EDO Principal Correspondence Control

FROM: DUE: 01/27/06

EDO CONTROL: G20050882
DOC DT: 12/23/05
FINAL REPLY:

Graham B. Wallis, ACRS

TO:

Reyes, EDO

FOR SIGNATURE OF : ** GRN ** CRC NO:

Reyes, EDO

DESC:

Early Site Permit Application for the Grand Gulf Site and the Associated Final Safety Evaluation Report

DATE: 12/27/05

ASSIGNED TO: CONTACT:

NRR Dyer

ROUTING:

Reyes
Virgilio
Kane
Silber
Dean
Cyr/Burns
Mallett, RIV
Dixon-Herrity, OEDO
ACRS File

SPECIAL INSTRUCTIONS OR REMARKS:

Prepare response to ACRS for EDO signature. Add Commissioners and SECY as cc's.

USE SUBJECT LINE IN RESPONSE.

Template: EDO-001

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

December 23, 2005

Luis A. Reyes
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: EARLY SITE PERMIT APPLICATION FOR THE GRAND GULF SITE AND THE ASSOCIATED FINAL SAFETY EVALUATION REPORT

Dear Mr. Reyes:

During the 528th meeting of the Advisory Committee on Reactor Safeguards, December 7-10, 2005, we met with representatives of the NRC staff and System Energy Resources, Inc. (SERI), the applicant for an early site permit (ESP) for the Grand Gulf site, and discussed the application and the NRC staff's final Safety Evaluation Report (FSER). We provided an interim report on this application and the draft Safety Evaluation Report on June 14, 2005. We reviewed this application to fulfill the requirement of 10 CFR 52.23 that the ACRS report on those portions of an ESP application that concern safety. We also had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

- The NRC staff has written a very readable and comprehensive Safety Evaluation Report. The three permit conditions the staff proposes for the early site permit and the 26 action items for the combined license phase are appropriate.
- This Safety Evaluation Report should be issued once the staff has made more explicit its analyses of the hazards posed to the proposed site by explosions in transportation accidents on the Mississippi River.
- The staff needs to provide additional guidance to applicants concerning the discussion in an application of "Major Features" of the emergency planning for a proposed site.

DISCUSSION

SERI seeks an early site permit for a reactor or a set of reactor modules of total power up to 4300 MW_{th} on a site adjacent to the current Grand Gulf Nuclear Power Station, a BWR/6 with a Mark III containment. With the additional unit or modules, the total nuclear generating capacity at the Grand Gulf site could be as high as 8600 MW_{th}. The Grand Gulf site had previously been approved for two units, but the second unit was never completed.

The SERI application for an early site permit does not specify a particular power plant technology for the new reactor or reactor modules to be placed on the site. The early site permit application, instead, uses a "plant parameter envelope" of power plant characteristics that is intended to bound the reactor technology that could eventually be selected.

- Nature of the Proposed Site

The proposed site is located on the eastern side of the Mississippi River about 25 miles south of Vicksburg, Mississippi. The site is rural in nature. There is little industrial activity and no military base near the site. There is a natural gas pipeline somewhat more than 4 miles from the site.

The nearest major airport is at Jackson, Mississippi, about 65 miles from the proposed site. The staff has determined that the air traffic corridors near the site pose no undue risk. There is a highway 4½ miles from the site. The principal ground transportation hazard is thought to be the delivery of hydrogen to the site for use in the currently operating boiling water reactor. The staff has found that the delivery and storage of this hydrogen would pose no undue risk to the proposed new power plant site.

The most important transportation route near the site is the Mississippi River. The nearest bank of this river is about 1.1 miles from the proposed site. Explosions and releases of toxic gases and vapors could pose threats to the proposed site. The staff and the applicant have agreed to defer consideration of the threats posed by the accidental releases of toxic vapors and gases until a specific plant for the site has been chosen and the habitability of the control room can be evaluated.

The staff has concluded that the detonation of 5000 tons TNT-equivalent bounds the explosion threat to the proposed site. According to staff-approved methods of analysis, such a detonation would require a standoff distance of about 2.1 miles from the facility. The staff concludes, however, that because the site is located behind a 65-foot bluff, the 1.1 mile standoff is adequate. The technical basis for this conclusion needs to be made clear in the Safety Evaluation Report prior to its issuance. This clarification should include a description of the reliability of the calculational method adopted by the staff.

The staff has concluded also that the detonation bounds the explosive hazard posed by vapor explosions such as might occur in the release of liquefied natural gas during a transportation accident on the river. The technical basis for this conclusion should also be made clear in the Safety Evaluation Report. The clarification should include a discussion of whether the staff used the TNT-equivalent method to analyze vapor explosions and the conservatisms associated with such an approximation if it was adopted.

- Population in the Vicinity of the Site

The permanent population around the site is low. The nearest town, Port Gibson, Mississippi, is about 6 miles from the proposed site and has a population of about 1750. The nearest population center, Vicksburg, Mississippi, is 25 miles to the north and has a current population of about 27,000. The projected population growth in the area to the year 2070 is expected to be small, perhaps less than 20%.

- Geology and Seismicity of the Site

The proposed site is located on consolidated river sediments. Geological investigations show no evidence of significant ground deformation for at least the last 500,000 years and perhaps for the last 5 million years. Salt domes in the area are 6 and 8 miles from the proposed site.

The site is in an area of little seismic activity. The nearest historical seismic event occurred more than 25 miles away. The limiting earthquake source is the New Madrid seismic zone over 200 miles away. SERI has performed a probabilistic seismic hazard analysis that takes into account recent revisions made by the U.S. Geological Survey to the frequencies and intensities of events in the New Madrid seismic center. The analysis also considers the possibility of seismic activity along the suspected faults on the Saline River which may not be capable faults. The proposed site is a deep soil site (bedrock is at a depth of about 10,000 feet). SERI has done sufficient characterization of the site to produce analyses of the soil amplification factors. The probabilistic seismic hazard curve developed for the site is bounded by the design safe shutdown earthquake curves adopted in the plant parameter envelope.

- Meteorology

Vigorous storms such as hurricanes and tornados are the principal weather threats to a reactor located on the proposed site. SERI and the staff have used historical information to characterize these and other weather features of the site. In our review of the Safety Evaluation Report, we examined the applicability of hurricane frequency data on the prediction of future storm activity. There is evidence that storm activity is increasing in the Gulf of Mexico due to known weather cycles. The staff and the applicant have used historical data over a sufficient period to capture data from previous weather cycles. We find no definitive evidence that storm intensities in excess of the bounds established by the applicant and accepted by the staff will develop. These bounds may not be especially conservative. Representatives of SERI informed us that inland wind gusts produced by the recent hurricane Katrina at the latitude of the proposed site were somewhat less than 92 mph which can be compared to the 96 mph maximum three-second wind gust adopted for the site characterization. The staff has stated that should future weather evidence indicate site characteristics accepted in the Safety Evaluation Report are not adequate, these characteristics will be amended as needed.

The proposed site is located on a bluff about 65 feet above the normal river level. Land on the opposite bank of the river is more easily flooded than the proposed site. Consequently, major river flooding is not a threat to the site. Local, onsite flooding will have to be addressed if the permit is granted and a decision is made to construct a power plant on the site.

- Emergency Plans

The applicant has elected to submit for review just the "major features" of emergency planning for the proposed site, as is allowed by the regulations. The staff has concluded that these major features are largely adequate. The applicant has stated that the remaining information would be submitted with a combined license application. The applicant and the staff encountered challenges in defining the limitations that should exist on descriptions of major

features of emergency planning, especially for a site where reactors currently exist. These challenges could be avoided in the future by providing additional guidance to the applicants.

Sincerely,

Graham B. Wallis

Graham B. Wallis
Chairman

References:

1. U.S. Nuclear Regulatory Commission, Final Safety Evaluation Report, "Safety Evaluation of Early Site Permit Application in the Matter of System Energy Resources, Inc., a Subsidiary of Entergy Corporation, for the Grand Gulf Early Site Permit Site," October 21, 2005.

2. System Energy Resources, Inc., Grand Gulf Early Site Permit Application, Revision 0, October 2003.

3. Letter dated June 14, 2005, from G. B. Wallis, Chairman, ACRS, to L. A. Reyes, Executive Director for Operations, NRC, Subject: Interim Letter: Draft Safety Evaluation Report on Grand Gulf Early Site Permit Application.