

November 20, 2006

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) )

NRC STAFF PRE-FILED TESTIMONY CONCERNING HEARING ISSUE H:  
CONTINUITY BETWEEN THE ESP STAGE AND COL STAGE

Q.1. Please state your name, occupation, by whom you are employed and your professional qualifications.

A.1. (GW) George F. Wunder. I am employed as a Project Manager in the ESBWR/ABWR Projects Branch 1, Division of Licensing Project Management, Office of New Reactors, U.S. Nuclear Regulatory Commission ("NRC"). A statement of my professional qualifications is attached.

A.1. (JW) James H. Wilson. I am employed as a Senior Project Manager in the New Reactor Environmental Projects Branch, Division of New Reactor Licensing, Office of Nuclear Reactor Regulation, NRC. A statement of my professional qualifications is attached.

A.1. (TC) Thomas Cheng. I am employed as a Geotechnical Engineer in the Division of Engineering, Office of Nuclear Reactor Regulation, NRC. A statement of my professional qualifications is attached.

A.1. (GB) Goutam Bagchi. I am employed as a Senior Advisor in the Division of Engineering, Office of Nuclear Reactor Regulation, NRC. A statement of my professional qualifications is attached.

Q.2. Please describe your professional responsibilities with regard to the review of the application by System Energy Resources, Inc. ("SERI" or "Applicant") for an early site permit ("ESP") for a new nuclear power plant or plants to be located on the existing Grand Gulf Nuclear Station ("GGNS") site near Port Gibson, Mississippi.

A.2. (GW) I took over Project Management responsibilities in May 2006, following issuance of NUREG-1840, the "Safety Evaluation Report for an Early Site Permit (ESP) at the Grand Gulf Site" ("SER"). I have been responsible for project management activities with respect to the SER since that time.

A.2. (JW) I am the NRC Senior Project Manager for the environmental review of SERI's Grand Gulf ESP application. I was responsible for overseeing the preparation of NUREG-1817, the "Environmental Impact Statement for an Early Site Permit (ESP) at the Grand Gulf ESP Site: Final Report," April 2006 ("FEIS").

A.2. (TC) As part of the NRC Staff's health and safety review of the SERI ESP application, documented in the Grand Gulf Site SER, I reviewed the aspects of the Applicant's Site Safety Analysis Report that concerned geotechnical engineering.

A.2. (GB) As part of the NRC Staff's health and safety review of the SERI ESP application, documented in the Grand Gulf SER, I reviewed the aspects of the Applicant's Site Safety Analysis Report that concerned hydrology.

Q.3. In its November 6, 2006, Order, the Atomic Safety and Licensing Board ("Board") identified certain issues to be addressed in connection with the mandatory hearing. With regard to the continuity between the ESP stage and the combined license ("COL") stage, the Board stated that numerous unresolved items, Applicant commitments, NRC Staff assumptions, deferred issues, COL Action Items, and permit conditions, not currently on any list, should be formally captured for transition to the COL stage. Further, the Board stated that it is not clear how these unresolved items, commitments, assumptions, and deferred issues will be tracked

between the ESP and the COL stage, and then subsequently managed (*i.e.*, discovered, implemented, reviewed, and approved), so as to assure that they are satisfactorily completed at the COL stage. In view of the foregoing, please first summarize how reviews were conducted and what steps were taken to assure consistency among the Staff reviewers and contractors.

A.3. (GW) With respect to how reviews were conducted, and the consistency of those reviews, the Staff prepared its Safety Evaluation Report (SER) in accordance with the guidance of RS-002, the Review Standard for "Processing Applications for Early Site Permits," (RS-002). The purpose of RS-002 is to ensure, in part, that evaluations across the spectrum of technical disciplines meet a consistent standard. In addition, RS-002 contains regulatory guidance derived from NUREG-0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (hereinafter referred to as the Standard Review Plan or SRP). The Standard Review Plan reflects the NRC Staff's historical experience in establishing and promulgating guidance concerning the safety of nuclear facilities, as well as in evaluating safety assessments.

Each section of RS-002 provides specific guidance on how to prepare the corresponding section of the SER. The sections of RS-002 contain subsections defining 1) the specific areas to be reviewed, 2) the acceptance criteria as contained in the relevant section of the Code of Federal Regulations, 3) the review procedures, and 4) guidance on documenting the review findings. In addition to the section-specific guidance, RS-002 states that "[r]eviewers will ensure that the safety case in all assigned sections is adequately supported by clearly identified references as needed." However, because not all portions of the SRP are within the scope of an early site permit (ESP) proceeding, some sections of those guidance documents are not addressed in RS-002 and/or the SER. These issues would be addressed, as appropriate, in the review of a combined license (COL) application that referenced the Grand Gulf ESP.

After the individual sections of the SER are completed, the technical branches submit them to the safety project manager. The safety project manager is tasked by RS-002 to ensure that the facts stated in the Staff's SER are internally consistent as well as consistent with the statements set forth in the applicant's site safety assessment.

After all sections of the SER are completed and the document is compiled, it is again reviewed for consistency by the project manager, project branch chief, and individual technical branches. The project manager is also tasked with obtaining review by and concurrence from Staff counsel to ensure that the SER is defensible and that counsel has no legal objection to the document.

The Staff does employ contractors from outside the NRC as consultants to work on certain areas of the SER; however, the Staff technical branches retain responsibility for the content of their respective sections. All SER input from outside contractors is submitted through the appropriate technical branch. Many outside contractors are familiar with the guidance of RS-002; however, in any event, the individual Staff technical branches are responsible for ensuring that their respective sections of the SER conform to that guidance.

The Staff employs detailed guidance on preparation of the SER as well as a regimen of peer, supervisory, and legal review. Combined, these features ensure consistency across the entire spectrum of the Staff safety review.

A.3. (JW) The NRC standards for review of an ESP application are outlined in 10 C.F.R. § 52.18. The NRC Staff conducts its environmental reviews of ESP applications in accordance with guidance set forth in review standard RS-002. That review standard draws from the previously published NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," as well as from NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants" (ESRP). As provided in 10 C.F.R. Part 51, Subpart A, Appendix A, the techniques of tiering and incorporation by reference were used to

aid in the presentation of issues, eliminate repetition, and reduce the size of the environmental impact statement (EIS); for example, the Staff also considered the information and analyses provided in NUREG-1437, the "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" in its review.

Each section of RS-002 provides specific guidance on how to prepare the corresponding section of the EIS. The sections of RS-002 contain subsections defining 1) the specific areas to be reviewed, 2) the acceptance criteria as contained in the relevant section of the Code of Federal Regulations, 3) the review procedures, and 4) guidance on documenting the review findings. However, because not all portions of the SRP are within the scope of an early site permit (ESP) proceeding, some sections of those guidance documents are not addressed in RS-002 or the EIS (*e.g.*, the final balancing of the environmental costs and benefits of construction and operation of a nuclear power plant). These issues would be addressed, as appropriate, in the review of a combined license (COL) application that referenced the Grand Gulf ESP.

After the individual sections of the EIS are completed, the technical branches submit them to the environmental project manager. The environmental project manager is tasked by RS-002 to ensure that the facts stated in the Staff's EIS are internally consistent as well as consistent with the statements set forth in the applicant's environmental report.

After all sections of the EIS are completed and the document is compiled, it is again reviewed for consistency by the project manager, project branch chief, and individual technical branches. The project manager is also tasked with obtaining review by and concurrence from Staff counsel to ensure that the EIS is defensible and that counsel has no legal objection to the document.

The Staff does employ contractors from outside the NRC as consultants to work on certain areas of the EIS; however, the Staff technical branches retain responsibility for the

content of their respective sections. All EIS input from outside contractors is submitted through the appropriate technical branch. The contractors from Pacific Northwest National Laboratory are familiar with the guidance of RS-002; however, in any event, the individual Staff technical branches are responsible for ensuring that their respective sections of the EIS conform to that guidance.

The Staff employs detailed guidance on preparation of the EIS as well as a regimen of peer, supervisory, and legal review. Combined, these features ensure consistency across the entire spectrum of the Staff environmental review.

Q.4. With respect to the Board's concerns identified in the previous question, please address whether the Staff is utilizing a consistent approach for formally characterizing the conclusions and limitations of the ESP for unambiguous transition to the COL stage. In doing so, please describe the progression from the ESP to the COL stage in terms of the use of formal lists such as Applicant commitments, Staff assumptions, COL Action Items, etc., and demonstrate that these list(s) are sufficiently comprehensive. Please also discuss the logic behind how the Staff chose which transition items would be formally documented and which would not.

A.4. (GW) With respect to the relationship between the ESP and COL reviews, and the consistency of the Staff's approach to the two reviews, the Board expressed concern about Staff assumptions and applicant commitments and the assurance that these will be tracked so as to be addressed at the COL stage.

In its ESP reviews, the Staff ensures that assumptions and commitments on which an ESP SER relies will be addressed by documenting such assumptions or commitments, either in the SSAR or as Permit Conditions. A Permit Condition is established when 1) the Staff's evaluation in the SER rests on an assumption that is not currently supported; 2) a site physical

attribute is not acceptable, standing alone, for the design of structures, systems, or components important to safety; or 3) the Staff's evaluation depends on some future action.

In addition, in instances where the Staff identifies design information that should be provided by any future applicant referencing the ESP at the COL stage, the Staff generates COL Action Items and includes them as an Appendix to the ESP. COL Action Items identify certain design matters that any future applicant referencing the ESP shall address in the site-specific section of the Final Safety Analysis Report (FSAR). These COL Action Items call for a set of design information to be provided by any future applicant referencing the ESP, but this list is not exhaustive; that is, they do not constitute the complete set of information that must be provided by any future applicant. For example, a COL application referencing a Grand Gulf ESP would still need to meet the requirements of 10 CFR Part 52, Subpart C, and the Staff would review the COL application in accordance with the Standard Review Plan.

There are no other lists of commitments or assumptions on which the Staff bases its SER. If a particular assumption, commitment, or COL-stage information need does not rise to the level of a Permit Condition or COL Action Item, the Staff determines that no further formal documentation is necessary beyond the discussion or reference in the SER.

Consequently, in the course of developing the Grand Gulf SER, the Staff created a list of Permit Conditions. These Permit Conditions become a part of any Early Site Permit (ESP) that may be issued. Also in the course of developing the Grand Gulf SER, the Staff also created a list of COL Action Items. The COL Action Items will be listed in an Appendix to any ESP that may be issued. Finally, the Staff notes that while the Staff had identified a set of Open Items in its Draft SER, all of these Open Items were subsequently resolved and their resolution documented in the Staff's Final SER.

The Staff considers its list of Permit Conditions to be comprehensive because the Staff has determined that the Permit Conditions identified are the only ones necessary to ensure that

10 CFR Part 100 is satisfied. The Staff's list of COL Action Items is not comprehensive in the sense of covering all items needing to be reviewed at the COL stage; in that sense, only the Standard Review Plan would be comprehensive. However, the list of COL Action Items is comprehensive with respect to the Staff having exercised its judgment in identifying site-specific issues relating to design that would need special attention at the COL stage.

The Staff believes that its approach to reviewing the health and safety aspects of the Grand Gulf ESP application and documenting the conclusions and limitations of the ESP has been consistent and comprehensive, and that all relevant conditions and future action items are appropriately presented to facilitate the review of any COL application referencing a Grand Gulf ESP.

A.4 (JW) With respect to the relationship between the ESP and COL reviews, and the consistency of the Staff's approach to the two reviews, the Board expressed concern about Staff assumptions and applicant commitments and the assurance that these will be tracked so as to be addressed at the COL stage.

In the course of developing the Grand Gulf FEIS, the Staff created a list of key assumptions, found in Appendix J to the FEIS. An assumption was considered "key" if the assumption was necessary to determine the magnitude of impact for a particular resource at the proposed site. Therefore, while some assumptions, including certain Applicant commitments, were important enough to be considered key assumptions and documented in Appendix J, the Staff did not prepare a list of all commitments or assumptions. The Staff considers Appendix J to be a sufficiently comprehensive list for the purpose of facilitating a future COL environmental review.

The Staff identified COL Action Items in the Grand Gulf SER for specific design matters that the Staff concluded that a future COL applicant should address in a facility Final Safety Analysis Report. As COL Action Items concern the adequacy of the proposed design, and the

environmental review does not consider the adequacy of the design, the environmental Staff did not identify COL Action Items. While Appendix J of the FEIS presents assumptions and commitments that the Staff intends to verify at the COL stage, the listing of these assumptions and commitments (unlike COL Action Items) does not necessarily reflect the need for new or additional information from the COL applicant at that time.

Issues were deferred in the Grand Gulf FEIS if the ESP application did not address the issue (*e.g.*, the benefits assessment) or if the issue could not be resolved because 1) the ESP application did not provide sufficient information and 2) other information was not then reasonably available to allow the Staff to reach a conclusion on the impacts. However, the Staff was able to resolve or address all environmental issues required for reaching its conclusion with respect to the ESP; no issues were deferred that were necessary for the Staff to make its determination with respect to whether an environmentally preferable or obviously superior site had been identified.

As just stated, the Staff believes that its approach to reviewing the environmental aspects of the Grand Gulf ESP application and documenting the conclusions and limitations of the ESP has been consistent and comprehensive, and that all relevant conditions and future action items are appropriately presented to facilitate the review of any COL application referencing a Grand Gulf ESP.

However, with that in mind, because the Board's question reflects its concern about the broader relationship between an ESP review and the review of a COL referencing an ESP, it may be helpful at this time to note briefly the process and scope of any COL-stage environmental review that would reference an ESP.

For an early site permit, the NRC prepares an EIS that resolves numerous issues within certain bounding conditions. These issues have issue preclusion at the COL or CP stage, provided certain conditions are met. If the issue (*e.g.*, the benefits assessment) could be

deferred and the ESP applicant elected to do so, then the COL applicant would be required to address the issue in its COL or CP application. A COL or CP application must also demonstrate that the design of the facility falls within the parameters specified in the ESP. In addition, the application should indicate whether the site is in compliance with the terms of the ESP. The applicant should maintain, in auditable form, information supporting such a conclusion that the site is in compliance with the ESP. While the NRC is ultimately responsible for completing any required NEPA review – for example, to ensure that the conclusions for a resolved ESP environmental issue remain valid for a COL action -- the COL applicant must identify whether there is new and significant information<sup>1</sup> on any resolved issue. A COL applicant should have a reasonable process to ensure that it becomes aware of new and significant information that may have a bearing on the earlier NRC conclusion, and should document the results of this process in an auditable form even for issues for which the COL applicant does not identify any new and significant information.

Pursuant to 10 CFR 51.70(b), 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 CFR 50.70(b), the staff may (1) inquire into the continued validity of the 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 deferred to the COL or CP application falls to the applicant. The applicant is required to provide

---

<sup>1</sup> 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 in 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, but has changed by the time of the COL application. Such new information may or may not be significant.

information sufficient to resolve any other 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 CFR 51.45). Therefore, the environmental report must contain new and significant information identified by the COL applicant.

In the NRC environmental review process for a COL application, the COL EIS brings forward the Commission's earlier conclusions from the ESP EIS and articulates the activities undertaken by the NRC staff to ensure that an issue that was resolved need not be reconsidered. If there is new and significant information on a previously resolved issue, then the staff will limit its inquiry to determine whether such information changes the Commission's earlier conclusion. Environmental matters subject to litigation in a COL proceeding mainly include (1) those issues that were not considered or not resolved in the previous proceeding on the site or the design, (2) those issues for which there is new and significant information, and (3) those issues subject to the change or waiver process in 10 CFR Part 52.

Issuance of a COL is a major Federal Action and, in accordance with 10 CFR 51.20, the NRC must prepare an EIS on that action. If there is no new or significant information on an issue resolved at the ESP stage, then the Staff will tier off from the ESP EIS and disclose the NRC conclusion.

As previously stated, the Staff believes that its environmental review of the Grand Gulf ESP application has resolved all matters necessary for the issuance of an ESP and that the Staff's documentation of its ESP review would support the necessary review process for any COL application referencing a Grand Gulf ESP.

Q.5. In its November 6, 2006, Order, the Board identified certain issues to be addressed in connection with the mandatory hearing. With regard to the continuity between the ESP stage and the COL stage, the Board stated that there are several Staff proposed

conditions to the ESP that appear to be difficult, if not impossible, to achieve during the COL stage due to the absolute nature of the requirements. Specifically the Board identified the site characteristic for stability of subsurface materials and foundation, which is defined as minimum shear wave velocity of soil at the proposed foundation level as 1000 feet per second (fps), as such a condition. Please explain in detail how this can be achieved at the COL stage and whether it will be verified.

A.5. (TC) As indicated in SSAR Figures 2.5-75 through 2.5-77 (Rev. 1), the foundation for a reactor referencing the ESP site would be about 140 ft below the grade (Elevation -5 ft), which is in the old alluvium zone. In Revision 1 of SSAR Figures 2.5-36 and 2.5-37, the shear wave velocity of the old alluvium at Elevation -5 ft is greater than 1000 fps. During the COL stage, the soil above Elevation -5 ft needs to be removed to allow the construction of the proposed powerblock area (PPBA) foundation mat. On this basis, the site characteristic of "shear wave velocity of 1000 fps or greater for the foundation of the power block" can be achieved at the COL stage.

Q.6. In its November 6, 2006, Order, the Board identified certain issues to be addressed in connection with the mandatory hearing. With regard to the continuity between the ESP stage and the COL stage, the Board stated that there are several Staff proposed conditions to the ESP that appear to be difficult, if not impossible, to achieve during the COL stage due to the absolute nature of the requirements. Please explain in detail how proposed Permit Condition No. 2 (which requires that an applicant referencing the Grand Gulf ESP design any new unit's radwaste systems with features to preclude any and all accidental releases of radionuclides into any potential liquid pathway) can be achieved at the COL stage:

A.6. (GB) Consistent with 10 CFR Part 52, a specific plant design evaluation was not conducted in this ESP review. The Staff's sole conclusion at the ESP stage is that the requirements postulated in the proposed Permit Condition 2 are not technically unreasonable.

The Staff based this conclusion on recent certified designs and on an understanding of historic inadvertent releases at various nuclear facilities. The Staff concluded that engineering solutions did exist that could have precluded these past releases. The proposed Permit Condition 2 can be met through the use of radwaste facility designs that are already incorporated in some certified designs. These certified designs of advanced and passive reactors locate the radwaste facility on the nuclear island, protected from leakage by stainless steel liner and leakage collection drains. These designs are also provided with high surrounding walls to contain any inadvertent spillage during radwaste handling or any unanticipated component failure. The Staff concluded that preclusion of accidental releases, including inadvertent releases, is technically feasible as in the examples cited above.