services. During its review of an application for a COL referencing a Grand Gulf ESP, the Staff would assess whether there is new and significant information and, if so, whether additional mitigation should be considered. **SERI Input:** See SERI response to Board Inquiry No. 40.
43	4-56	4.10	How will SERI's compliance with these regulatory requirements be monitored and enforced? **Response:** The regulatory requirements listed in Section 4.10 will be monitored and enforced by the applicable regulatory agency. An applicant is required by applicable Federal and State laws to obtain these permits and licenses. During its review of an application for a COL referencing an ESP, the Staff will update the status of compliance and consultations regarding such permits and licenses. **SERI Input:** Regarding reviews during the COL application phase for required state, local, and federal permits and licenses, see SERI comment in response to Board Inquiry No. 3(4).
44	4-59	Table 4-3	The construction impacts on land use, water use, water quality, and terrestrial ecosystems are all listed as "unresolved" but given an "estimated" impact. 1. Discuss in greater detail how each of these impacts were estimated and the validity of these estimates. 2. Summarize what specific site studies would resolve any of these items, and explain why the Applicant was not asked to perform some or all of these site studies as part of the ESP application. 3. Does any inaccuracy in these estimates make the alternatives analysis virtually meaningless? **Response:** 1. The Staff estimated a SMALL impact for water use based on the abundance of water in the Mississippi River. While the capacity of the Catahoula aquifer may be limited, an abundance of water exists in the vicinity. While this issue

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			remains unresolved due to the limited information on the Catahoula, Staff concluded that if the impact to the Catahoula would be significant, the water the Applicant proposed to obtain from the Catahoula could be obtained from other local sources such as the Mississippi River. In that case, the water withdrawn from the Mississippi River would be trivial compared to the minimum river flows. The Staff estimated a SMALL impact for water quality based on the current state of water treatment technology, the requirement for a NPDES permit, and the special consideration of the Catahoula aquifer. As stated above, the Staff concluded that if investigations at the COL stage to resolve impacts to the Catahoula determine that the Catahoula is unable to support the required volume of withdrawals, the local abundance of water would ensure alternative sources. Experience at existing nuclear power plants and other industrial facilities led the Staff to conclude that current water quality treatment technologies are adequate to protect the water bodies, including the Mississippi, receiving effluents from the plant. The Mississippi Department of Environmental Quality would regulate the discharges from the plant through administration of the NPDES permit program. Processing water for use at the plant would result in a small amount of solid waste that could be disposed of on site or in an offsite disposal facility with little environmental impact. The Staff estimated a MODERATE impact for terrestrial ecosystems based on its consideration of the most reasonable of three hypothetical scenarios for the possible location of new rights-of-way associated with transmission system upgrades. These three scenarios are described in EIS section 4.4.1.2. The most likely of the three scenarios that would be implemented to accommodate the proposed new generating capacity, was widening the existing rights-of-way (*i.e.*, creating new, adjacent rights-of-way), which would result in a MODERATE impact. The other two scenarios, 1) emplacing upgrades solely within the existing rights-of-way (*i.e.*, no new rights-of-way), or 2) creating new rights-of-way with routings different from existing lines, appeared less likely, as follows. First, the Staff considered it to be less likely that transmission system upgrades could be restricted to within the existing rights-of-way without encroaching on and affecting adjacent areas. Second, the Staff considered creation of new rights-of-way with different routings to be less likely because it would be undesirable in terms of acquiring easements (where feasible, new transmission corridors are often sited next to adjacent,

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			existing corridors). 2. In general, the Staff did not request specific studies unless it concluded that such studies would completely resolve a specific unresolved issue. For water use/water quality, the Staff concluded that additional studies were not justified because complete resolution would not be possible without a specific detailed design. For terrestrial ecosystems, the Staff did not request that the Applicant perform studies to resolve the issue of impacts due to transmission system upgrades because the resolution of the issue is outside the Applicant's purview and is the responsibility of the transmission system distribution owner and operator. The transmission system distribution owner and operator would perform the scoping, feasibility, and facility studies under 18 CFR Part 35 that are described in EIS section 3.3. These studies would be done prior to or during the CP or COL stage and the results would identify the location and physical modifications required to upgrade the transmission system to accommodate the new generating capacity. In its ESP application, an applicant has the option to provide as much or as little information regarding the impacts of constructing and operating the proposed unit(s) provided, however, that the environmental report must address all environmental effects of construction and operation necessary to determine whether there is any obviously superior alternative to the site proposed. Although the results of the site studies discussed above would have given the Staff further insight into these issues, the Staff concluded that it had sufficient information in these impact areas to allow it to determine whether any of the alternative sites was environmentally preferable to the proposed site. At the completion of the Staff's review of an ESP application, this is the minimum determination that must be made. In contrast, for a COL application the Staff will have to determine and reveal the environmental impacts of the construction and operation of the proposed plant. In order to make this determination, the COL applicant will be required to provide sufficient information to resolve any significant environmental issue not considered in the ESP proceeding and any significant new information regarding issues that were resolved in the ESP proceeding. 3. Based on the approach used by the Staff to estimate the impacts (as discussed in Part 1 of the response to this Inquiry), and on the Staff's expert judgment, the Staff believes that the impact levels that were assigned in these

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			areas are defined well enough to be used for the purposes of a comparison between the proposed and the alternative sites. While these impact determinations are estimates, they are (as alluded to above) informed by the provisions of state and local regulations, by extensive institutional experience with the licensing of existing reactors (including analyses developed during recent license renewal reviews, such as those in the associated License Renewal GEIS), and by the judgment and professional experience of individual Staff reviewers with respect to their areas of expertise. Furthermore, the Staff applied the same methodology to the Grand Gulf ESP site and the alternative sites. Therefore, although the comparisons in the alternatives analysis are based on reconnaissance-level information, the Staff considers them to be informed comparisons, and has concluded that they are sufficient for making the core ESP determination concerning the existence of an obviously superior site. **SERI Input:** SERI has no additional comments or input.
45	5-1	Intro. to 5.0	1. Please list the mitigative measures planned by the various State and county governments that were used in the Staff's evaluation of impacts. 2. How will these measures be tracked in the ESP license documentation, and how will the Staff assure that they are implemented during the COL stage? **Response:** 1. As outlined in the response to Inquiry No. 42, in preparing this EIS, the Staff was required to consider the potential environmental impacts of construction and operation of one or more power reactors and disclose the result of its analysis. The proposed action (issuance of an ESP) will not result in these operation impacts, as the Applicant did not seek authorization to conduct plant construction activities or even site preparation activities that could be authorized with an ESP. Consequently, at the time of the Staff's ESP review there was no complete list of mitigative measures contemplated by the various State and county governments. 2. As just noted, there was no list of planned mitigative measures to be undertaken by State and county governments during the period of plant operation that could be tracked forward into the COL. However, as the Staff outlined in its response to Inquiry No. 9, the Staff may have made key assumptions (*i.e.*, beyond the information presented in the ER or otherwise currently available) that

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			were included in Appendix J. These assumptions, or those made by the ESP applicant, included actions that could be taken by State, county or local governments to mitigate environmental impacts. **SERI Input:** Regarding reviews during the COL application phase for required state, local, and federal permits and licenses, see SERI comment in response to Board Inquiry No. 3(4).
46	5-7	5.3.1	The EIS supports its conclusion regarding the impact on the groundwater flow pattern "based on the character of the shallow groundwater system." Please summarize the data used to characterize the shallow groundwater system. **Response:** Based on information identified in the ER and the site audit, the Staff concluded that the shallow groundwater system is unconfined with numerous perched aquifer systems. The aquifer is primarily recharged through surface infiltration and the piezometric surface is at least partially defined by the surface topography. Relatively high storage coefficients for the terrace deposits and alluvium reported in the ER support the Staff's assumption of unconfined conditions. **SERI Input:** SERI has no additional comments or input.
47	5-7 to 5-9	5.3.2	What is the feasibility of treating Mississippi River water that is pumped directly from the river, with regards to treatment costs, materials handling, and waste sediment disposal? **Response:** Water treatment technologies are sufficiently mature that relatively poor quality waters can be treated to obtain water of the quality needed for a nuclear power plant. Standard water treatment methods could reduce total suspended solids in Mississippi River water to provide an abundant water supply with water quality generally equal to that of groundwater. The Staff did not consider the costs of treatment in its assessment. However, if some portion of the sediment is returned to the Mississippi River through the blowdown discharge, it would be regulated by MDEQ through its NPDES permitting authority. **SERI Input:** Refer to SERI response to Board Inquiry No. 21(2).

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48	5-7	5.3.2	In regards to water use impacts, the EIS states that "the Staff's analysis is not to the depth warranted for actual operation," yet it is "sufficient for the purpose of comparing the proposed action to the alternatives." What is the basis for this statement? **Response:** The purpose and need associated with an application for an ESP is different from the purpose and need associated with an application for a COL. For the ESP, the minimum acceptable result is developing sufficient information to determine whether any of the alternative sites is obviously superior to the proposed site. For the COL, the Staff must reveal the impacts of the construction and operation of the proposed plant. These two reviews are not completely independent, but it is possible to make the determination regarding the alternative sites with less information than would be required to fully reveal the impacts for a COL. This is the point the Staff is making on page 5-7. The Applicant did not provide sufficient information to allow the Staff to determine the impacts of the proposed use of the Catahoula aquifer - a result that would be necessary to support a COL. However, because of the regulatory controls (of other agencies) in place for this sole source aquifer, the Staff was able to draw a conclusion regarding this issue for the purposes of the comparison with the alternative sites. **SERI Input:** Refer to the SERI response to Board Inquiry No. 41.
49	5-8	5.3.2	Without any site data, how can a LARGE impact – with respect to the Catahoula formation – be eliminated from consideration? **Response:** The Staff concluded that extremely low transmissivities would be self-limiting. Drawdown in a pumping well is limited by the depth of the well and the depth of the formation. The Staff concluded that the drawdown would remain relatively localized. Of greater concern was the possibility that even modest drawdowns might result in water quality impacts to a sole source aquifer. In Section 5.3.3 of the EIS, the Staff concluded that the impacts could be LARGE "if the proposed withdrawal were to induce degradation of water quality of the sole source aquifer." However, the Staff concluded that the impact of groundwater use for operation of an ESP plant at the Grand Gulf site remains unresolved; an applicant for a CP or COL referencing a Grand Gulf ESP would need to

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			provide additional information in order for the Staff to make a significance determination with respect to this resource. **SERI Input:** Refer to the SERI response to Board Inquiry No. 41 regarding regulatory controls on ground water use. Based on these controls, it is highly unlikely that there will be a large impact or the Catahoula formation.
50	5-12	5.3.3.2	Why did SERI not provide the bounds of concentrations of chemical effluents to be discharged in Streams A and B? **Response:** Any statement by the Staff as to SERI's motivation for not providing bounds on concentrations of chemical effluents to be discharged into Streams A and B would be speculative. **SERI Input:** As stated in ER 3.3.2, the actual designs of the water supply systems and the cooling water systems are not finalized at this point in the licensing process. Because of this, exact methods of water treatment and the quantities of chemicals required cannot be specified. ER 2.4.2.1.4 indicates Stream A extends west from the GGNS sanitary waste water treatment facility. Currently, this drainage [stream] receives continual flow from plant storm water drains and process discharge from the [GGNS Unit 1] waste treatment plant. Stream B extends west from the cooling towers on the south side of the Heavy Haul Road. Flow into the [Stream B] drainage channel derives from storm water runoff. In ER 5.2.1.4, SERI assumes that discharges to Stream A and Stream B from a new facility likely would be similar to the existing GGNS facility, and may include increased discharge of treated effluent from the waste water treatment plant, building drains from support buildings, and storm water, depending on the design of any new waste water treatment facilities. Discharges to these streams would be controlled in accordance with future NPDES permit requirements. ER 5.5.1.2.1 states that chemicals utilized in general operations and water treatment at the GGNS site are subject to review and approval by the Mississippi Department of Environmental Quality (MDEQ), the agency authorized to administer the NPDES program for the State of Mississippi. Therefore, waste discharges from a new facility at GGNS would be subject to limits established by the MDEQ through the NPDES permitting process.

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			As noted in the above discussions, the majority of water discharged via Streams A and B is storm water runoff, with Stream A possibly accepting additional waste water from a new facility's waste water treatment plant. Concentrations of chemicals in any effluent would be controlled by the NPDES permit.
51	5-40	5.5.4.4	Statements made at the limited appearance session held on August 28, 2006 indicated deficient emergency medical capacity and transportation logistics. Please reconcile these statements with the degree of impact indicated in the EIS. **Response:** Emergency response is an operational issue that should be dealt with as part of the ongoing regulatory oversight of the operating plant. Emergency response (including medical capacity and transportation related to emergencies) is not addressed in the environmental review. However, the Applicant's ability to develop and implement an adequate emergency plan for the proposed ESP site is addressed in the SER. The concerns of the local officials were noted in Section 2.8.2.6 of the FEIS. Specific agreements have been established with local medical care suppliers to support emergency planning. The Staff expects that these arrangements would be updated at the time of a COL application to support a new facility. A new medical center has recently been constructed in Vicksburg (56 km/35 mi from the site on Highway 61 North) with a full range of major medical capabilities. The Applicant anticipates that Port Gibson Hospital would accept minor construction injuries. However, more serious injuries would be routed to medical centers more capable of handling severe injuries, including River Regional Medical Center and Parkview Hospital. The Applicant does not expect that Claiborne County medical facilities would be the principal source of medical support in an emergency. **SERI Input:** Additional clarification is provided regarding the role of the Claiborne County Hospital which is located in Port Gibson, Mississippi. (It is noted that the Staff's response appears to have referred to this facility as the "Port Gibson Hospital.") As stated in the ESP Application, Part 4 (Emergency Planning Information), Section 3.12, "the primary medical facility for injured personnel, with or without contamination, is the Claiborne County Hospital located in Port Gibson, approximately six miles from the plant site. The existing

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			GGNS facility maintains an agreement with this hospital to accept injured personnel and/or victims of radiation-related accidents for emergency medical, and surgical treatment and observation. River Region Medical Center has agreed to serve as a back-up with the same emergency medical capabilities as Claiborne County Hospital. Hospital emergency kits for treatment of contaminated personnel will be maintained at these facilities." Thus, the Claiborne County Hospital is the primary medical facility in an emergency. As noted in ESP Application Part 4, Section 3.17, it is generally expected that additional agreements can be reached for support of emergencies at the proposed ESP facility similar to those already in place for GGNS Unit 1. In addition, Claiborne County Hospital was one of several agencies providing letters indicating their support for emergency preparedness efforts associated with the proposed new facility. (See ESP Application Part 4, Section 3.17.) However, it is recognized that Claiborne County Hospital facilities are limited, and thus, backup agreements are in place (GGNS Unit 1) for large, private sector medical facilities (River Region Medical Center, Vicksburg, MS and Ochsner Clinic, New Orleans, LA). Transportation support is provided via letter of agreement with a private sector organization. (See SERI comment in response to Board SER Inquiry No. 71 regarding discussion of expected arrangements with private sector organizations for medical and transportation services.) Lastly, it is understood that the subject limited appearance session statements referred to a Jefferson County medical facility ("System Energy Resources, Inc. ESP Limited Appearance," August 28, 2006, official transcript of proceeding, pages 63-64). SERI offers no comment regarding the medical response capability of the facility in Jefferson County. That Jefferson County facility is not designated as a medical facility in the GGNS Unit 1 Emergency Plan and, as such, no agreements for support have been established. At this time, no support is expected to be sought from the Jefferson County facility in support of a proposed new plant at the ESP site.
52	5-54 to 5-57	Tables 5-5; 5-6; 5-7	1. Why were the analyses contained in these tables performed for only 1 unit? 2. Would the effects be linear for multiple units? 3. Why was the existing plant not included, particularly since Table 5-8 provides a comparison against 40 CFR Pt. 190 standards, which includes the existing plant and 2 additional plants?

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			Response: 1. The Grand Gulf ESP application did not commit to the number of units that would be constructed on the site. The text in the EIS typically stated "construction and operation of one or more new nuclear units...." (See chapter 3.0). However, because the ER calculated doses for 1 unit, the Staff did this also. 2. Yes. The dose would be double for two units. 3. Doses in Table 5-7 are compared to the Design Objectives in 10 CFR Part 50, Appendix I, which states that dose commitments are to be calculated from the "annual total quantity of all radioactive material above background to be released from each light water-cooled- nuclear power reactor." Therefore, the dose commitments were calculated per reactor. Table 5-8 does compare the doses to 40 CFR Part 190, considering the current unit and two additional nuclear units. **SERI Input:** The SERI ESP Application provided the maximum individual doses in ER Table 5.4-8, Table 5.4-11A, and Table 5.4-11B on a per unit basis, for comparison with the 10 CFR 50, Appendix I limits. The design objectives of 10 CFR Part 50, Appendix I are applicable to each reactor unit. The maximum individual doses given in ER Table 5.4-18 are provided for comparison with 40 CFR 190 limits, which are based on all units on a site (*i.e.*, GGNS Unit 1 and two ESP units).
53	5-65 to 5-66	5.10.1	In Table 5-10 the Staff indicates that SERI's X/Q values are not acceptable for use in environmental reviews. On the top of page 5-66, the Staff indicates that the X/Q values are acceptable if they fall within the bounds set by the Staff's X/Q values. 1. Please clarify if the "acceptable values" are those set by the Staff or by SERI. 2. The "adverse" values calculated by SERI are seemingly more conservative than the typical values used by Staff. Why aren't the adverse X/Q values calculated by SERI used as conservative values? 3. Is it appropriate for the Staff to provide X/Q values for this site, especially if they are less conservative than the Applicant's values. **Response:** Staff reviews of design basis accidents are included in both

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			the SER and the EIS. The review for the SER is conducted pursuant to the NRC health and safety missions under the Atomic Energy Act. It is performed assuming adverse dispersion conditions, *i.e.*, χ/Qs that give doses that are exceeded no more than 5% of the time. The review for the EIS is conducted pursuant to the NRC's responsibilities under the National Environmental Policy Act, as implemented in 10 CFR Part 51. NEPA reviews are generally aimed at realistic assessments of potential environmental impacts. Hence, the DBA review performed for the EIS assumes typical dispersion conditions, *i.e.*, χ/Qs that give doses that are exceeded 50% of the time (median doses). Guidance concerning the use of typical (50%) χ/Qs is set forth in Regulatory Guide 4.2, Revision 2 (1976), which provides applicants guidance for preparation of environmental reports, and in Environmental Standard Review Plans 2.7 and 7.1 (NUREG-1555, March 2000). 10 CFR 51.70(b) concludes with the statement that "The NRC Staff will independently evaluate and be responsible for the reliability of all information used in the draft environmental impact statement." The same computer output used by SERI to estimate the adverse χ/Qs it presented contains information that can be used, with little additional effort to derive typical χ/Qs for environmental applications. Therefore, the Staff concluded that the SERI χ/Qs were unacceptable and derived χ/Qs for typical conditions itself using information supplied by SERI. As stated in the last paragraph on 5-65, the typical χ/Qs in Table 5-10 are those derived by the Staff. With this background, the answers to the Board's questions are: 1. The Staff's χ/Q values are the values that Staff finds acceptable for purposes of the EIS. (2. and 3.) The χ/Q values calculated by SERI are more conservative. However, the EIS is the Staff's realistic evaluation of the likely impacts of the proposed action. Conservative estimates should not be used when better estimates of the likely impacts are readily available, as they were in this instance. Given the burden imposed on the Staff by 10 CFR 51.70(b), it is appropriate for the Staff to use the χ/Q values that it considers most suitable for the purposes of the EIS, even if those values are less conservative than the values provided by SERI. The second sentence of the question indicates that the Board may have questions about the distinction between a design χ/Q and a site χ/Q. The atmospheric dispersion factor for a reactor design is generally a calculated value based on 1)

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			atmospheric releases (source terms) derived from the evaluation of the accident and release path, and 2) dose limits found in regulations and guidance. These values are the maximum atmospheric dispersion factors for which the design will meet the Commission's regulations. A large dispersion factor means that a site does not need much dispersion to be an acceptable site for the design, and a small dispersion factor means that a site needs to have good dispersion to be an acceptable site for the design. Atmospheric dispersion factors calculated for a specific site, such as the Grand Gulf ESP site, are based on atmospheric conditions and the distance to site boundaries. A large atmospheric dispersion factor (*e.g.*, 1.0×10^{-3} s/m^3 for the exclusion area boundary) indicates that the site does not have very good dispersion, while a small atmospheric dispersion factor (*e.g.*, 1.0×10^{-4} s/m^3 for the exclusion area boundary) indicates that the site has good dispersion. Applicants can reduce the magnitude of these dispersion factors by increasing distance to the site boundaries. By showing that the design χ/Q is greater than the Site χ/Q, a COL or CP applicant would be demonstrating that the dispersion at the site is such that the consequences of DBAs evaluated for the design fall within regulatory limits. **SERI Input:** SERI understood that the dose analysis in the ESP ER, that used adverse atmospheric dispersion coefficients (5% X/Qs), would result in very conservative dose consequences. However, since the calculated doses were well within the regulatory limits, the decision was made to use the 5% X/Qs instead of the less conservative, but more realistic, 50% X/Q values. For a COL Application, SERI would use the 50% X/Qs in the ER analyses. SERI also notes that the AP1000 and ESBWR χ/Q values were based on a "generic site" or on conditions selected to bound 70-80 percent of the potential US sites (Ref. ESBWR DCD Rev. 1, paragraph 15.4.4.5.4, and AP1000 DCD section 2.3.4).
54	5-67	5.10.1	Why is the conservative analysis performed for design certification appropriate for safety analysis, "but overly conservative for environmental reviews"? **Response:** The DBA analyses performed for design certification primarily serve to demonstrate that the design is safe. This demonstration is consistent with the purposes of the SER as

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			indicated above. In contrast, the emphasis of the DBA analysis in the EIS is to disclose the likely impacts of DBAs pursuant to NEPA and 10 CFR Part 51. NRC guidance to applicants and to the Staff states that the DBA analysis for environmental applications should be performed using typical meteorology (*e.g.*, χ/Q) rather than the adverse meteorology used in DBA analyses for safety applications. **SERI Input:** SERI has no additional comments or input.
55	5-78	5.10.2.3	The GEIS for license renewals assumes a $1x10^{-4}$ Ryr^{-1} probability for melt-through. Please explain the basis for this assumption in the GEIS, and why is it applicable for an ESP. **Response:** The logic set forth in the GEIS is as follows: 1) The groundwater pathway requires a core-melt followed by basemat melt-through; 2) The core melt probability for most, but not necessarily all current generation reactors is less than $1x10^{-4}$ Ryr^{-1}; 3) Given a core melt, the conditional probabilities of basemat melt-through from NUREG-1150 range from 0.05 to 0.24; and 4) "Therefore, it is reasonable and conservative to assume a 10^{-4} probability of occurrence of basemat melt-through per reactor-year . . . ." The GEIS then goes on to evaluate the risk associated with the groundwater pathway for a sites in a variety of settings. Ultimately, in the GEIS, the Staff concludes "...groundwater generally contributes only a small fraction of that risk attributable to the atmospheric pathway...." The Staff believes that the GEIS conclusion related to relative contributions of the atmospheric and groundwater pathways to risk is still likely to be valid for the Grand Gulf ESP. The Staff's conclusion in the FEIS is based on this belief rather than on the $1x10^{-4}$ Ryr^{-1} basemat melt-through probability. The $1x10^{-4}$ Ryr^{-1} basemat melt-through probability is only relevant to the extent that the conclusion in the GEIS about relative contributions to risk of the air and groundwater pathways is based on a conservative estimate of the basemat melt-through probability. The precise value is of no relevance. **SERI Input:** SERI has no additional comments or input.
56	5-82 to 5-84	Table 5-17	The operational impacts on water use and water quality are listed as unresolved but given an "estimated" impact of SMALL.

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			1. Discuss in more detail how each of these impacts were estimated and the validity of these estimates. 2. Summarize what specific site studies would resolve any of these items, and explain why the Applicant was not asked to perform some or all of these basic site studies as part of the ESP application. 3. Does any inaccuracy in these estimates make alternative analyses virtually meaningless? **Response:** 1. The Staff estimated a SMALL impact for water use based on the abundance of water in the Mississippi River. While the capacity of the Catahoula aquifer may be limited, an abundance of water exists in the vicinity. While this issue remains unresolved due to the limited information on the Catahoula, Staff concluded that, if the impact to the Catahoula would be significant, the water Applicant proposed to obtain from the Catahoula could be obtained from other local sources such as the Mississippi River. In that case, the water withdrawn from the Mississippi River would be trivial compared to the minimum river flows. A SMALL impact for water quality was estimated based on the current state of water treatment technology, the requirement for a NPDES permit, and the special consideration of the Catahoula aquifer. As stated above, the Staff concluded that if investigations at the COL stage to resolve impacts to the Catahoula determine that the Catahoula is unable to support the required volume of withdrawals, the local abundance of water would ensure alternative sources. Experience at existing nuclear power plants and other industrial facilities led the Staff to conclude that current water quality treatment technologies are adequate to protect the water bodies, including the Mississippi, receiving effluents from the plant. The MDEQ would regulate the discharges from the plant through administration of the NPDES permit program. Processing water for use at the plant would result in a small amount of solid waste that can be disposed of on site or in an offsite disposal facility with little environmental impact. 2. Unless the Staff concluded that specific studies would completely resolve a specific unresolved issue, such studies were not requested. Staff concluded that unless a specific design was proposed, additional studies were not justified since complete resolution would not be possible without a specific detailed design. The second part of this question is the same as the second

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			part of Inquiry 44.2. See the response to that question for the details of the Staff's response. But in summary, although the results of the site studies discussed above would have given the Staff further insight into these issues, the Staff concluded that it had sufficient information in these impact areas to allow it to determine whether any of the alternative sites was environmentally preferable to the proposed site. 3. See the Staff's response to Inquiry 44.3. **SERI Input:** SERI has no additional comments or input.
57	6-2	6.1.1	The EIS states that it is using the PPE power rating of 8600 MW(t) with a net electrical output of 3000 MW(e). A review of the PPE in Appendix I indicates a power rating of 4300 MW(t). SSAR § 1.3.1.4 indicates that the site target value for electrical output is 2000 MW(e). A brief review of other ESPs indicates a correspondence between the PPE values and the values utilized in their EIS analyses. Please clarify this apparent discrepancy. **Response:** As the Staff outlined in its response to Inquiry No. 19, there is no discrepancy. In SAR Section 1.3.1.4, Grand Gulf Site Specific "Bounding Plant," SERI indicated that the site capacity "target" of 2000 MW(e) was only an initial step in PPE development, meaning that no less than an additional 2000 MW(e) was being considered for the Grand Gulf ESP site. Because the reactor types considered by SERI ranged from 160 MW(e) to 1500 MW(e), it doubled the bounding number for each PPE value, where appropriate. In its SAR Table 1.3-1 and again in its ER Table 3.0-1, SERI represented that the "Composite Value" generally reflects the values corresponding to a plant that is twice the vendor's specified "standard size plant" and that the PPE bounding values were "driven" by a multiple of reactor units representing a total generation capacity that was either equivalent to or, in some cases, much greater than 2000 MW(e). Therefore, in some cases, the values were designated as unit specific (US) values that had to be doubled for the site; consequently, 4300 MW(t) per unit was doubled to 8600 MW(t) for the site so that the approximately 1500 MW(e) was doubled to about 3000 MW(e) to exceed the floor of 2000 MW(e) for the site. **SERI Input:** SERI offers the following clarifications with regard to the target electrical output parameter of 2000 MWe and the

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			reactor power of 8600 MWt, taken from SERI's responses to the Board's inquiries on the SER: SERI's Input to SER Inquiry No. 8: (A) In addition to the Staff response, SERI notes that the PPE bounding value for "Megawatts Thermal" (Item 17.3, SSAR PPE Table 1.3-1) is utilized for other considerations in evaluation of environmental impacts. For example, megawatts thermal would be a consideration in the evaluation of environmental impacts related to normal and accident dose consequences, transportation of radioactive materials, and uranium fuel cycle impacts. (B) The PPE value for megawatts thermal (4300 MWt) listed in SSAR Table 1.3-1 represents the postulated design parameter. If the selected facility (in this example the thermal design power level for the ESBWR in its DCD) does not fall within this value, a COL application referencing the ESBWR design shall include a request for variance that complies with §§ 52.39 and 52.93. (C) PPE values listed in SSAR Table 1.3-1 are based on the PPE development process described in SSAR Section 1.3.1.3. SSAR Table 1.3-1 lists those parameters relevant to the safety analyses. For each parameter, the most limiting value was selected. As described in the Staff response, the 2000 MWe value is a "target site capacity" and is discussed in detail in SSAR Section 1.3.1.4. The establishment of this value was an "initial step in PPE development" (SSAR, page 1.3-4).
58	6-7	6.1.1	The Staff indicates that in the review and evaluation of the environmental impacts of the fuel cycle, they used the stated capacity factor in the SERI PPE of 96 percent. Please identify the PPE table which provides this capacity factor. **Response:** The reference for the capacity factor was incorrectly stated as from the ER. The capacity factor was actually taken from the report titled "Early Site Permit Environmental Report Sections and Supporting Documentation, by Idaho National Engineering and Environmental Laboratory (INEEL 2003) which was the reference document used for the Uranium Fuel Cycle and Transportation sections of the ER. In addition, in correcting an inconsistency from the draft EIS to the Final, the capacity factor was incorrectly changed to 96% when it should have been 95%. However, this difference does not impact any conclusions. **SERI Input:**

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			SERI has no additional comments or input.
59	6-16	6.1.2.1	The EIS states that the 1000 MW(e) LWR scaled plant would require about 160 MT of enriched uranium fuel annually. This number is used in subsequent analyses. The reference plant in Table 6-1 (EIS at 6-3) is indicated on page 6-7 to require 35 MTU annually (EIS at 6-7). Since the scaled plant is a factor of 4 greater than the reference plant, why is the number not 140 MTU? **Response:** The statement on page 6-7 refers to the amount of enriched UO_2 needed on an annual basis for the reference LWR. This is equivalent to 40 MT of enriched UO_2 annual output from the fuel fabrication plant (see section 5.7.2.3.1 of the ER). Thus, 40 MT times 4 is equal to 160 MT per year. **SERI Input:** SERI has no additional comments or input.
60	6-42	6.3	How will decommissioning issues be captured at the COL stage? **Response:** The issue of decommissioning impacts has not been resolved for the Grand Gulf ESP. Therefore, as with any issue that is not resolved in the ESP proceeding, the issue would have to be addressed in any COL application that references a Grand Gulf ESP. The Staff would then review the information that was submitted and assess the environmental impacts of decommissioning in the EIS for the COL. **SERI Input:** SERI has no additional comments or input.
61	General	7.0	1. It is not clear to the Board how cumulative impacts were evaluated. Please clarify the nature of the Staff's review. 2. How is cumulative impact being defined. Is it the sum of construction/operations/decommissioning of the proposed ESP plant(s), the sum of synergy from several different impacts, or the sum of the impacts from the existing plant and the proposed ESP plant(s))? **Response:** 1. As part of its NEPA review of the SERI ESP application, the Staff evaluated the direct and indirect cumulative effects of the proposed action to the extent that the analysis informs the public and NRC decisionmakers. The Staff's analysis

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			included the environmental effects of past actions, the proposed action and future actions. To the extent that such information was not already within the NRC's purview, the cumulative impacts analysis relied upon reconnaissance-level information. The Staff considered the current environment (taking into account the effects of relevant past actions) and then looked forward to the reasonably foreseeable effects of the proposal and of potential future actions. The forward look considered the relevant resource issues individually and cumulatively to determine whether the actions would have an ongoing and significant relationship to the existing impacts. The Staff has been guided by insights from the CEQ indicating that agencies should use scoping to focus on the extent to which information is "relevant to reasonably foreseeable significant adverse impacts," is "essential to a reasoned choice among alternatives," and can be obtained without exorbitant cost (40 CFR 1502.22). Experience with and information from past actions (including the previous licensing of plants in the same vicinity) provide insight on the direct and indirect effects of the proposed action. 2. CEQ defines "cumulative impact" at 40 CFR 1508.7 as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." The NRC does not use an alternate definition. Grand Gulf Unit 1 effects are included in the Staff's cumulative impact analysis, which includes the impacts of the proposed additional unit(s). A future action, such as a CP or COL Application, would also include analysis of, among other things, activities at the Grand Gulf ESP site as well as of continued operation of Grand Gulf Unit 1. Decommissioning of all nuclear units at GGNS are expected to be small; however, information on this and other resource issues was not sufficient to resolve the associated cumulative impacts determinations. **SERI Input:** See SERI comments in response to Board Inquiry No. 5..
62	7-3	7.3	The EIS states that groundwater considerations reflected steady-state drawdown. How could the shape of the drawdown curve be established without aquifer characterization? **Response:** The EIS states that the process to be used by the Staff to consider cumulative impacts would rely on a steady state analysis. However, since groundwater use and groundwater

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			quality impacts remain unresolved at the ESP stage, no actual drawdown calculations were performed. However, at COL stage the cumulative impacts will be estimated based on steady state assumptions. **SERI Input:** SERI has no additional comments or input.
63	7-7	7.5	What data are available to ascertain fish distribution in the Mississippi River to assure that any change in the location of the intake structure would be away from areas of higher fish concentration? **Response:** EIS Section 2.7.2. discusses the available data on the distribution of fish as well as the life histories of important species; this information has been used to evaluate the impacts from the proposed intake structure. For example, the depth of the intake structure will affect some life stages of sturgeon more than others. If a new location for the intake structure were to be proposed, then a similar analysis with the data discussed in Section 2.7.2 would determine if the new location has a different impact level than currently evaluated. **SERI Input:** The existing aquatic ecology at the GGNS ESP site is presented in Section 2.4.2 of the ER. In this section, it is stated that the Mississippi River channel is the dominant aquatic habitat at GGNS. This habitat is characterized by deep water, strong (and turbulent) currents, and coarse grained substrate, typically consisting of gravelly sand sediments. The severity of this habitat imposes restrictions on living organisms. With regard to this issue, SERI relied primarily on information in the original ER for the GGNS (Mississippi Power and Light Company, Grand Gulf Nuclear Station Units 1 and 2 Final Environmental Report (FER), as amended through Amendment No. 8.) This information was supplemented by current work on Aquatic Species of Special Interest (ESP ER Section 2.4.2.2). SERI believes that moving the location of the intake structure within the limited confines of the site boundaries would not be expected to result in differing potential impacts on fish concentrations.
64	7-12	7.10	The EIS states that "several areas . . . have the *potential* for a MODERATE impact" and "mitigation measures may be warranted." (emphasis added).

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			How is this to be managed during the COL stage and who will determine when mitigation is warranted and when to implement these mitigation measures? **Response:** During the COL stage, the Staff would evaluate whether significant new information relating to each cumulative impact area would result in a MODERATE cumulative impact. The decision on when mitigation is warranted and when it should be implemented varies depending on the particular impact and associated mitigation measures at issue. For example, decisions relating to mitigating the impact of construction in wetlands crossed by the transmission line rights-of-way would be determined by the U.S. Army Corps of Engineers as part of the Section 404 permitting process. Measures that have not been considered at the ESP stage will be considered at the COL stage to the extent that they are associated with new and significant information identified for a particular resource. **SERI Input:** With regard to management of mitigation measures identified as commitments in the ER and EIS, see SERI comment in response to Board Inquiry No. 3(4).
65	8-2	8.1	One of the ESP benefits identified, relative to the no-action alternative, is the ability to bank sites on which nuclear plants may be located. Other benefits involve the early resolution of issues and the facilitation of future construction decisions. What is the significance of these benefits given the numerous unresolved issues, assumptions, etc., identified in this EIS and also the decision to not provide a site redress plan? **Response:** The decision by the Applicant to forego the inclusion of a site redress plan in its ESP application means that the holder of a Grand Gulf ESP cannot perform the activities at the site allowed by 10 CFR 50.10(e)(1) without first obtaining the separate authorization required by that section. With respect to the other benefits of the ESP, even though some issues remain unresolved, a large number of issues are resolved. For these resolved issues, an applicant for a COL referencing a Grand Gulf ESP would only have to determine whether there is any significant new information. If there is not, the issue is resolved for the COL proceeding and is accorded finality. If significant new information is identified for an issue that was resolved in the ESP proceeding, the Staff would address the impacts of that new information in

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			the COL EIS. If the time between issuance of the ESP and application for the COL is short, then the Staff would not expect to find significant new information for most resolved issues. **SERI Input:** As described in response to Board Inquiry No. 1 above, SERI believes that there are a limited number of unresolved issues, that such issues have been appropriately addressed in the EIS through the use of reasonable bounding assumptions, and that the use of reasonable bounding assumptions complies with NEPA. Further, based on the substantial data available from the existing GGNS site, and additional site-specific data collected as part of the ESP application, the EIS identifies numerous resolved issues that will be accorded finality in a COL proceeding. Therefore, SERI believes that the benefits of the ESP process listed in SERI's response to Board Inquiry No. 1 have largely been achieved.
66	8-2	8.1	1. If the no-action alternative is just not issuing an ESP permit, has the Staff quantified the benefits achieved with issuing an ESP? 2. What is the difference between the no-action alternative and issuing this ESP with so many unresolved issues and items deferred to the COL stage that none of the ESP goals is effectively achieved? **Response:** 1. Neither the Applicant nor the Staff has attempted to quantify the benefits achieved by issuance of an ESP. The primary benefits would be difficult to quantify – early resolution of many issues and early completion of the siting decision. Clearly the Applicants for the ESPs considered that the benefits warranted the associated investment of resources. As an example, in the case of one of the ESP applications (North Anna), the ESP process led to the early identification and resolution of a significant issue related to water use. Resolution of that issue required a significant design change that would have been more difficult and costly if it was being made late in the review of a COL application. 2. The Staff believes that some of the ESP goals are effectively achieved. As discussed above, a large number of issues have been resolved in the Grand Gulf EIS, a full alternative site analysis has been performed, and the Staff has made a recommendation regarding the siting decision. Even with respect to the issues unresolved in the Grand Gulf ESP, a future COL applicant would have an improved understanding of the Staff's associated concerns and would

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			be better prepared to anticipate and address these issues, which would ultimately allow the Staff to resolve them in a COL application. **SERI Input:** 1. 10 CFR § 52.21 explicitly exempts both the NRC Staff and the applicant from assessing the benefits of the ESP because an ESP is only a partial construction permit. As noted by the Commission, "[p]ostponing the NEPA cost-benefit balancing simply reflects the limited scope of an ESP proceeding, as compared with that of a full construction permit case (addressing both site and plant design) . . ." *Clinton ESP Site*, CLI-05-17, 62 NRC at 47. 2. SERI does not agree with the Board's inference that there are too many unresolved issues for the goals of the ESP to be achieved. See SERI's response to Board Inquiry No. 1 above. SERI concurs with the Staff that a large number of environmental issues have been resolved in the GGNS EIS, and these issues also will be considered resolved in the COL application unless there is any significant new information not previously considered. Many of these issues are documented in Appendix B to this submission.
67	8-3	8.2	1. What is the difference between a "target value for the desired electrical output," and the "output level" presented in the PPE? 2. Why wasn't the 3000 MW(e) presented in the PPE used in the alternative analysis, instead of the 2000 MW(e) target value established by SERI? **Response:** 1. As the Staff outlined in its response to Inquiry No. 19, in SAR Section 1.3.1.4, Grand Gulf Site Specific "Bounding Plant," SERI indicated that the site capacity "target" of 2000 MW(e) was only an initial step in PPE development, meaning that no less than an additional 2000 MW(e) was being considered for the Grand Gulf ESP site. The "output level" would reflect the multiples of units necessary to meet or exceed the 2000 MW(e) floor and would be used for "bounding" purposes. Because the reactor types considered by SERI ranged from 160 MW(e) to 1500 MW(e), and because it wanted to preserve flexibility in selecting a reactor type, SERI doubled the bounding number for each PPE value. Therefore, the 1500 MW(e) unit specific value was doubled. 2. The proponent of the action, SERI, set the "target." Consequently, in the alternative energy analysis, the Staff

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			considered the site capacity "target" of 2000 MW(e). The variety of energy sources considered, whether requiring new generating capacity or not, could be achieved at increments closer to the "target" value than the "bounding" value [two units of 1500 MW(e)]. For example, if purchased power was the alternative, then the 2000 MW(e) could be met right on the mark. For coal or gas, the Staff analyzed a plant with a net electrical output just over 500 MW(e) per unit (meaning that four units could meet the "target") and for the combination of alternatives, the 2000 MW(e) could be met right on the mark. **SERI Input:** See also, SERI response to Board Inquiry No. 19. 1. The Staff is correct in its use and explanation of "target value" and "output level" in EIS Section 8.2. Target value pertains to the value of 2000 MWe set as a tool to facilitate comparison of various reactor plant designs. For example, the target value for site generation would require two ABWR designs, generating an approximate electrical "output level" of 3000 MWe. It should be noted that MWe was NOT a PPE parameter. Since the ABWR design set the bounding thermal power output of the 4300 MWth per unit, this value became the bounding value for PPE parameter 17.3 ("Megawatts Thermal") in ER Table 3.0-1. 2. The application's ER 9.2 analysis of alternative energy sources was prepared in a manner similar to that used to establish the PPE. In order to facilitate comparison of various types of viable alternative energy generation sources (*i.e.*, nuclear, coal, and natural gas), the target site generation capacity of 2000 MWe was used. For example, four coal plants with an electrical capacity of 508 MWe each would be necessary to achieve a total site capacity of 2000 MWe or greater. This approach is described in ER 9.2.2.2. The results of the alternative energy source evaluation are summarized in ER Table 9.2-1. Directly relevant to the Board's inquiry, it is important to note that the proposed project (regardless of the particular reactor design) represented a total site electrical output in excess of 2000 MWe. Thus, bounding PPE parameter values were set by a reactor design producing greater than 2000 MWe. As stated in ER 9.2.2.2 and Footnote 4 to ER Table 9.2-1, this approach is considered conservative for comparing environmental impacts between the proposed (nuclear) project and other viable energy alternatives.

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68	8-5	8.2.1	What is the basis for the Staff's statement that purchasing power or re-activating old plants are not reasonable alternatives to providing power? **Response:** The Staff assumes that an applicant would not incur the expense of preparing and submitting an ESP application if the desired electric power could be obtained at less expense and with equivalent reliability by purchasing the power on the open market or by reactivating retired generating facilities owned by the applicant. **SERI Input:** In addition to economic considerations mentioned in the above Staff response, the potential use of purchased power and/or reactivation of older plants as energy alternatives also raises environmental issues, including air quality and land use impacts. As discussed in more detail in ER 9.2.1.1, neither purchased power nor reactivation of older plants were found to be environmentally preferable alternatives to the proposed project.
69	8-10	8.2.2.1	Why does cooling makeup water for a coal power plant have a greater impact than for a nuclear plant? **Response:** The Staff did not find that cooling makeup water for a coal power plant would have a greater impact than for a nuclear plant. Page 8-10 of the FEIS states that extraction of cooling makeup water for a new coal-fired plant located at the Grand Gulf site could have adverse impacts on aquatic resources. However, the impacts on aquatic resources of makeup water withdrawal for a coal plant should not differ significantly from the impacts of makeup water withdrawal for the proposed ESP facility. Aquatic ecosystem impacts associated with the water intake system for the proposed ESP facility are discussed in Section 5.4.2.1 of the FEIS. The ecological impacts shown in Table 8-4 of the FEIS are characterized as MODERATE to LARGE for a coal-fired plant and SMALL to MODERATE for nuclear, natural gas, and a combination of alternatives. The coal impact characterization reflects the greater potential ecological impacts related to mining activities for a coal fired plant relative to the other plants; cooling makeup water impacts were not a significant contributor to that determination. **SERI Input:** SERI has no additional comments or input.

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70	8-26	8.3	Couldn't it be shown that all the unresolved construction and operational issues with this ESP (*see* Tables 4-3 & 5-17) might also apply to other types of power plants so that a comparison (Table 8-4) is meaningless? **Response:** No. The impact characterizations in Table 8-4 represent the Staff's best judgment, taking account of the uncertainties involved for the four categories of plants. The unresolved characterizations shown in Tables 4-3 and 5-17 of the FEIS could have been carried over to Table 8-4. The unresolved characterizations would be similar for nuclear, coal, and natural gas (but not necessarily for the combination of alternatives). However, even if the unresolved characterizations had been carried over to Table 8-4, the Staff's conclusion in Section 8.2.5 of the FEIS would not have changed. Furthermore, while some impacts are unresolved, the estimated impact levels are still supported by the Staff's expertise and experience. These estimated impact levels allowed the Staff to make an informed comparison of the relative impacts for all the categories of plants as well as the combination of alternatives. **SERI Input:** SERI concurs with the Staff that, for the limited unresolved issues, the Staff made reasonable and supportable estimates of the impact levels based on input from SERI and the Staff's experience and expertise. Use of such estimates in the absence of available information complies with NEPA and is sufficient for the Staff and the Board to reasonably consider energy alternatives as required by NEPA. See also SERI responses to Board Inquiry Nos. 1, 65, and 66, above.
71	8-28	8.3.1	Please elaborate as to why the EPA determined that dry cooling is not the best technology for minimizing adverse environmental impacts, since it seems that this conclusion is predominantly based on economic reasons associated with the plant. **Response:** EPA concluded (66 FR 65282) that closed-cycle wet cooling represented the best technology available because: (1) dry cooling costs more than ten times as much per year as closed-cycle wet cooling, but it is estimated to reduce water intake by only an additional five percent relative to once-through cooling; (2) dry cooling requires more energy and as a result yields more undesirable air emissions from

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			fossil fired plants; (3) the costs of dry cooling would pose a barrier to entry for some facilities and discourage the construction of new facilities, which are generally better for the environment than existing facilities; (4) dry cooling is far less effective in warmer climates; and (5) dry cooling is not technically feasible for manufacturers and some types of power plants. *Riverkeeper, Inc. v. EPA*, 358 F.3d 174 (2nd Cir. 2004). In addition, the reduced efficiency associated with dry cooling would increase nuclear fuel cycle impacts relative to the energy output. Accordingly, while the EPA's determination does take "economic" factors into account, these factors intersect with the EPA's assessment of the comparative effectiveness of the larger-scale environmental outcomes that could result from use of different technologies. **SERI Input:** As noted in ER Table 9.4-1, dry cooling towers also require three to four times the land area of wet towers (Ref. the EPA report, EPA-821-R-01-036). Therefore, they were eliminated from further consideration.
72	8-30	8.3.2.4	How can an ESP application be considered sufficient without an assessment of the practicality of treating the water directly pulled from the Mississippi River? Isn't it possible for the treatment costs and effluent (*i.e.*, sediment sludge) disposal to be high enough to make this option infeasible? **Response:** The Staff did not perform a cost-benefit analysis for the Grand Gulf EIS. In preparing its EIS, the Staff used the technical approach taken by the Applicant within the bounds of the PPE. Accordingly, the Staff did not consider the cost of treating water withdrawn from the Mississippi River. Specifically, there is no consideration by the Staff in the FEIS of the cost of water treatment or the cost of the safe disposal of sediment sludge. Rather, without considering costs, the Staff concluded that based on current water treatment technology, it is not unreasonable to assume that water from the Mississippi River could be withdrawn and treated sufficiently to meet the cooling water needs of a new nuclear plant sited at the Grand Gulf ESP site. See response to Inquiry No. 47. **SERI Input:** Refer to SERI responses to Board Inquiry Nos. 21(2) and 66.
73	General	8.4	There does not seem to be much discussion of the analyses performed in defining Entergy's ROI & and the alternative site

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			selection process. Please elaborate on how the Staff evaluated: 1. the adequacy of the Applicant's analysis of its ROI and selection of alternative sites; 2. the general site screening process; 3. the decision to reduce the alternative sites from 7 to 4; and 4. the decision to reduce the alternative sites from 4 to 1. **Response:** 1. The Applicant's reasons for selecting its ROI and the alternative sites are stated on p. 8-32 of the FEIS. The Staff reviewed these reasons and the Staff guidance in ESRP 9.3, especially pages 9.3-6 and 9.3-7 of ESRP 9.3, and concluded that the applicant's ROI and alternative sites were reasonable. 2. The applicant employed a two step process to screening alternative sites. The Applicant employed site screening criteria to reduce the number of candidate sites from seven to four, and a separate (more detailed) list of criteria was used to reduce the number from four to one. The Staff followed the procedures in Section III of ESRP 9.3 to evaluate the Applicant's site screening procedures and determined that the procedures were reasonable and allowed valid comparisons between alternative sites. 3. The Applicant first eliminated the Indian Point Energy Center site because the site did not meet the population density criterion in Regulatory Guide 4.7. The Staff concluded that eliminating this site based on this criterion was reasonable. The Applicant then applied the screening criteria shown in Table 8-5 of the FEIS to the remaining six alternative sites. Using the guidance in ESRP 9.3, the Staff concluded that the screening criteria shown in Table 8-5 were reasonable for the initial screening. The Applicant's exclusion of the Arkansas Nuclear One (ANO) and Waterford-3 sites is discussed in the response to Inquiry No. 74. 4. After the initial screening, the Applicant then applied the screening criteria shown in Table 8-6 of the FEIS to the remaining four sites. Using the guidance in ESRP 9.3, the Staff concluded that the screening criteria shown in Table 8-6 were reasonable for the final screening. **SERI Input:** 1), 2) and 3): SERI has no additional comments or input.

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			4) See Section 9.3.5 of the ER for additional information regarding the preferred site selection process.
74	8-33	8.4.2.1	Please explain the basis for Entergy's conclusion that the Waterford-3 and Arkansas Nuclear sites are less suitable than Grand Gulf, and how the Staff analyzed that representation. **Response:** Table 2 in Section 1 of the Applicant's 2001 "Early Site Permit Selection Committee Notebook" contains the Applicant's results for screening six sites (after exclusion of Indian Point) to four. The sites ranked as shown on p. 8-33 of the FEIS. The Applicant eliminated Waterford-3 and ANO from further consideration even though they scored higher than the Pilgrim site. The Applicant's 2001 Notebook states in Section 1 that "Waterford and ANO were challenged by various avoidance criteria (*i.e.*, wetlands, threats from industrial and other plants, thermal discharge limits, etc.) or transmission and market constraints. Both of these sites are viable for new nuclear plants, but were analyzed as less suitable than other southern sites." In a 2004 response to an RAI, the Applicant also stated that it eliminated the Waterford-3 and ANO sites from further consideration because it wished "to gain ESP experience in a variety of technical and public acceptance environments, as well as to capitalize on two separate power markets" (p. 8-33 of the FEIS). The Staff's evaluation of the Applicant's decision to eliminate the Waterford-3 and ANO sites is on the bottom of p. 8-34 of the FEIS. **SERI Input:** SERI would like to clarify the statement in the Staff response: "The Applicant eliminated Waterford-3 and ANO from further consideration . . . ." As stated in the Staff response, the proposed action, which formed the objectives for the siting study reported in the Notebook, was to identify one potential ESP site in each of Entergy's northern and southern operating areas. In order to accomplish this objective, Waterford and ANO-1 were compared to Grand Gulf and River Bend to identify a southern site and were <u>deferred</u> from further consideration for the purposes of this ESP application (not <u>eliminated</u> as the Staff states) in favor of these sites for the southern ESP location.
75	8-34	Table 8-5	Please explain the "Relative Weighing Factors" on Table 8-5, including how they were developed and how they are applied.

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			Response: The Applicant's approach shown in Table 8-5 of the FEIS is explained in Section 1 of the Applicant's 2001 "Early Site Permit Selection Committee Notebook." The Applicant's process was derived from a 2001 Electric Power Research Institute (EPRI) report, *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*. The screening criteria in Table 8-5 come from Section 4.2 of the EPRI report except that the Applicant added the last criterion dealing with public acceptance. The Applicant's process for assigning weighting factors is explained at p. 2 of Section 3 of the Notebook. The Applicant states that "weights were assigned on a 1 to 10 scale, with 10 being most important and 1 being least. Participants were polled twice, once before the Discussion Group reports and once after. Individual weight scores were averaged to arrive at final weighting factors." The Applicant's technical experts assigned a score for each criterion on a scale of 1 - 5, with 5 being most favorable and 1 least favorable. The total score for each site was the sum of the product of weighting factor multiplied by the assigned score for each screening criterion. **SERI Input:** As a clarification, the process employed to develop weight factors was an adaptation of the modified Delphi process described in Section 2.11 and Appendix D of the Electric Power Research Institute (EPRI) report, *Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*.
76	8-40; 8-59; 8-80	8.5.1.3; 8.5.2.3; 8.5.3.3	1. Isn't it possible for the Staff to determine whether the transmission lines at River Bend (EIS at 8-40), Pilgrim (*id.* at 8-59), and Fitzpatrick (*id.* at 8-80) have the capacity to handle a new plant rather than just assuming that they do not have enough capacity? 2. What is the basis for the Staff's assumption that a new transmission line and right-of-way would be needed at River Bend, Pilgrim, and Fitzpatrick, respectively. 3. At what length does a new transmission line become a long distance? **Response:** 1. Using available reconnaissance-level information, the Staff reports the existing transmission capacity at each alternative site. None of the sites had more than two 500kV transmission lines – what is currently present at Grand Gulf. Since the Staff assumed that the PPE power output could not

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			be handled by the existing Grand Gulf transmission service, this assumption was perpetuated for the alternative sites. 2. There are three possible scenarios for new rights-of-way associated with transmission system upgrades (see section 4.4.1.2). The Staff determined that the most likely of the three scenarios that would be implemented at the alternative sites to accommodate the proposed new generating capacity, was widening the existing rights-of-way (*i.e.*, creating new, adjacent rights-of-way). The Staff found that the other two scenarios, 1) emplacing upgrades solely within the existing rights-of-way (*i.e.*, no new rights-of-way) or 2) creation of new rights-of-way with routings different from existing lines, appeared less likely. 3. The Staff did not establish a criterion for a "long" distance. For the purposes of assessing impacts at the Pilgrim site, the Staff noted that the transmission line ROW would be "relatively short", in this case, it was 5 miles. By comparison, the ROW for Pilgrim was relatively short, compared to about 70 miles for Grand Gulf, River Bend and FitzPatrick. Those ROW lengths are longer, compared to Pilgrim, but the Staff makes no judgment that those transmission line ROWs are "long distance." In any event, the primary factor in the Staff's determination that impacts from construction and transmission line right-of-way expansion on terrestrial ecological resources at FitzPatrick would be MODERATE to LARGE was not the length of the transmission line at issue; the Staff noted that, for FitzPatrick, the area affected by transmission line right-of-way expansion would include substantial forest and wetland habitat. **SERI Input:** SERI has no additional comments or input.
77	8-58	8.5.2.2	Please explain why the quantity of makeup water and blowdown discharge are expected to be higher at Pilgrim than at Grand Gulf. **Response:** The high total dissolved solids and corrosive properties of ocean water generally limit the number of number of cycles of concentration that ocean water in a wet cooling tower can support. Evaporation of water increases the concentrations in the recirculating cooling water to levels that can impair the performance of the cooling tower. **SERI Input:** Because the cycles of concentration are limited as a result of the use of ocean (salt) water for cooling, more makeup water

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			is required to maintain water chemistry within prescribed limits for the circulating water and cooling tower system equipment.
78	General	8.5.2.3	This section appears to be a repetition of the Applicant's submittal to the Staff, with a conclusory statement of impact. Please elaborate on the Staff's analysis that supports assigning the categorical impacts to the various components of terrestrial resources. **Response:** The Applicant's submittal to the Staff that contains the related description of terrestrial ecological impacts is the Early Site Permit Selection Committee Notebook (Entergy 2001 [pages 50-62]). Entergy (2001) compared the alternative sites, including Pilgrim, to the Grand Gulf site on the bases of potential impacts to important species/habitats, wetlands, and cooling tower drift, but does not attribute these to construction and operation separately. Section 8.5.2.3 of the FEIS considers a wider range of potential impacts of construction (important species/habitats, wetlands, and forest habitat) and operation (important species, cooling tower drift, cooling tower noise, avian collisions with cooling towers and transmission lines, transmission line electromagnetic field effects, and transmission line right-of-way maintenance effects on floodplains and wetlands) than Entergy (2001), and treats them separately. The FEIS analysis permitted determination of categorical impacts for terrestrial ecosystems and contributed half of the information for the determination on threatened and endangered species (other half from aquatic ecology [FEIS section 8.5.2.4]), for both construction and operation (FEIS Tables 9-1 and 9-2). Thus, while the FEIS analyses are somewhat broader and more specific to construction and operation than the Applicant's submittal, the conclusion is the same, *i.e.*, the Pilgrim site is not obviously superior to the Grand Gulf site in terms of terrestrial ecology (FEIS Tables 9-1 and 9-2, and Entergy 2001, pages 50-62). **SERI Input:** SERI has no additional comments or input.
79	8-65	8.5.2.3	1. What is the basis for the statement that Pilgrim would use cooling towers for any new units? 2. Please elaborate on the basis for the Staff's conclusion that "there could be damage to offsite vegetation resulting from salt drift from operation of cooling towers" at the Pilgrim site.

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			Response: 1. Regulations (codified at 40 CFR 125 Subpart I) issued by the Environmental Protection Agency in December 2001 (66 FR 65256) under Section 316(b) of the Clean Water Act make it very difficult for owners of new power plants to utilize once-through cooling. The Applicant recognized this fact in its 2001 "Early Site Permit Selection Committee Notebook" (Section 4, pages 56 and 58). Once-through cooling is not part of the PPE for the Applicant's proposed site. Based on the preceding factors, the Staff assumed that new nuclear generating units at the Pilgrim site would also use cooling towers. 2. Salt water cooling may result in salt deposition greater than ambient levels, which may in turn result in impacts on crops and ornamental vegetation and native plants. The license renewal GEIS discusses this issue for the only existing nuclear power plant that employs salt water closed-cycle cooling, Hope Creek, and a coal-fired plant, Chalk Point, both of which use natural draft cooling towers. The GEIS also discusses this issue for another nuclear plant, Palo Verde, which employs treated sewage effluent of relatively high salinity and mechanical draft cooling towers. At these three plants, there were no visual impacts to crops or native vegetation from salt drift. This suggests that the potential impacts of salt water cooling at the Pilgrim site would be negligible, but is not conclusive. The only other reference to salt drift effects stemming from salt water cooling is EPA (2001) (see Section 8.5.2.3). EPA (2001) only "anticipated" that the effects of salt drift from using tidal/estuarine water as cooling water would be of small significance, based on information presented in the GEIS. Given the paucity of data on salt water cooling, and the uncertainty as to which type of cooling towers (natural draft or mechanical) would be employed at the Pilgrim site, a conservative approach was taken in the EIS, *i.e.*, that "there could be damage to offsite vegetation." **SERI Input:** SERI has no additional comments or input.
80	8-72	8.5.2.5	Please elaborate on how the MODERATE adverse socio-economic impact was derived for Pilgrim. **Response:** The MODERATE adverse socioeconomic impact was derived from three potential adverse impacts, all of which were considered to be noticeable but not destabilizing of essential features of the resource. 1) The local economic development

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			leaders consider construction and operation of additional unit(s) at the Pilgrim site to be incompatible with the current tourism-based economy and their economic plans for the county. It is not clear how the tourism industry would react. Regionally, the service sector (tourism) now offers the most employment opportunities. Local officials believe that the value of tourism -related property might decline in value if a new nuclear plant were built, offsetting at least some of the gain in tax base due directly to the facility. 2) The roads near the plant are narrow and crowded, with no plans to upgrade them. Construction and operations traffic would significantly degrade level of service on nearby roads. 3) While current structures at Pilgrim are not visually obtrusive from any vantage point, any new facilities would not be able to take advantage of once-through cooling, so cooling towers would be necessary and would be visually obvious, especially from "view properties" south of the facility. Plumes generated by the operation of cooling towers could also cause a negative aesthetic effect. **SERI Input:** SERI has no additional comments or input.
81	8-83	8.5.3.3	Why is it assumed that cooling towers would be used for a new plant at the Fitzpatrick site when the existing plant uses once-through cooling? **Response:** Regulations (codified at 40 CFR 125 Subpart I) issued by the Environmental Protection Agency in December 2001 (66 FR 65256) under Section 316(b) of the Clean Water Act make it very difficult for owners of new power plants to utilize once-through cooling. The Applicant recognized this fact in its 2001 "Early Site Permit Selection Committee Notebook" (Section 4, pages 56 and 58). Once-through cooling is not part of the PPE for the applicant's proposed site. Based on the preceding factors, the Staff assumed that new nuclear generating units at the FitzPatrick site would use cooling towers. **SERI Input:** SERI has no additional comments or input.
82	8-99	8.5.4.3	What is the title and full citation for NCRP 1991? It is not listed in section 8.7 (References). **Response:** National Council on Radiation Protection and Measurements (NCRP). 1991. *Effects of Ionizing Radiation on Aquatic*

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			Organisms. NRCP Report No. 109, Bethesda, Maryland. **SERI Input:** SERI has no additional comments or input.
83	8-100	8.5.4.5	What is the basis for the Staff's conclusion that treated water from the surface water sources could be used if groundwater impacts were significant? **Response:** Water treatment technologies are sufficiently mature that relatively poor quality waters can be treated to meet water quality requirements likely to be experienced at a nuclear power plant. Standard water treatment methods could reduce total suspended solids in Mississippi River water to provide an abundant water supply with water quality generally equal to groundwater. **SERI Input:** See SERI response to Board Inquiry No. 21(1). Also, ESP ER Section 5.2.3 indicates that the Corps of Engineers and the state do not restrict the quantity of water that can be withdrawn from the Mississippi River.
84	8-102 to 8-103	Tables 8-13 & 8-14	1. The two tables list water use and water quality impacts as SMALL, yet in text the Staff justifies these impacts as equal to the ESP site, which the Staff states are unresolved. Please clarify this inconsistency. 2. While BMPs and the large size of the water body supports the generic impact assessment for surface water, can the same be said for the potential impact on aquifer levels? **Response:** 1. As the Staff states in Section 9.1 (page 9-2), for the unresolved issues "the Staff indicated a likely impact level for these unresolved issues based on professional judgment, experience, and consideration of controls likely to be imposed under required Federal, State, or local permits that would not be acquired until an application for a construction permit or combined license is underway. These considerations and assumptions were similarly applied at each of the alternative sites to provide a common basis for comparison. These impact levels are, therefore, best estimates of impacts that the Staff used for its "obviously superior" determination." 2. Given the status of the Catahoula Formation as a sole source aquifer, the Staff concluded that Federal controls (administered by EPA) are likely adequate to protect the site

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			from adverse aquifer drawdowns. Additionally, any necessary mitigation of declines in aquifer levels would be technically feasible by obtaining water from the Mississippi River instead of from groundwater wells. **SERI Input:** In addition, with respect to Board Inquiry No. 2, SERI notes that ESP ER Section 5.2.3 indicates that the Corps of Engineers and the state do not restrict the quantity of water that can be withdrawn from the Mississippi River.
85	9-2	9.1	It is stated that the same considerations and assumptions for unresolved issues at the proposed ESP site were applied to alternative sites without incorporating any differentiating site characteristics. Explain why this does not "force fit" similar impact results, which further undermines the usefulness of the alternative analyses? **Response:** Tables 9-1 and 9-2 in the FEIS contain unresolved impacts for the Grand Gulf site, but not for the alternative sites. The reason the alternative sites do not have unresolved impacts is that impacts were only evaluated using reconnaissance-level information, as discussed on p. 8-1 of the FEIS. The FEIS does in fact incorporate "differentiating site characteristics." What follows is a specific example to show the approach the Staff used for these issues. Regarding land use impacts related to transmission lines, for the Grand Gulf ESP site the Staff was unable to reach a resolution, but concluded the impacts were likely to be SMALL. For the Pilgrim site, the Staff assumed the same amount of power would have to be transmitted from the site. But in Section 8.5.2.1, the Staff pointed out some local characteristics that would lead to land use impacts (related to the transmission lines) that would differ from those at the Grand Gulf site. For the Pilgrim site the Staff concluded that the impacts of construction of transmission lines would be SMALL to MODERATE. The Staff reached the same conclusion for the FitzPatrick site for similar reasons. So it is clear the Staff was not force-fitting similar results for the alternative sites for the issues that were unresolved for the Grand Gulf site. Rather, the Staff was using similar base assumptions (*e.g.*, amount of power to be generated) and applying those assumptions on a site-specific basis. **SERI Input:** SERI has no additional comments or input.

Inquiry No.	EIS Page	EIS Section	Inquiry
86	9-3 to 9-4	Tables 9-1 & 9-2	Table 9-1 (construction) lists as unresolved impacts on land use, water use, water quality, and terrestrial ecosystems. Table 9-2 (operations) lists as unresolved impacts on water use and water quality. In each case these items are assigned an "estimated" impact. 1. Does the inaccuracy in the assigned impacts rendered the alternatives analyses of marginal use? 2. How do you suggest the Board proceed in making its independent "weighing of conflicting factors" when many of the critical site issues are unresolved, due to lack of specific studies? **Response:** 1. Although there is more uncertainty associated with the assigned levels of impacts for these issues than for the resolved issues, the Staff does not believe the level of uncertainty is so great as to render the alternatives analysis of marginal use. For example, while the Staff is, in its EIS, attempting to reveal the impacts of the proposed action, other agencies will still have to issue a number permits before the plant could be built and operated. (See Appendix G of the EIS.) These permits will control the actual level of the impacts to the associated resources. Because these permits and authorizations are not yet in place, the Staff could not include any associated limits in its analyses. However, the Staff can reasonably expect that the responsible agencies will establish permit limits that will protect the affected resources and limit the impacts of plant construction and operations. As stated in 10 CFR 51.71(d), "Due consideration will be given to compliance with environmental quality standards and requirements that have been imposed by Federal, State, regional, and local agencies having responsibility for environmental protection, including applicable zoning and land-use regulations and water pollution limitations or requirements promulgated or imposed pursuant to the Federal Water Pollution Control Act. The environmental impact of the proposed action will be considered in the analysis with respect to matters covered by such standards and requirements irrespective of whether a certification or license from the appropriate authority has been obtained." 2. Environmental factors could conflict with the issuance of an ESP if the ESP interfered with or was incompatible with any particular environmental values or resources. Potentially conflicting environmental factors are those identified in NEPA itself, in the Commission's requirements in 10 C.F.R. Part 51, and in Commission cases. Such factors include: (1) any

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			unavoidable adverse environmental impacts; (2) any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented; (3) any conflicts involving the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (4) whether an obviously superior alternative site has been identified. While the impacts of construction and operation of one or more nuclear power plants at the site is considered in assessing these factors, such impacts form only a portion of the elements considered. Further, the final assessment of adverse environmental impacts from construction and operation at the Grand Gulf ESP site would be performed at the CP or COL stage for issues that were not resolved in the ESP review. Finally, issuance of an ESP does not involve approval of any particular design, or approval to build a plant, nor does it involve the final balancing of the environmental costs and benefits of such action. *See Exelon Generation Company, LLC* (Early Site Permit for Clinton ESP Site), CLI-05-17, 62 NRC 5 (2005). While five issues regarding the ultimate impacts of plant construction and three issues regarding the impacts of plant operation remain unresolved for a Grand Gulf ESP facility, the Board may still independently weigh the conflicting factors related to the alternative sites evaluated in the FEIS. The Staff believes the Board may do so because issuance of the ESP itself will not result in any environmental impact, and this weighs heavily in favor of a finding that the first three of the four factors set forth above do not represent factors conflicting with ESP issuance. As for the fourth factor, regarding alternative sites, the Staff believes the Board may make its finding in light of the following four facts. First, some impacts are the same at the Grand Gulf ESP site and all the alternative sites. For example, the information in the Applicant's environmental report (ER) was insufficient for the Staff to resolve the impacts of postulated accidents and gas-cooled reactors not only for the proposed site, but for all the alternative sites. (If a gas-cooled reactor is selected at the construction permit (CP) or combined license (COL) stage, the ER prepared for the CP or COL application would need to address this issue.) Second, while the depth of information available was inadequate for the Staff to fully disclose the impacts to certain resources at the proposed Grand Gulf ESP site, so-called "reconnaissance-level" information was available at all sites. Resources for which reconnaissance-level information was available included ground water use and quality impacts from

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			construction and operation; site and power line corridor land use impacts from construction; and construction impacts on terrestrial ecology. Reconnaissance-level information includes information gleaned from literature searches, previous site studies (such as those performed for the existing nuclear power plants located at each of the sites under consideration), and, in some instances, limited field work. Such information is typically all that is available for a site selected for comparison as an alternative to an applicant's preferred site, and is sufficient to determine whether an obviously superior alternative site has been identified. Third, state and Federal regulations, such as those issued by the Environmental Protection Agency, in furtherance of the objectives of statutes such as the Clean Water Act, require permits for the use of certain resources, or otherwise limit impacts to such resources. With respect to ground water use and quality during construction and operation, the Staff relied on these regulations to estimate the likely impacts at the Grand Gulf ESP site for the purposes of the alternative site evaluation. Fourth, while FEIS Tables 9-1 and 9-2 appear to list entire areas as unresolved, examination of the text reveals that only certain issues or particular items under a given general resource area remain unresolved. For example, in spite of the limited information regarding water quality in the application, the Staff was able to resolve surface water quality issues, leaving only groundwater quality for resolution in the context of a construction permit or combined license application. In sum, the Staff suggests that the Board rely on the foregoing considerations in making its independent "weighing of conflicting factors." **SERI Input:** See SERI response to Board Inquiry Nos. 1, 65, 66, and 70.
87	9-8	9.4	Hasn't the conclusion that "no significant environmental impacts would be avoided by the no action alternative" been predetermined to some degree, due to the many assumptions made by the Staff, as a result of the paucity of site specific characterization data available for this analysis? **Response:** No. The Staff's conclusion is based on two facts, namely: (1) The Grand Gulf ESP application does not include a site redress plan, and (2) an ESP does not authorize construction

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			or operation of a new plant. Since the Applicant did not propose a site redress plan, it would not be authorized to perform any site preparation and preliminary work activities pursuant to 10 C.F.R. § 52.25(a) if the application were granted. Accordingly, since an ESP does not otherwise authorize plant construction or operation, the granting of an ESP for the Grand Gulf ESP site does not involve any significant environmental impacts. This conclusion is not related to the impacts of construction and operation of a plant on the ESP site or a lack of information as to such impacts, nor is that conclusion related to the assumptions on which the Staff's evaluation rests, or whether such issues remain unresolved. The FEIS discusses the impacts of construction and operation for two purposes: (1) to allow the comparisons necessary to determine whether an alternative site is obviously superior to the proposed site and (2) to allow early resolution of environmental issues (*i.e.*, prior to a COL application). While not stated in the FEIS, an EIS on a construction permit (CP) or combined license (COL) application referencing the Grand Gulf ESP (if granted), would consider the impacts of construction and operation, as compared to the no-action alternative of denying the CP or COL. **SERI Input:** SERI does not agree that there is a paucity of site-specific characterization data. As documented throughout the ER and EIS, the GGNS ESP site is adjacent to an operating nuclear power plant and, as a result, there is substantial available site-specific data, including data on hydrology, geology, seismology, and meteorology, upon which the ER and EIS are based. See also SERI responses to Board Inquiry Nos. 1, 65, 66, and 70.
88	10-5	Table 10-1	Table 10-1 implies that it lists all of the unavoidable adverse environmental impacts from construction. 1. How is this possible since land use, hydrological/water use/quality, and ecological/terrestrial issues are all unresolved? 2. What is the Staff's basis for stating that groundwater impacts will be localized and temporary since it is an unresolved issue? **Response:** 1. While the impacts of construction on land use, water use and quality, and terrestrial ecosystems were not resolved, it

Inquiry No.	EIS Page	EIS Section	Inquiry
			is clear that there will be impacts in these areas. In some cases (*e.g.*, land use for the site and vicinity) the Staff had information that addressed most of the impacts, with only some portions (*e.g.*, disposition of spoils) indeterminate. So, while the level of impacts may be indeterminate, the types of impacts and, in general, the forms of mitigation, are known and understood. This is the basis for the entries in Table 10-1. 2. Although the characterization of the subsurface environment at the site is inadequate to resolve the impact of construction for all feasible construction practices, the Staff still was able to conclude that specific construction practices and specific mitigation measures are likely to be feasible and would limit any adverse impacts. For instance, groundwater withdrawals from the Catahoula aquifer could be replaced with surface water withdrawals from the Mississippi River, or dewatering wells could be supplemented with sheet pile to limit the zone of influence of the dewatering system. Since costs were not considered in the ESP review, only technical (and not economic) feasibility was considered by the Staff. Given the designation of the Catahoula aquifer as a sole source aquifer, the EPA has oversight to ensure that such actions at the site would not impair this aquifer. **SERI Input:** SERI has no additional comments or input.
89	10-6	Table 10-2	Table 10-2 implies that it lists all of the unavoidable adverse environmental impacts from operations. How is this possible since hydrological/water use/quality issues are unresolved? **Response:** See the response to Inquiry 88. The same logic applies to this inquiry. **SERI Input:** SERI has no additional comments or input.
90	10-9 to 10-10	10.5	As mentioned in previous questions, the Staff states that the Applicant's proposed ESP has been analyzed in detail; however, the number of unresolved issues that are fundamentally site driven (summarized in Tables 9-1 & 9-2), raise basic questions: 1. Is there any real validity to the comparison of impacts that "assign" impacts for unresolved issues? 2. Of what use is this EIS given that most of it will need to be

Inquiry No.	EIS Page	EIS Section	Inquiry
			repeated at the COL stage? 3. What are the options to the Applicant if the Board decides there is insufficient information for it to make its independent "weighing of conflicting factors?" **Response:** 1. The Staff believes that there is validity to the comparison of impacts, even for the unresolved issues. See the Staff's responses to Inquiries 44, 56, 66, 70, and 84 - 86. 2. None of the work that has been completed in this EIS will have to be repeated for a COL referencing the ESP. As discussed in the response to Inquiry 20, a COL applicant referencing an ESP would have to determine whether there is any significant new information for the issues that were resolved in the ESP proceeding. For a given issue, if there is no significant new information then the applicant would report this in its environmental report. In addition, the applicant would have to address any issues that were not resolved in the ESP proceeding. 3. Before making its independent weighing of conflicting factors, a Board can request additional testimony with respect to matters on which the Board believes insufficient information has been provided. Such testimony could include additional data together with appropriate analyses and may be sponsored into evidence by either the applicant or the Staff. The Board's findings on environmental matters are deemed to modify the FEIS. *See Hydro Resources, Inc.* (P.O. Box 15910, Rio Rancho, NM 87174), CLI-01-4, 53 NRC 31, 53 (2001). Accordingly, the Staff believes the Board in this proceeding should be able to obtain sufficient information from the FEIS and testimony to make its independent weighing of conflicting factors. Nonetheless, in the hypothetical event a Board determined that it could not make an independent weighing of conflicting factors even in light of the FEIS and the testimony presented, the Board would be unable to make the findings specified in the Notice of Hearing, and, per force, would be unable to authorize the Staff to issue a permit. An applicant presented with such a scenario could, in its discretion, submit additional data and analyses to the Staff for evaluation and incorporation into the FEIS. The Staff declines to speculate on what other options an applicant might choose to exercise under such a scenario. **SERI Input:** 1. SERI concurs with the Staff that there is validity to the

Inquiry No.	EIS Page	EIS Section	Inquiry
			comparison of impacts for unresolved issues when the impact of those issues have been bounded using reasonable and supportable assumptions. For the GGNS ESP, the Staff made reasonable assumptions, based on input from SERI and the Staff's own experience and expertise, for the limited number of unresolved issues. See also SERI responses to Board Inquiry Nos. 1, 65, 66, 70, and 87. 2. SERI does not agree that most of the input or analyses provided in the ESP will need to be repeated at the COL stage. As more fully described in Appendix B to this submission, there are numerous resolved issues as a result of this ESP. Barring any significant new information pertaining to these issues, each of these resolved issues will also be considered resolved at the COL stage, and none of that work will have to be repeated. The resolution of these issues at the COL stage is one of the principal purposes of the ESP process and 10 CFR Part 52. The presence of a limited number of unresolved issues, which have been appropriately accounted for through bounding assumptions and which will be verified at the COL stage, does not invalidate the ESP process. 3. SERI concurs with the Staff that the Board may request additional testimony with respect to matters on which the Board believes insufficient information has been provided in order for the Board to conduct its "weighing of conflicting factors." Alternatively, if the Board requires some additional assurance that certain assumptions and/or bounding conditions contained in the EIS and relied upon by the Board in its decision making process are met at the COL stage, the Board could direct the Staff to include a Permit Condition(s), as applicable. For example, the Board could direct the Staff to include an ESP Permit Condition that requires a COL applicant referencing the GGNS ESP to conduct further capacity testing of the Catahoula aquifer to confirm that the actual proposed uses of the aquifer, if any, have only a SMALL impact on ground water quality. This would allow the Board to conduct its weighing of conflicting factors, using the impacts assumed by the Staff for this unresolved item, and ensure the assumed impacts are not exceeded at the COL stage when the actual plant design has been selected and more precise impacts on the aquifer can be assessed.

ATTACHMENT B

Grand Gulf ESP
EIS Inquiries

Response to Board Inquiry No. 1(2)

The Staff believes that the following issues have been resolved at the ESP stage. In general, issue resolution is based on specific assumptions that are detailed in the FEIS. The FEIS sections and pages noted in parentheses point to discussions of the environmental impacts and of the specific assumptions associated with resolution of the issues. These issues need not be addressed at the COL stage unless new and significant information is identified with respect to them.

SERI Input:

SERI has reviewed the listing below. SERI believed that there are additional sub-issues that are resolved within the various areas of impact that the Staff lists below. SERI's suggested revisions to this list are shown in "*Italics*" font below.

Construction Impacts on Air Quality

- Impacts of construction activities on air quality (Section 4.2.1 at 4-6)
- Impacts of increased traffic during construction on air quality (Section 4.2.2 at 4-6)

Construction Impacts on Water

- Impacts of hydrological alterations resulting from construction activity (Section 4.3.1
  at 4-8)
- *Impacts of construction dewatering on water use would be small, temporary, and localized (Section 4.3.2 at 4-9)*
- *Impacts on [Streams A and B] water quality from the erosion of sediment would be small (Section 4.3.3 at 4-10)*
- *Impacts on [MS River] water quality from dredging and shoreline construction would be negligible (Section 4.3.3 at 4-10)*

Construction Impacts on Ecology

- Loss of onsite habitat (Section 4.4.1.3 at 4-15)
- Impacts of onsite equipment staging and borrow areas on wildlife habitat (Section 4.4.1.3 at 4-15)
- *The impact of construction on wildlife habitat on the Grand Gulf site (including permanent and temporary losses of upland hardwood forest and bottomland forested wetlands) would be minimal (Section 4.4.1.5 at 4-18)*
- *The impact on wildlife populations, including State-listed species, onsite would also be minimal. (Section 4.4.1.5 at 4-18)*
- Overall impacts of construction activities on aquatic ecological resources (Section 4.4.2 at 4-20)
- Impacts of construction at the Grand Gulf ESP site on terrestrial and aquatic Federally listed species (Section 4.4.3.3 at 4-28)

Construction Impacts on Socioeconomics

- Overall physical impacts (socioeconomic) of construction on workers and local public, buildings, roads, and aesthetics (Section 4.5.1.5 at 4-32)
- Impacts of construction on increases in population (Section 4.5.2 at 4-34)
- Impacts of construction on the regional economy (Section 4.5.3.3 at 4-36)
- Offsite impacts of construction on transportation (Section 4.5.4.1 at 4-38)
- Overall impacts of construction on recreation (Section 4.5.4.2 at 4-38)
- Impacts of construction workers on housing (Section 4.5.4.3 at 4-40, 4-41)
- Impacts of construction on the regional infrastructure and community services (Section 4.5.4.6 at 4-44)

Construction Impacts on Historic and Cultural Resources

- Impacts of construction activities on historic and cultural resources (Section 4.6 at 4-47)

Construction Impacts on Environmental Justice

- Impacts of plant construction on environmental justice (Section 4.7 at 4-51)

Construction Impacts on Nonradiological Health

- Nonradiological health impacts of construction on construction workers, workers at the GGNS Unit 1 facility and the local population (Section 4.8.3 at 4-53)

Construction Impacts on Radiological Health

- Impact of radiological exposures to site preparation and construction workers (Section 4.9.5 at 4-56)

Operational Impacts on Land-Use

- Land-use impacts in the vicinity of the ESP site due to operations (Section 5.1.1 at 5-3)

- Land-use impacts in the transmission line rights-of-way and offsite areas from ESP facility operations (Section 5.1.2 at 5-4)

Operational Impacts on Air Quality

- Impacts of cooling towers on air quality (Section 5.2.1 at 5-5)

- Impacts of atmospheric releases other than cooling system releases on air quality (Section 5.2.2 at 5-5)

- Impacts of transmission line operation on air quality (Section 5.2.3 at 5-6)

Operational Impacts on Water

- Impacts of hydrological alterations resulting from operation (Section 5.3.1 at 5-7)

- *Impacts of operations on Mississippi River water use would be small (Section 5.3.2 at 5-8)*

- *Impacts of operations on Stream A and Stream B water use would be insignificant (Section 5.3.2 at 5-8)*

- *No operational impacts would be anticipated on the Holocene alluvial aquifer (Section 5.3.2 at 5-8)*

- *Impact of the thermal plume on the Mississippi River would be small and localized (Section 5.3.3.1 at 5-12)*

Operational Impacts on Ecological Resources

- Terrestrial ecological impacts of operation of a new generation facility at the Grand Gulf ESP site including the associated heat-dissipation system, transmission lines, and right-of-way maintenance (Section 5.4.1.10 at 5-20)
- Impacts of operation on aquatic ecosystems (Section 5.4.2.6 at 5-25)
- Impacts of operation on terrestrial and aquatic Federally listed threatened and endangered species (Section 5.4.3.3 at 5-30)

Operational Impacts on Socioeconomics

- Physical impacts (socioeconomic) of operation (Section 5.5.1.5 at 5-33)
- Demographic impacts of operation (Section 5.5.2 at 5-35)
- Impact on the regional economy of operation (Section 5.5.3.3 at 5-37)
- Impacts on the regional infrastructure and community service (Section 5.5.4.6 at 5-41)
- Impacts of operational workforce on transportation (Section 5.5.4.6 at 5-41)
- Impacts of operation on aesthetics and recreation (Section 5.5.4.6 at 5-41)
- Impacts of operation on public services and infrastructure (Section 5.5.4.6 at 5-42)

Operational Impacts on Historic and Cultural Resources

- Impacts of operation on historic and cultural resources (Section 5.6 at 5-43)

Operational Impacts on Environmental Justice

- Offsite impacts on minority and low-income populations from operation (Section 5.7.1
at 5-45)
- Health impacts on minority and low-income populations from operation (Section 5.7.2
at 5-45)

- Socioeconomic impacts on environmental justice (Section 5.7.4 at 5-46)

Operational Impacts on Nonradiological Health

- Nonradiological health impacts except acute and chronic impacts of EMFs (Section 5.8.6 at 5-50)

Operational Impacts on Radiological Health

- Radiological impacts on members of the public from routine operational releases (Section 5.9.3.3 at 5-58)
- Occupational doses to workers from operations (Section 5.9.4 at 5-59)
- Radiological impacts to biota from routine operation (Section 5.9.5.3 at 5-61)
- *Current operational monitoring program is adequate to establish radiological baseline (Section 5.9.6 at 5-62)*

Operational Impacts on Postulated Accidents

- Impacts of design basis accidents for advanced light water reactors (Section 5.10.1
  at 5-67)
- Impacts of severe accidents for advanced light water reactors (Section 5.10.2 at 5-79)

Fuel Cycle, Transportation, and Decommissioning

- Impacts of the uranium fuel cycle for light water reactors (Section 6.1.1.9 at 6-15)
- Impacts of transportation of fuel and radioactive waste to and from advanced light water reactors (Section 6.2.4 at 6-41)

Cumulative Impacts of Construction and Operation on Air Quality

- Cumulative impacts of construction and operation of a new facility at the Grand Gulf ESP site on air quality (Section 7.2 at 7-2)

Cumulative Impacts of Construction and Operation on Water Use and Quality

- Cumulative impacts of surface water use (Section 7.3.1 at 7-3)

Cumulative Impacts of Operation on Terrestrial Resources

- Cumulative impacts of cooling tower operation on wildlife and wildlife habitat (Section 7.4 at 7-5)

- Cumulative impacts of transmission line operation and maintenance on wildlife and wildlife habitat (Section 7.4 at 7-5)

- Cumulative impacts of operation on terrestrial ecological resources (Section 7.4 at 7-6)

Cumulative Impacts of Construction and Operation on Aquatic Resources

- Contribution of construction to cumulative losses of aquatic organisms (Section 7.5
at 7-6)

- Contribution of construction, operation, and decommissioning to cumulative impacts on aquatic ecological resources (Section 7.5 at 7-8)

Cumulative Impacts of Construction and Operation on Socioeconomics, Historic and Cultural Resources, and Environmental Justice

- Cumulative socioeconomic impacts of construction and operation (Section 7.6 at 7-8)

- Cumulative impacts on historic and cultural resources (Section 7.6 at 7-9)

- Cumulative impacts on environmental justice (Section 7.6 at 7-9)

Cumulative Impacts of Construction and Operation on Nonradiological Health

- Cumulative impacts on nonradiological health (Section 7.7 at 7-10)

Cumulative Impacts of Construction and Operation on Radiological Health

- Cumulative radiological impacts of operation for light water reactors (Section 7.8 at 7-10)

Cumulative Impacts of Construction and Operation on Fuel Cycle, Transportation, and Decommissioning

- Cumulative fuel cycle impacts for light-water reactors (Section 7.9 at 7-11)

- Cumulative impacts of transportation of fuel and waste to and from the Grand Gulf site for light water reactors (Section 7.9 at 7-11)

Alternatives

- Evaluation of power generation alternatives (Section 8.2.5 at 8-24)

- Evaluation of alternative sites (Section 9.2.1 at 9.6; Section 9.2.2 at 9-7; Section 9.3
at 9-7)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the matter of	)	
	)	
SYSTEM ENERGY RESOURCES, INC.	)	Docket No. 52-009-ESP
	)	
(Early Site Permit for Grand Gulf ESP Site)	)	ASLBP No. 04-823-03-ESP

CERTIFICATE OF SERVICE

I hereby certify that copies of "System Energy Resources Inc. Comments on NRC Staff Response to Licensing Board's Order of October 3, 2006" in the captioned proceeding have been served as shown below by deposit in the United States Mail, first class, this 30th day of October, 2006. Additional service has also been made this same day by electronic mail as shown below.

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