

MEMORANDUM TO: Med El-Zeftawy, Senior Staff Engineer  
ACRS

FROM: Dana A. Powers, Chairman  
Early Site Permits Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES FOR THE MEETING OF  
THE ACRS SUBCOMMITTEE ON EARLY SITE PERMITS,  
MAY 16, 2005—ROCKVILLE, MARYLAND

I do hereby certify that, to the best of my knowledge and belief, the minutes of the subject meeting on May 16, 2005, are an accurate record of the proceeding for that meeting.

Dana A. Powers 7/July/2005

Dana A. Powers  
Subcommittee Chairman

Date

**7/7/05***File  
Date*

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
EARLY SITE PERMITS SUBCOMMITTEE MEETING MINUTES  
MAY 16, 2005  
ROCKVILLE, MARYLAND

**INTRODUCTION**

The ACRS Subcommittee on Early Site Permits met on May 16, 2005, at 11545 Rockville Pike, Rockville, Maryland, in Room T-2B3. The purpose of the meeting was to review and discuss the staff's draft safety evaluation report (DSER) for the Grand Gulf early site permit (ESP) and the application submitted by System Energy Resources, Inc. (SERI- the applicant). The Subcommittee met to gather information, analyze relevant issues and facts to formulate proposed positions, as appropriate, for deliberation by the full Committee. The entire meeting was open to public attendance. Med El-Zeftawy was the cognizant staff engineer and the Designated Federal Official for this meeting. The Subcommittee received no written comments, or requests for time to make oral statements from any members of the public regarding this meeting. The meeting was convened at 8:30 am and adjourned at 1:07 pm.

**ATTENDEES****ACRS**

D. Powers, Chairman  
M. Bonaca, Member  
T. Kress, Member  
M. El-Zeftawy, Staff

S. Rosen, Member  
G. Wallis, Member  
W. Hinze, ACNW Member

**NRC**

L. Dudes, NRR  
J. Segala, NRR  
B. Sosa, NRR  
R. Anand, NRR  
T. Cheng, NRR  
D. Barss, NSIR  
B. Ibrahim, NMSS  
L. Quinones-Navaro, NRR

P. Prescott, NRR  
W. Beckner, NRR  
J. Lee, NRR  
B. Harvey, NRR  
L. Brown, NRR  
A. Hsia, RES  
Z. Perez, NRR  
G. Bagchi, NRR

**OTHERS**

J. Hegner, Dominion  
G. Cesare, Enercon  
R. Wheeley, USGS  
K. Hughey, Entergy  
E. Grant, Exelon  
S. Routh, Bechtel  
M. McCann, JBA  
J. Hengesh, W. Lettis & Assoc.

G. Zinke, Entergy  
S. Harmsen, USGS  
A. Schneider, Enercon  
R. Bell, NEI  
W. Eaton, Entergy  
M. Bourgeois, Entergy  
J. Bachhuber, W. Lettis & Assoc.  
K. Sutton, M. Lewis

A complete list of attendees is in the ACRS Office file and will be made available upon request. The presentation slides and handouts used during the meeting are attached to the Office copy of these minutes.

### **OPENING REMARKS BY THE SUBCOMMITTEE CHAIRMAN**

Dr. Dana A. Powers, Chairman of the Early Site Permits Subcommittee, stated that the purpose of this meeting is to hear presentations by and hold discussions with representatives of the NRC staff regarding the draft safety evaluation report (DSER) for the Grand Gulf early site permit (ESP) and the application submitted by System Energy Resources, Inc. (SERI- the applicant). The ACRS is conducting such effort to fulfill the requirement of 10 CFR 52.23, which requires that the ACRS report on those portions of an ESP application that concern safety.

### **SERI's Presentation**

Mr. George Zinke, , Entergy ESP team, stated that on October 16, 2003, SERI submitted ESP application to the NRC for the Grand Gulf ESP site. The Grand Gulf ESP site is in Claiborne County near Port Gibson, Mississippi, approximately 25 miles south of Vicksburg, Mississippi, and is adjacent to the existing nuclear power reactor operated by Entergy Operations, Inc. The ESP site identified in the application is collocated with the Grand Gulf Nuclear Station, Unit 1. In its application, SERI seeks approval of an ESP that could support a future application to construct and operate additional nuclear unit(s) at the ESP site, with total nuclear generating capacity of up to 8,600 megawatts thermal (Mwt), with maximum 4,300 Mwt per unit.

The proposed site is quite rural in nature. There is little industrial activity near the site and no nearby bases. There is a natural gas pipeline more than 4 miles from the site. The nearest major airport is at Jackson, Mississippi, about 65 miles from the proposed site. Air traffic corridors near the site have been determined by the staff to pose no undue risk. There is a highway 4.5 miles from the site. There is an important river transportation corridor 1.1 miles from the site.

The proposed site is located on consolidated river sediments. The site is an area of little seismic activity. The limiting earthquake source is the New Madrid seismic zone more than 200 miles away. The proposed site is a deep soil site. SERI has done sufficient characterization of the site and the probabilistic seismic hazard curve developed for the site is bounded by the design safe shutdown earthquake curves adopted in the plant parameter envelope.

Weather at the proposed site is mild and the reactor site is on a bluff approximately 65 feet above normal river levels. SERI has elected to submit for review just the major features of emergency planning as it is allowed to do by the NRC regulations.

### **NRC STAFF's Presentation**

Mr. Raj Anand, NRR, stated that the DSER summarizes the results of the staff's technical evaluation of the suitability of the proposed site for a nuclear power plant(s) falling within the plant parameter envelope (PPE) that SERI specified in its application.

The regulations 10 CFR Part 52 and 10 CFR Part 100, "Reactor Site Criteria", that apply to an ESP do not require that an ESP applicant provide specific design information. However, some design information may be required to address 10 CFR 52.17(a)(1), which calls for "an analysis and evaluation of the major structures, systems, and components of the facility that bear significantly on the acceptability of the site under the radiological consequence evaluation factors."

The ESP site identified in the application is collocated with the Grand Gulf Nuclear Station, Unit 1. In the Site Safety Analysis Report (SSAR) of the ESP application, SERI provided a list of postulated design parameters, referred to as the PPE. The applicant stated that the PPE approach provides sufficient design details to support the NRC's review of the ESP application. SERI states that the PPE is intended to bound multiple reactor designs and the actual reactor design selected would be reviewed at the combined license (COL) stage to ensure that the design fits within the PPE. The PPE references the following designs:

- ACR-700 (Atomic Energy of Canada, Ltd.)
- Advanced Boiling Water Reactor (General Electric)
- AP1000 (Westinghouse)
- Economic and Simplified Boiling Water Reactor (General Electric)
- Gas Turbine Modular Helium Reactor (General Atomics)
- International Reactor Innovative and Secure (IRIS) Project (Consortium led by Westinghouse)
- Pebble Bed Modular Reactor (PBMR (Pty) Ltd.)

The staff has reviewed the proposed PPE values and has found them to be acceptable. Should an ESP be issued for the Grand Gulf ESP site, an entity might wish to reference that ESP, as well as a certified design, in a combined license (COL) or construction permit (CP) application. Such a COL or CP applicant would need to demonstrate that the site characteristics established in the ESP bound the postulated site parameters established for the chosen design, and that the design characteristics of the chosen design fall within the PPE values specified in the ESP application.

The NRC staff developed the draft safety evaluation report (DSER) that summarizes the staff's technical evaluation of the Grand Gulf ESP site. The DSER focused on the following matters:

- population density and land use characteristics of the site environs including seismology, meteorology, geology, and hydrology.
- potential hazards to a nuclear power plant(s) that might be constructed on the ESP site posed by manmade facilities and activities, transportation accidents, and the existing nuclear power plants.
- potential capability of the site to support the construction and operation of a nuclear power plant(s) with design parameters falling within those specified in the applicant's

## PPE.

- suitability of the site for development of adequate physical security plans and measures.
- proposed major features for an emergency plan.
- quality assurance measures applied to the information submitted by the applicant.
- the acceptability of the applicant's proposed exclusion area and low population zone (LPZ) under the dose consequence evaluation factors of 10 CFR 50.34(a)(1).

In developing the DSER, the staff identified certain issues that require additional information. The staff refer to these issues as "Open Items". There are currently 23 open items. One open item regarding exclusion area authority and control, one open item regarding population distribution, five open items regarding meteorology, seven open items regarding hydrology, five open items regarding seismology and geology, and four open items regarding emergency planning. In addition, the staff has identified two items ( verification of information obtained from the Internet) and (verification that any ESP application revision is consistent with RAI responses) as resolved, but for which the staff needs confirmation that the applicant has taken the planned action. Also, the staff has identified 10 permit conditions and 18 site-related COL action items that it will recommend the Commission impose should an ESP be issued to the applicant.

The applicant analyzed and provided the radiological consequences of design-basis accidents (DBAs) to demonstrate that new nuclear units could be sited at the proposed ESP site without undue risk to the health and safety of the public. The applicant, however, did not identify a particular reactor design to be considered for the proposed ESP site. Instead, the applicant developed a set of reactor DBA source term parameters using surrogate reactor characteristics.

In selecting DBAs for dose consequence analyses, the applicant focused on two light-water reactors, the certified ABWR and the AP1000 designs, to serve as surrogates. Using source terms developed from these two designs, the applicant performed radiological consequence analyses for the following DBAs:

- PWR main steamline break
- PWR feedwater system pipe break
- locked rotor accident
- reactor coolant pump shaft break
- PWR rod ejection accident
- BWR control rod drop accident
- failure of small lines carrying primary coolant outside containment

- PWR steam generator tube failure
- BWR main steamline break
- PWR and BWR LOCAs
- fuel handling accident

The applicant calculated site-specific DBA doses by first obtaining DBA dose information from the ABWR and AP1000 design control documents (DCDs), then calculated site-specific  $\chi/Q$  values using onsite meteorological information. The applicant, then multiplied the doses from the two designs by the ratio of the site-specific  $\chi/Q$  values to the assumed  $\chi/Q$  values from the DCDs. The applicant cited Regulatory Guide (RG 1.183), "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors"- issued July 2000, as the applicable NRC regulations. The NRC staff finds the applicant's site-specific  $\chi/Q$  values and dose consequence evaluation methodology to be acceptable. In addition, the staff concludes that the proposed distances to the exclusion area boundary (EAB) and the LPZ outer boundary of the proposed ESP site, in conjunction with the fission product release rates to the environment provided by the applicant as PPE values, to be adequate.

### **General Questions and Observations from the Subcommittee Members**

1. Dr. Powers expressed concern that not enough information was provided in either the applicant's SSAR or the staff's DSER to understand and reproduce the atmospheric dispersion ( $\chi/Q$ ) calculations.
2. Dr. Powers stated that the applicant is requesting for a site permit applicable for the next 20 years, and in some respect prognosticating what the future is, yet throughout the application and the DSER, there is very little prognostication.
3. Dr. Powers stated that the applicant has used staff's approved methods to deduce the consequences of radionuclide release at the proposed site . However, neither the application nor the DSER provide sufficient information to reproduce these analyses.
4. Dr. Powers expressed concern regarding the lack of documentation in the DSER and the application regarding the exposition of threats posed by transportation accidents on the river adjacent to the proposed Grand Gulf site.
5. Subcommittee members questioned the need for detailed examinations of emergency plans for proposed sites that are on or adjacent to sites with operating plants having approved emergency plans.

### **Subcommittee's Action**

The staff and the applicant plan to provide a briefing regarding this matter to the full Committee

during the June 1-3, 2005 ACRS meeting.

Documents provided to the Subcommittee

1. Status Report by M. El-Zeftawy, dated April 20, 2005.
2. DSER, Grand Gulf Early Site Permit, April 2005.
3. Grand Gulf Early Site Permit Application, Revision 0, October 20043(CD- Form).
4. ACRS Letter, Draft Review Standard, RS-002: "Processing Applications For Early Site Permits", dated March 13, 2003.

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NOTE : Additional details of this meeting can be obtained from a transcript of this meeting available for downloading or viewing on the Internet at "<http://www.nrc.gov/ACRSACNW>" or can be purchased from Neal R. Gross and Co., 1323 Rhode Island Ave., N.W., Washington, DC 20005 (202) 234-4433.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D.C. 20555-0001

June 29, 2005

MEMORANDUM TO: Dr. Dana A. Powers  
Early Site Permits Subcommittee

FROM: Med El-Zeftawy, Senior Staff Engineer  
ACRS

A handwritten signature in black ink, appearing to read "MEZ", with a horizontal line extending to the right.

SUBJECT: WORKING COPY OF THE MINUTES FOR THE MEETING OF THE  
ACRS SUBCOMMITTEE ON EARLY SITE PERMITS, MAY 16, 2005-  
ROCKVILLE, MARYLAND

A working copy of the minutes of the subject meeting is attached for your review. Please review and comment on them at your earliest convenience. Copies are being provided to each ACRS member who attended the meeting for information and/or review.

Attachment: As Stated

cc: ACRS Members  
J. Larkins  
M. Scott  
M. Snodderly

MME

arrangements can be made. Electronic recordings will be permitted.

Further information regarding this meeting can be obtained by contacting the Designated Federal Official between 7:30 a.m. and 4:15 p.m. (ET). Persons planning to attend this meeting are urged to contact the above named individual at least two working days prior to the meeting to be advised of any potential changes to the agenda.

Dated: April 27, 2005.

Michael L. Scott,

Branch Chief, ACRS/ACNW.

[FR Doc. E5-2172 Filed 5-3-05; 8:45 am]

BILLING CODE 7590-01-P

**NUCLEAR REGULATORY COMMISSION**

**Advisory Committee on Reactor Safeguards Meeting of the Subcommittee on Early Site Permits; Notice of Meeting**

The ACRS Subcommittee on Early Site Permits will hold a meeting on May 16, 2005, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows: Monday, May 16, 2005—8:30 a.m. until 1 p.m.

The Subcommittee will discuss and review the application for an early site permit for the Grand Gulf site and the staff's draft safety evaluation report related to that application.

The Subcommittee will hear presentations by and hold discussions with representatives of the NRC staff, System Energy Resources, Inc. (the applicant), and other interested persons regarding this matter. The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

Members of the public desiring to provide oral statements and/or written comments should notify the Designated Federal Official, Dr. Medhat M. El-Zeftawy (telephone (301) 415-6889) five days prior to the meeting, if possible, so that appropriate arrangements can be made. Electronic recordings will be permitted.

Further information regarding this meeting can be obtained by contacting the Designated Federal Official between 7:30 a.m. and 4:15 p.m. (ET). Persons planning to attend this meeting are urged to contact the above named individual at least two working days prior to the meeting to be advised of any potential changes to the agenda.

Dated: April 27, 2005.

Michael L. Scott,

Branch Chief, ACRS/ACNW.

[FR Doc. E5-2173 Filed 5-3-05; 8:45 am]

BILLING CODE 7590-01-P

**NUCLEAR REGULATORY COMMISSION**

**Notice of Opportunity To Comment on Model Safety Evaluation on Technical Specification Improvement for Combustion Engineering Plants to Risk-Inform Requirements Regarding Selected Required Action End States Using the Consolidated Line Item Improvement Process**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Request for comment.

**SUMMARY:** Notice is hereby given that the staff of the Nuclear Regulatory Commission (NRC) has prepared a model safety evaluation (SE) relating to changes in Combustion Engineering (CE) plant required action end state requirements in technical specifications (TS). The NRC staff has also prepared a model no-significant-hazards-consideration (NSHC) determination relating to this matter. The purpose of these models is to permit the NRC to efficiently process amendments that propose to adopt technical specifications changes, designated as TSTF-422, related to Topical Report CE NPSD-1186, Rev. 00, "Technical Justification for the Risk Informed Modification to Selected Required Action End States for CEOG PWRs," which was approved by an NRC SE dated July 17, 2001. Licensees of CE nuclear power reactors to which the models apply could then request amendments, confirming the applicability of the SE and NSHC determination to their reactors. The NRC staff is requesting comment on the model SE and model NSHC determination prior to announcing their availability for referencing in license amendment applications.

**DATES:** The comment period expires June 3, 2005. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure consideration only for comments received on or before this date.

**ADDRESSES:** Comments may be submitted either electronically or via U.S. mail. Submit written comments to Chief, Rules and Directives Branch, Division of Administrative Services, Office of Administration, Mail Stop: T-6 D59, U.S. Nuclear Regulatory

Commission, Washington, DC 20555-0001. Hand deliver comments to: 11545 Rockville Pike, Rockville, Maryland, between 7:45 a.m. and 4:15 p.m. on Federal workdays. Copies of comments received may be examined at the NRC's Public Document Room, 11555 Rockville Pike (Room O-1F21), Rockville, Maryland. Comments may be submitted by electronic mail to [CLIP@nrc.gov](mailto:CLIP@nrc.gov).

**FOR FURTHER INFORMATION CONTACT:** Tom Boyce, Mail Stop: O-12H4, Division of Inspection Program Management, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone 301-415-0184.

**SUPPLEMENTARY INFORMATION:**

**Background**

Regulatory Issue Summary 2000-06, "Consolidated Line Item Improvement Process for Adopting Standard Technical Specifications Changes for Power Reactors," was issued on March 20, 2000. The consolidated line item improvement process (CLIP) is intended to improve the efficiency of NRC licensing processes, by processing proposed changes to the standard technical specifications (TS) in a manner that supports subsequent license amendment applications. The CLIP includes an opportunity for the public to comment on proposed changes to the STS after a preliminary assessment by the NRC staff and finding that the change will likely be offered for adoption by licensees. This notice solicits comment on a proposed change to the STS that allows changes in CE plant required action end state requirements in technical specifications, if risk is assessed and managed. The CLIP directs the NRC staff to evaluate any comments received for a proposed change to the STS and to either reconsider the change or announce the availability of the change for adoption by licensees. Licensees opting to apply for this TS change are responsible for reviewing the staff's evaluation, referencing the applicable technical justifications, and providing any necessary plant-specific information. Each amendment application made in response to the notice of availability will be processed and noticed in accordance with applicable NRC rules and procedures.

This notice involves the changes in CE plant required action end state requirements in TS, if risk is assessed and managed. The change was proposed in Topical Report CE NPSD-1186, Rev. 00, "Technical Justification for the Risk Informed Modification to Selected

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MEETING OF THE AD HOC SUBCOMMITTEE ON  
EARLY SITE PERMIT GRAND GULF APPLICATION  
MAY 16, 2005  
ROCKVILLE, MARYLAND

Contact: Dr. Medhat El-Zeftawy (301/415-6889, [mme@nrc.gov](mailto:mme@nrc.gov))

**PROPOSED AGENDA**

<b>TOPIC</b>	<b>PRESENTER</b>	<b>TIME</b>
I. Introductory Remarks, ACRS Subcommittee Chairman	Dr. D. Powers	8.30-8.35 a.m.
II. System Energy Resources (SERI)  - Overview of Application - Response to NRC issues - Schedule	G. Zinke, et. al.	8.35-10.15 a.m.
<b>Break</b>		10.15-10.30 am
III.NRC Staff Presentation: - Review Status - DSER Review - Open Items - Upcoming Milestones - Schedule	R. Anand, et. al.	10.30- 12.15 pm
IV. Public Comments		12.15-12.25 pm
V. General discussion / Adjourn		12.25-1.00 pm

**NOTE:**

- Presentation time should not exceed 50 percent of the total time allocated for specific item. The remaining 50 percent of the time is reserved for discussion.
- 35 copies of the presentation materials to be provided to the Subcommittee.

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON EARLY SITE PERMITS

May 16, 2005

Date

NRC STAFF PLEASE SIGN IN BELOW

PLEASE PRINT

<u>NAME</u>	<u>NRC ORGANIZATION</u>
✓ <u>RAJ ANAND</u>	<u>NRR/DRIP/RNRP</u>
✓ <u>LAURA DUDAS</u>	<u>NRR/DRIP/RNRP</u>
✓ <u>WILLIAM BECKNER</u>	<u>NRR/DRIP/RNRP</u>
✓ <u>Thomas Cheng</u>	<u>NRR/DE/EMEB</u>
✓ <u>Leta Brown</u>	<u>NRR/DSSA/SPSB</u>
( <u>Rus Wheeler</u>	<u>USGS</u>
✓ <u>Steve Harmsen</u>	<u>USGS</u>
✓ <u>Brad Harvey</u>	<u>NRR/DSSA/SPSB-C</u>
✓ <u>DAN BARSS</u>	<u>NSIA/OPR/EPD</u>
✓ <u>GOUTAM BAGCHI</u>	<u>NRR/DE/EMEB</u>
✓ <u>BEKYS Sosa</u>	<u>NRR/RNRP</u>
✓ <u>Sohn Sejal</u>	<u>NRR/RNRP</u>
✓ <u>Zahira Cruz Perez</u>	<u>NRR/DE</u>
✓ <u>Lauren Quirones-Navarro</u>	<u>NRR/DRIP/RNRP</u>
✓ <u>Paul Prescott</u>	<u>NRR/DIEM/ISB</u>
✓ <u>Jag Lee</u>	<u>NRR/DSSA/SPSB</u>
✓ <u>Tony Huan</u>	<u>RES/DE/ERAB</u>
✓ <u>Badr Ibrahim</u>	<u>NMSS/HCWRS</u>

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
SUBCOMMITTEE MEETING ON EARLY SITE PERMITS

May 16, 2005  
Date

ATTENDEES PLEASE SIGN IN BELOW

PLEASE PRINT

NAME

NRC ORGANIZATION

✓ JOE HEGNER

DOMINION

✓ Guy Cesare

ENERCON SERVICES

✓ ~~Anthony Sutton~~

MORAN LEWIS

✓ Al Schneider

ENERCON SERVICES INC

✓ Jim Hengesh

William Lettis + Associates

✓ Jeff Bachhuber

William Lettis + Assoc.

✓ Steve Rowth

Bechtel

✓ Michael Bourgeois

ENERGY

✓ Russ Bell

NEI

✓ Kenneth Hughey

Energy

✓ Eddie R Grant

Exelon

✓ MARTIN M<sup>O</sup>LAN

JBA

✓ Bill Eaton

Energy



# Presentation to the Advisory Committee on Reactor Safeguards

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## Safety Review of the Grand Gulf Early Site Permit Application

**Presented by  
Raj Anand  
Project Manager  
New, Research and Test Reactors Program  
May 16, 2005**



# Purpose

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- Brief the Subcommittee on the Grand Gulf early site permit (ESP) application and the status of the NRC staff's safety review of that application
- Support the Subcommittee's review of the application and subsequent interim letter from ACRS to the Commission
- Answer the Subcommittee's questions



# Agenda

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- Background and Milestones 5 min
- Grand Gulf ESP Application 5 min
- Draft Safety Evaluation Report (DSER) 5 min
- Future Oriented Items 5 min
- Summary of Open Items 5 min
- DSER Conclusions 5 min
- Presentation Conclusions 5 min
- Discussion / Subcommittee questions 5 min



# Background and Regulatory Framework

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- Subpart A to 10 CFR Part 52 governs ESPs
- Subpart B to 10 CFR Part 100 contains applicable siting evaluation factors
- 10 CFR 52.23 requires ACRS to report to Commission on portions of application that pertain to safety (i.e., Site Safety Analysis Report)
- Grand Gulf is third of three ESP applications the NRC staff is currently reviewing – First is North Anna, Second is Clinton, and Third is Grand Gulf



# Completed Milestones

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- System Energy Resources (SERI) submitted ESP application by on 10/16/2003
- Staff docketed application on 11/21/2003
- Staff issued draft safety evaluation report (DSER) on 4/7/2005
- Staff issued draft environmental impact statement on 4/21/2005



# Purpose of ESP Process

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- Separates, to the extent feasible, review of site from review of design
- Allows resolution of site-related issues separated from design related issues
- Allows ESP holder to “bank” site for future use



# Future Milestones

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- ACRS interim letter to the Commission assumed by end of June 2005
- Staff issues FSER on October 21, 2005
- Staff provides FSER to ACRS also in October 2005
- ACRS Subcommittee meeting on November 22, 2005, and Full committee meeting on December 8, 2005
- ACRS letter to the Commission assumed December 2005
- Staff incorporates ACRS letter and issues FSER as NUREG by 01/28/06
- Mandatory hearings begin early 2006
- Commission decision assumed October 2006



# Grand Gulf ESP Application

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- Proposed ESP site is adjacent to existing Grand Gulf Nuclear Unit 1 site
- ESP applicant, System Energy Resources (SERI), is a owner of the ESP site, subsidiary of Entergy Corporation
- SERI has no plans to perform activities at ESP site under 10 CFR 50.10(e)(1), therefore no site redress plan is submitted



# Grand Gulf ESP Application

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- SERI requests ESP site be approved for total nuclear generating capacity of up to 8600 MWt, with max 4300 MWt per unit
- Each unit may be one large reactor or multiple smaller reactors
- SERI has chosen not to submit a specific design but instead has submitted a plant parameter envelope (PPE) based on a number of current and future reactor designs
- Staff's review of PPE values in ESP application limited to whether they are reasonable



# Grand Gulf ESP Application

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- Original Grand Gulf Nuclear Site was designed for two units. Construction of second unit was halted prior to completion. Switch yard for both the units was completed
- SERI plans to use existing switchyard for the proposed unit(s)
- Normal heat sink comprised of closed loop circulating water system, pumps, water basin and cooling tower(s)
- SERI considering use of the Mississippi River for intake and discharge structures
- SERI seeks 20-year ESP term



# Safety Review Areas and Lead Staff Reviewers

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- Meteorology: Brad Harvey
- Hydrology: Goutam Bagchi (contract support from Pacific Northwest Laboratory) (PNNL)
- Site Hazards: Kaz Campe (contract support from PNNL)
- Geology/seismology: Yong Li (support from U.S. Geologic Survey and BNL)
- Demography/Geography: Jay Lee
- Emergency Planning: Joe Anderson (consultation with Federal Emergency Management Agency)
- Quality Assurance: Paul Prescott
- Physical Security: Al Tardiff
- Radiological Consequence Analysis: Jay Lee



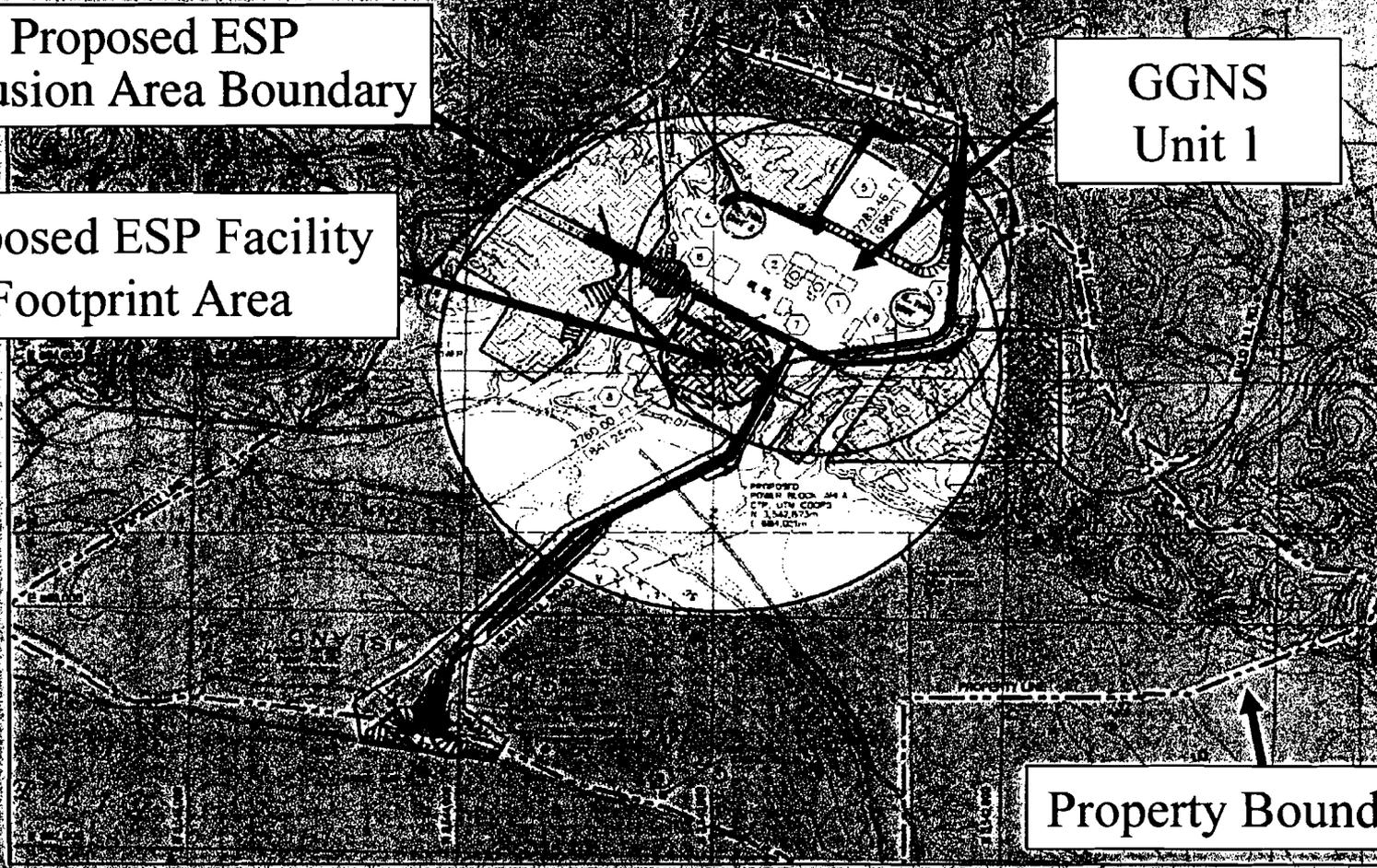
# GGNS Site and Environments

Proposed ESP  
Exclusion Area Boundary

Proposed ESP Facility  
Footprint Area

GGNS  
Unit 1

Property Boundary





# ESP Site Features

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- Location of the ESP site
- Cooling water use
- Flooding in Mississippi River
- Local Intense Precipitation
- Effects of Probable Maximum Flood
- Flood Carrying Capacity of Mississippi River near the ESP site
- Effects of low water
- Ground water use



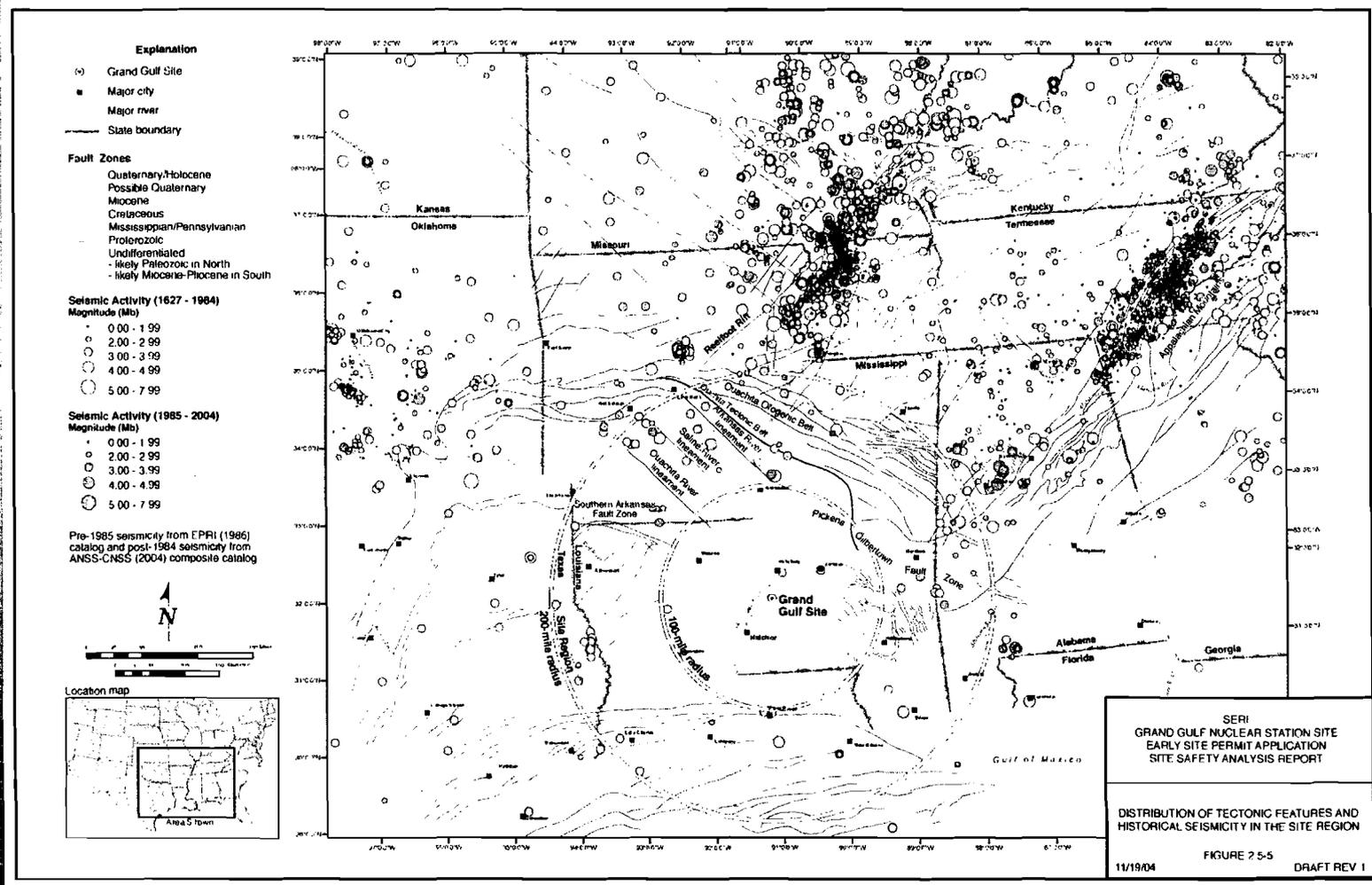
# Seismic

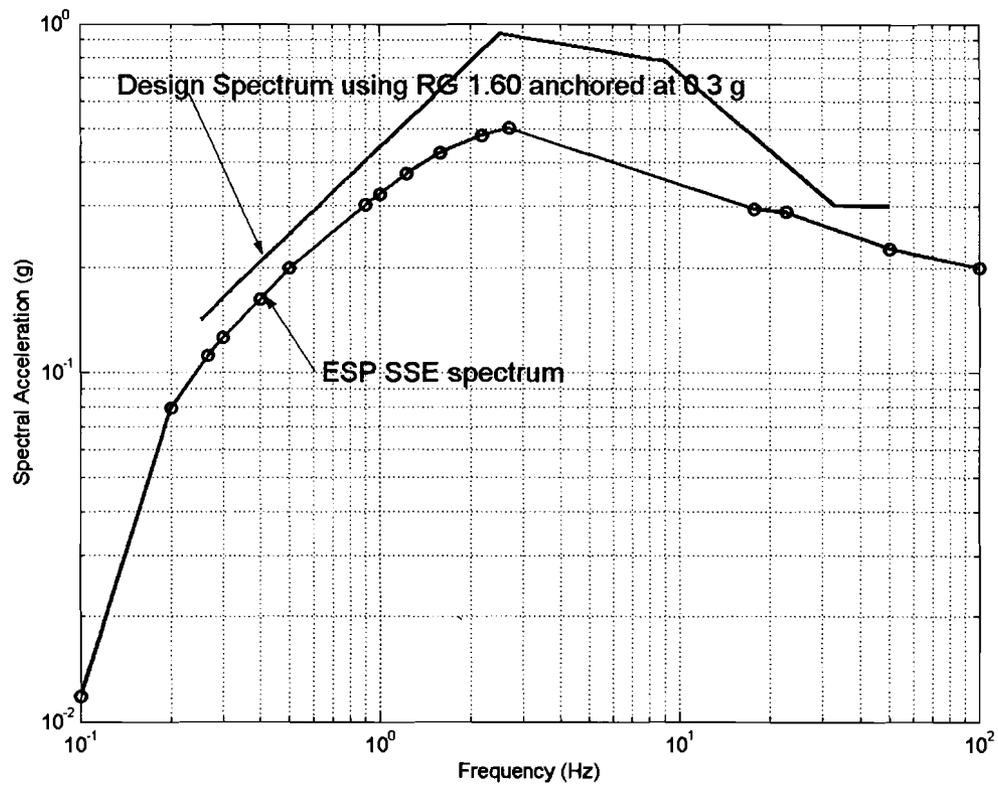
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- The ESP is located in a relative low seismic region.
- No earthquake recorded within 25 miles radius.
- No active faults mapped within 90 miles radius
- The ESP site is a deep soil site
- Seismic hazard estimate using Regulatory Guide 1.165



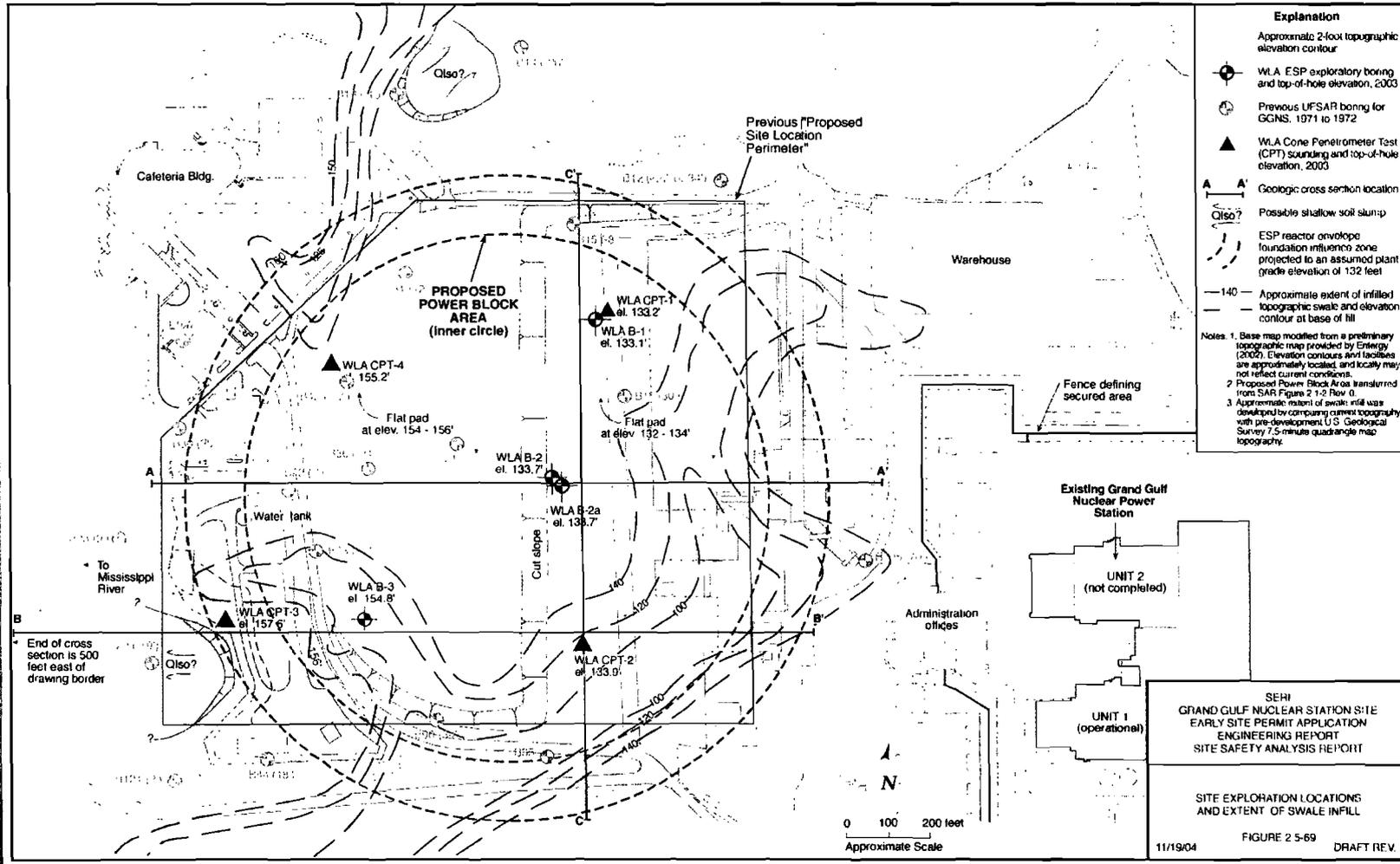
# Seismic Background of Grand Gulf ESP Site







# Boring Locations





# Emergency Planning

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- SERI has elected to seek acceptance of “major features” of emergency plans as provided in 10 CFR 52.17(b)(2)(i)
- NRC/FEMA have issued draft guidance document, Supplement 2 to NUREG-0654/FEMA-REP-1
- Generic industry concern with degree of finality associated with major features
- Staff can grant finality as to the overall description but will need to address implementation details at COL



# Summary of Open Items

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There are 23 open items in the DSER

- Exclusion Area Authority and control (1)
- Population Distribution (1)
- Meteorology (5)
- Hydrology (7)
- Seismology and Geology (5)
- Emergency Planning (4)



# DSER Conclusions

---

- DSER defers general regulatory conclusion regarding site safety and suitability to FSER after open items addressed
- Some conclusions from individual sections without open items
  - Applicant has provided appropriate quality assurance measures equivalent to those in 10 CFR Part 50 Appendix B
  - Site characteristics are such that adequate security plans and measures can be developed



# DSER Conclusions

---

- Additional conclusions from individual sections without open items
  - Applicant has established appropriate atmospheric dispersion characteristics to support design basis radiological calculations
  - Based on PPE and site characteristics, site meets radiological dose consequence criteria in 10 CFR 50.34(a)(1)



# DSER Conclusions

---

- Additional conclusion from individual section without open items
  - Potential hazards associated with nearby transportation routes, industrial and military facilities pose no undue risk to facility that might be constructed on the site



# Presentation Conclusions

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- Staff issued DSER for SERI's ESP application on April 7, 2005
- Open item responses expected by June 21, 2005
- Looking forward to seeing interim ACRS letter and to briefing the Subcommittee and the full Committee during November/December, 2005 on final results of staff's review of this application



# Backup Slides





# Open Items

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- 2.1-1, Control of exclusion area
  - Applicant must have control over exclusion area or irrevocable right to obtain control
  - Legal issue being addressed in Office of General Counsel
  
- 2.1-2, Weighted transient population data
  - The applicant needs to provide weighted transient population in the projected population density and population center
  
- 2.3-1, Applicant needs to provide 100-year return max/min dry-bulb temperatures
  - values recorded at Jackson, MS during 1896-2003 (107°F/-5°F)
  - 110°F was recorded at Vicksburg MS (08/31/200)
  - -8°F was recorded at St. Joseph LA (01/27/1940)



## Open Items

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- 2.3-2, Applicant needs to provide 48-hour probable maximum winter precipitation
- 2.3-3, Applicant needs to provide design basis site characteristic to assess potential for freezing in UHS water storage facility
- 2.3-4, Applicant needs to identify a 3-second gust wind speed that represents a 100-year return value used to determine wind loading



# Open Items

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- 2.3-5, Applicant needs to identify Atmospheric Dispersion and Deposition Factors for nearest milk Cow and meat cow
- 2.4-1, Applicant needs to provide corrected UTM coordinates of the center of the proposed powerblock and/or revise Figure 2.1-1 in the SSAR to show the correct location and coordinates.
- 2.4-2, Applicant needs to provide information on the elevation (depth) of the zone that could be disturbed by the construction of the new facility, such that the local subsurface environment and its alignment with the existing hydrogeological environment could be altered.



## Open Items

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- 2.4-3, Applicant to provide more details regarding dewatering wells to allow the staff to determine whether ground surface subsidence could affect safety-related structures and piping. Provide information related to the location of dewatering wells in relation to safety-related structures and associated monitoring of the ground water table.
- 2.4-4, Applicant to provide more details regarding the floodwater level estimation, including data and methods used to arrive at the floodwater elevation of 133.25 feet MSL.



# Open Items

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- 2.4-5, Applicant to revise and present estimates of the local intense precipitation as shown in Table 2.4-7 of the SSAR using the guidelines of HMR 52.
- 2.4-6, Applicant to provide further description of the rationale for considering Sr-90 and Cs-137 in the radionuclide transport analysis.
- 2.4-7, Applicant to factors, such as soil, sediment, and rock characteristics; adsorption and retention coefficients; ground water velocity; and distances to the nearest body of surface water are important to hydrological radionuclide transport. Provide these site characteristics from onsite measurements



# Open Items

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- 2.5-1, Applicant to provide justification for not updating the background seismic source for the ESP site.
- 2.5-2, Applicant to provide and evaluate the criteria or weights used for ranking of model clusters and the judgements involved in balancing data consistency and adherence to seismological principles in the EPRI 2003 ground motion evaluation. Explain how recordings from a single earthquake can provide well-resolved values of both crustal quality factor ( $Q$ ) and site kappa, also explain why the  $Q$  value of 317 at 1 Hz is much lower than values found in other studies of eastern North American earthquakes, and why other studies find less frequency dependence of  $Q$  in the eastern North American than in the western North American.



# Open Items

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- 2.5-3, Applicant to provide an explanation why the magnitude and distance bin corresponding to the SRSZ makes no contribution to the hazard deaggregation
- 2.5-4, Applicant to provide justification on applying the generic shear wave velocity profile derived from Memphis area to the ESP site and on its applying kappa value derived from ground motion observation on the Mississippi embayment in the sensitivity test.
- 2.5-5, Applicant to provide the basis for the selection of values of BE, UB, and LB and other parameters for the base case profile.



## Open Items

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- 13.3-1, Various additional details on offsite emergency response measures
  - Based on FEMA review of Supplement 2 acceptance criteria
- 13.3-2, Applicant responsibility for making information available to offsite authorities for distribution
- 13.3-4, Additional information on evacuation time estimate (ETE)
  - Clarify whether results of the 2003 ETE study were discussed with officials from the States of Mississippi and Louisiana involved in implementing traffic management plans



# Open Items

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- 13.3-3, Adequacy of technical support center (TSC), emergency operations facility (EOF), and operations support center (OSC)
  - No evaluation or decision has been made by applicant as to whether the existing Unit 1 OSC and EOF facilities could or would be shared for proposed new reactor(s)
  - TSC facility would not be shared; Part 52 design certifications establish TSC design criteria, which would need to be incorporated as appropriate



**Presentation to the Advisory  
Committee on Reactor Safeguards**

**Early Site Permit Application for the  
Grand Gulf Nuclear Station Site**

**May 16, 2005  
Entergy / System Energy Resources, Inc.**



**Entergy®**



# Entergy ESP Team

- Entergy
  - William Eaton, Vice President Engineering
  - George Zinke
  - Kenneth Hughey
  - Michael Bourgeois
- Enercon
  - Guy Cesare
  - Al Schneider
  - Ralph Berger
- William Lettis & Associates
  - James Hengesh
  - Jeff Bachhuber
  - Martin McCann



# Presentation Agenda

- Introduction
- General Information
- ESP Application: Purpose & Overall Approach
- ESP Duration and COL Application Process
- GGNS Site & Environs
- Site Climatology, Meteorology
- Geological, Seismological, and Geophysical Analysis
- Emergency Planning
- Draft SER Open Items



## General Information

- ESP Site Safety Analysis Report (SSAR) prepared to meet 10 CFR 52.17
- Format, content followed guidance of Reg. Guide 1.70
- Proposed new facility, located on existing Grand Gulf Nuclear Station site
- GGNS Unit 1 licensed June 1982



## General Information, Cont'd

- Site Owner and ESP Applicant - System Energy Resources, Inc. (SERI)
- GGNS Unit 1 Operator - Entergy Operations, Inc.
- ESP Application Preparer - Entergy Nuclear Potomac, Inc.



## General Information, Cont'd

- Active participation in extensive Pre-Application activities (NRC, NEI, Industry) in 2002 - 2003 timeframe
  - Considered beneficial to overall product;
  - Efficiency of Applicant and NRC Staff resources
  - Early development of staff positions for issues
- Application submitted: October 16, 2003



# ESP Application: Purpose & Overall Approach

- Purpose
  - Exercise Regulatory Processes
    - New Regulations (10CFR 52, 10CFR100.23, 10CFR 2)
    - Dated Guidance Documents
    - Mandatory Hearing Process – Early Resolution
    - Establish Early Site Permit Cost/Value
    - Establish Repeatable Predictable ESP and Site Suitability Process
  - Establish Suitability of Entergy Site for Additional Unit(s)
    - Defer Technology Selection to COL
    - Resolve Appropriate “matters” with “finality” (10CFR52.39)



# Purpose & Overall Approach, Cont'd

- Overall Approach
  - Application Content
    - Site Characteristics
      - Geography and Demography
      - Nearby Industrial, Military and Transportation Facilities and Routes
      - Meteorology
      - Hydrologic Engineering
      - Geology, Seismology, and Geotechnical Engineering
    - Site Safety Assessment
      - Non-Seismic Siting Criteria
      - Dose Consequences from Normal Operations
      - Accident Dose Consequences
      - Geologic and Seismic Siting Factors



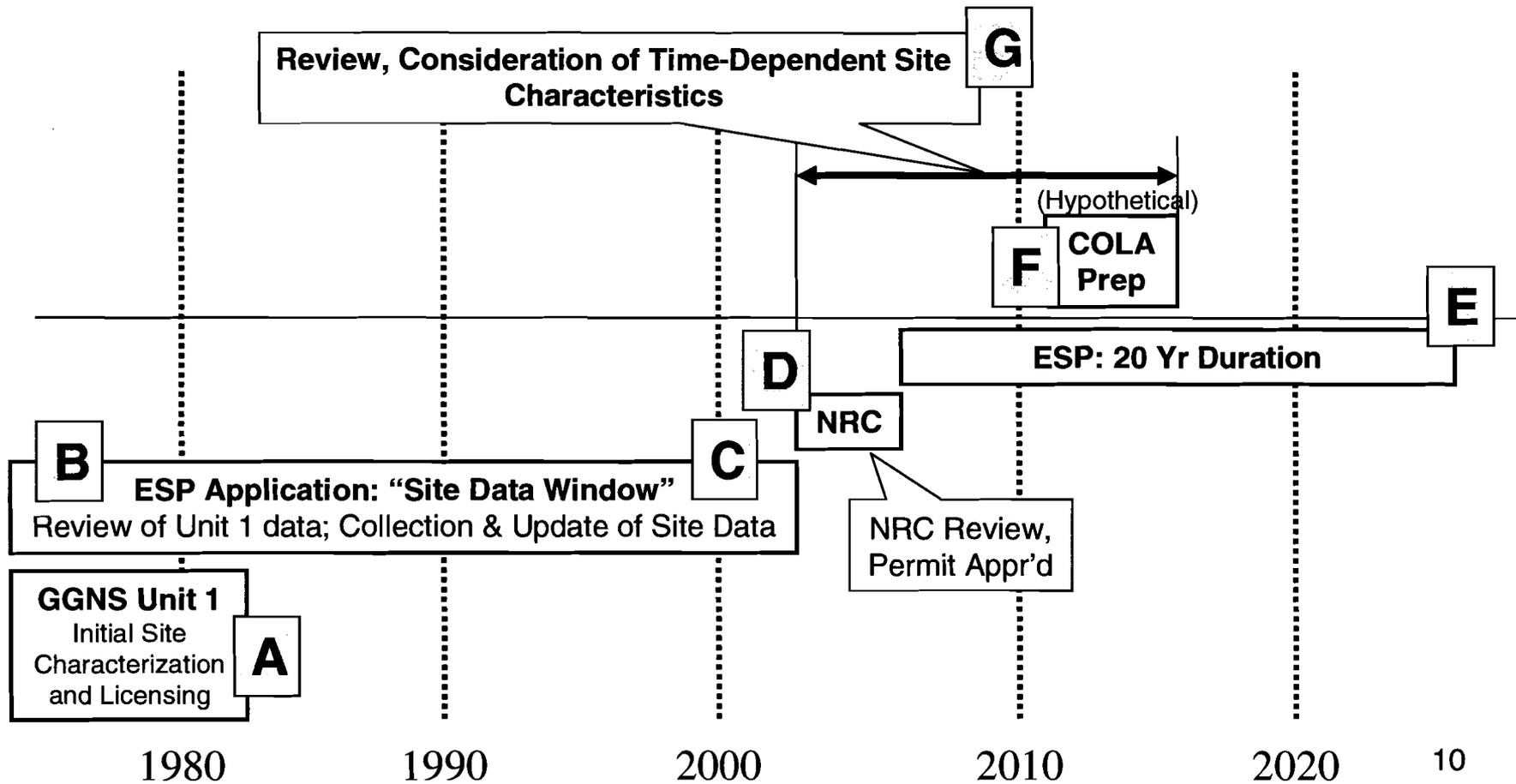
# Purpose & Overall Approach, Cont'd

- Overall Approach (continued)
  - Application Content (continued)
    - Environmental Report
    - Emergency Planning Information
  - Use of Existing Site Licensing Information
  - Plant Parameter Envelope
    - Facility parameters, as needed to support site suitability analyses, established by “surrogate” Plant Parameter Envelope (PPE) approach
  - ESP Duration
    - 20 Year
    - 10CFR52.39 Finality
    - 10CFR52.79 COL Application Content and Process



# ESP Duration And COL Application Process

## General Timeline, Consideration of ESP Data at COL Stage





# ESP Duration And COL Application Process, Cont'd

- Time-dependence of site characteristics fundamentally considered in development of ESP SSAR and Emergency Planning Information
  - In general, expectations of future: reflective of past
  - Population projection
- COL Application Process
  - Reactor technology/design selected
  - Identification of site-related design margins
  - Risk Significance of Site Characteristics Established



# ESP Duration and COL Application Process, Cont'd

- 10CFR52.79 Comparison
  - Requirement: “...information sufficient to demonstrate that the design of the facility falls within the parameters specified in the early site permit...”
  - Prudent & Reasonable COL Applicant (Entergy) Considerations
    - Safety Margins
    - Potential for change/variation in ESP site characteristics
      - Since ESP issuance
      - Duration of COL
    - Review of Regulatory Issues Since Permit Issuance
    - Relevant Operating Experience
    - Safety and Risk Significance



# ESP Duration And COL Application Process, Cont'd

- 10CFR52.79 Comparison (continued)
  - Site information review
    - Selected information confirmed and/or augmented as necessary and appropriate to identify/resolve risk significant issues
  - Design and/or monitoring considerations
  - Examples
    - Population (permanent and transient)
    - Man-made hazards in vicinity of site
    - Meteorological conditions
    - Seismic



# ESP Duration and COL Application Process, Cont'd - Examples

<b>PARAMETER</b>	<b>POSSIBLE SITE INFORMATION REVIEW APPROACH AT COL APPLICATION</b>
Population	<ul style="list-style-type: none"><li>- Latest census; confirm projections remain valid</li><li>- Possible need to update Evacuation Time Estimate</li></ul>
Man-Made Hazards	<ul style="list-style-type: none"><li>- Survey of transportation systems for substantial change (highway with closer approach)</li><li>- Consult with FAA and USAF re: air traffic</li><li>- Consider new industry and possible impact</li></ul>
Meteorological	<ul style="list-style-type: none"><li>- Consult operating unit regarding changes in annual wind patterns, temp/humidity data summary; consider advances in climatology</li></ul>
Seismic	<ul style="list-style-type: none"><li>- More data obtained in accordance with Regulatory Guidance in location of safety related foundations</li></ul>

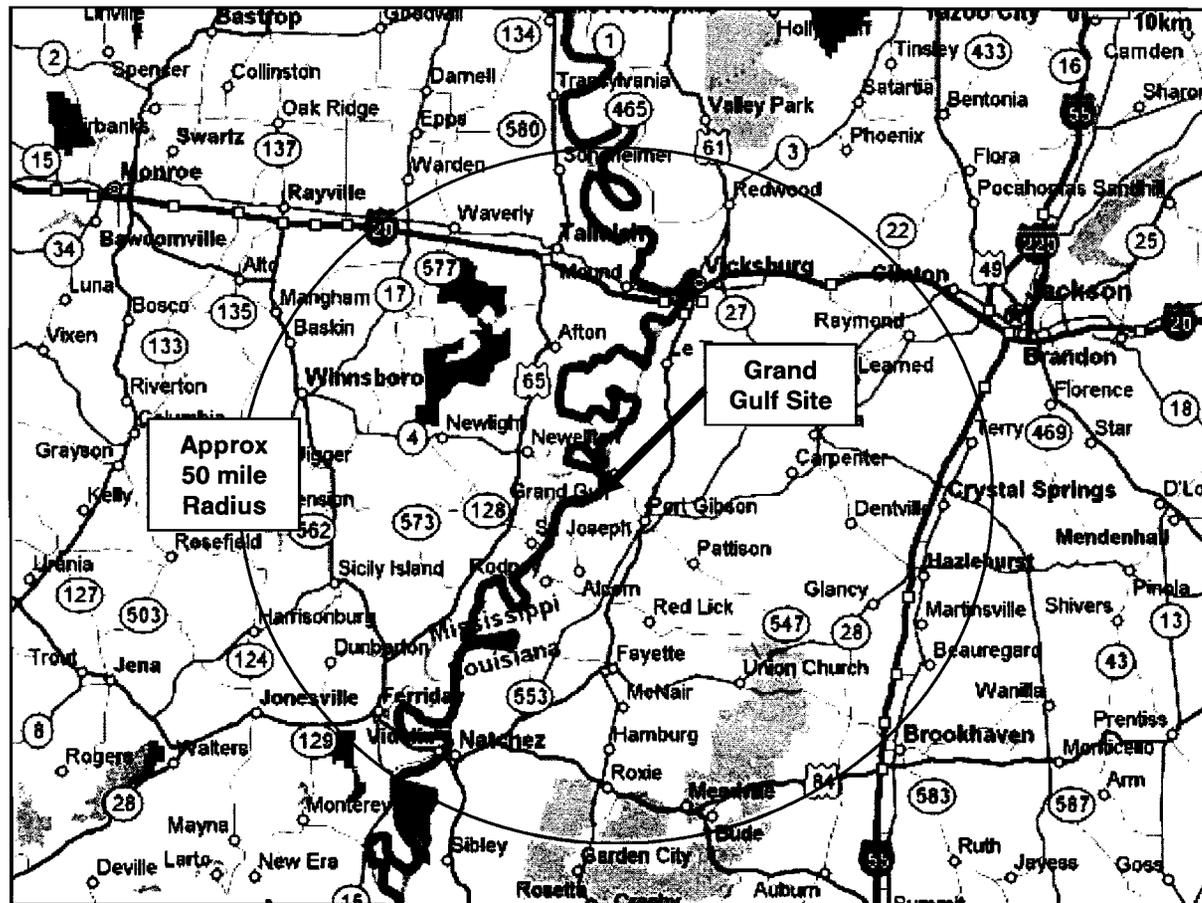


## GGNS Site and Environs

- Location: Claiborne County, MS; eastern bank of Mississippi River
- GGNS Site Property - Approx 2100 acres
- Nearest “population center”: Vicksburg, MS (approx. 25 miles N)
- Principal town in site vicinity: Port Gibson, MS (6 miles, SE)



# GGNS Site and Environs, Cont'd

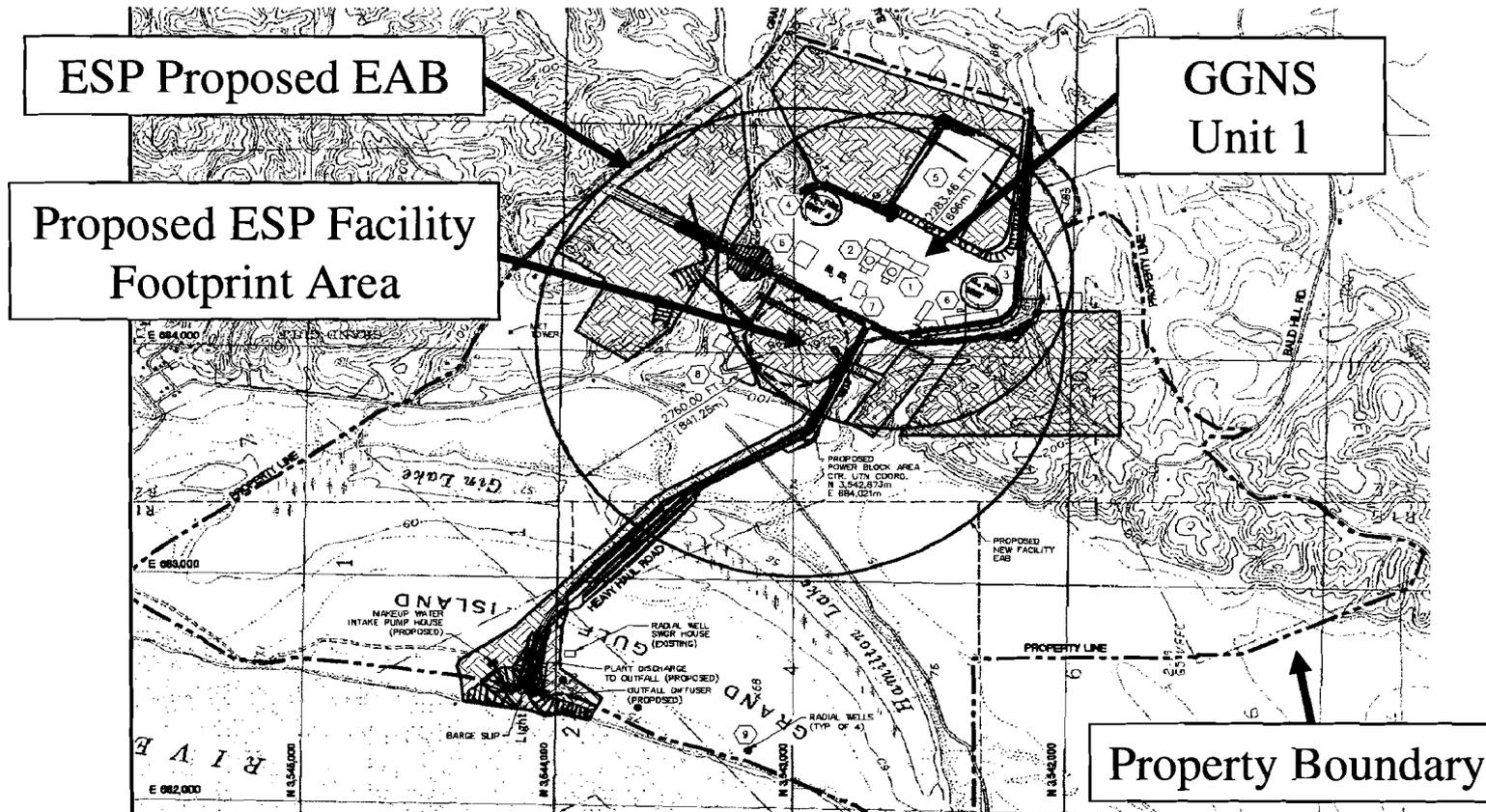




## GGNS Site and Environs, Cont'd

- Exclusion area boundary, revised to encompass proposed new facility
  - No residents within EAB; not traversed by rail or navigable waterway; one county road crosses through EAB
  - New EAB, wholly contained with GGNS site property boundary
- Low Population Zone - 2 mile radius (essentially unchanged from Unit 1)

# GGNS Site and Environs, Cont'd





# GGNS Site and Environs, Cont'd

- Site Area Population
  - Permanent (2000 Census)
    - 0 to 10 Miles: 10,000 (approx)
    - 10 to 50 Miles: 325,000 (approx)
- Projections
  - Methodology: MS and LA State
  - Estimated growth, Low to Modest
    - 2030 (Permit Expiration): 8%
    - 2070 (Facility End-of-Life): 19%



## GGNS Site and Environs, Cont'd

- Generally rural, remote area; land use, forestry and agriculture; limited industry (primarily lumber)
- No commercial airports within 10 miles; closest at 65 miles (Jackson Intl)
- Closest major highway (US 61), 4.5 miles East of site
  - Minimum safe distance, explosive truck cargo calculated to be 0.3 miles (Unit 1 UFSAR)



## **GGNS Site and Environs, Cont'd**

- No active rail lines or military installations in vicinity
- Closest gas/oil pipeline: 4.75 miles (4", natural gas)
- Current air traffic corridors (commercial and military) evaluated met NRC criteria for no undue risk
- Mississippi River, important river transportation corridor; 1.1 miles from ESP site



## GGNS Site and Environs, Cont'd

- At proposed EL 132', site is located 65' above normal MS River levels.
  - River West bank levee structure: EL 103'
  - River flood height, >29' below site grade
- Consideration of river-borne hazards
  - Updated shipment information considered
  - Distance and river bluff provide protective feature
  - Unit 1 UFSAR analyses, as supplemented, and conclusions remain applicable



# Site Climatology, Meteorology

- Data sources supporting SSAR
  - NWS Stations at Vicksburg, Jackson and Unit 1 Met tower
  - National Climate Data Center
  - Extensive data collection in support of Unit 1 licensing (1970's) utilized
- General climate: humid, tropical
- Characterized by short cold season; long warm season; infrequent snow/ice events; frequent summer thunderstorms



## Site Climatology, Meteorology, Cont'd

- Current data, NWS and/or Unit 1 Met Tower: Applied appropriate exceedance criteria to develop ambient dry bulb, wet bulb temps and humidity
- Historic data (1896-2003): Used to support long term reviews, required to determine historic extremes

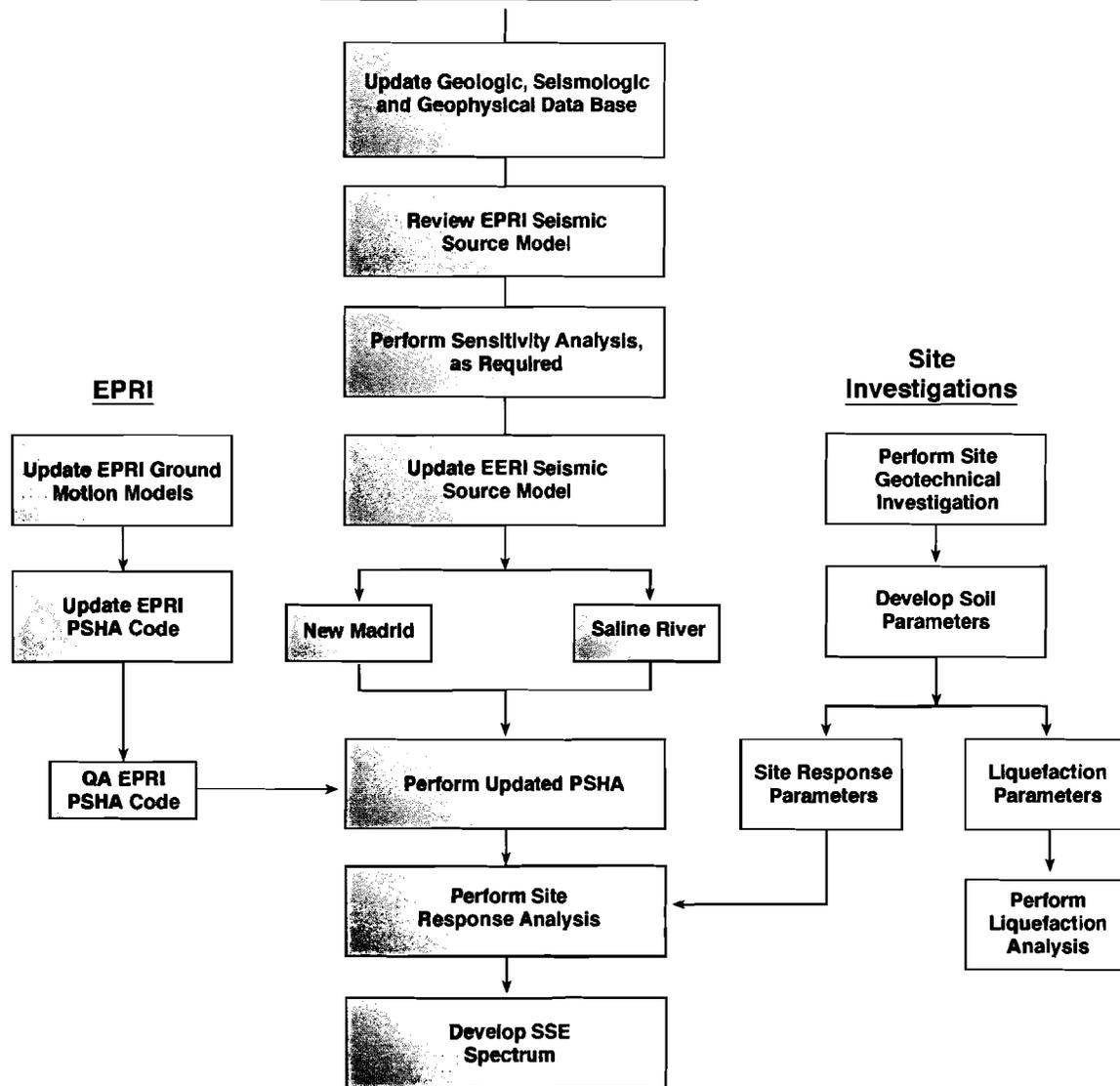
*Geologic and Geotechnical Site  
Characterization*

*Regional Geology*

*Seismic Source Characterization*

*PSHA, Site Response and SSE*

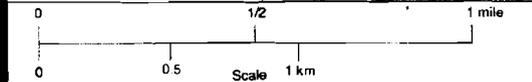
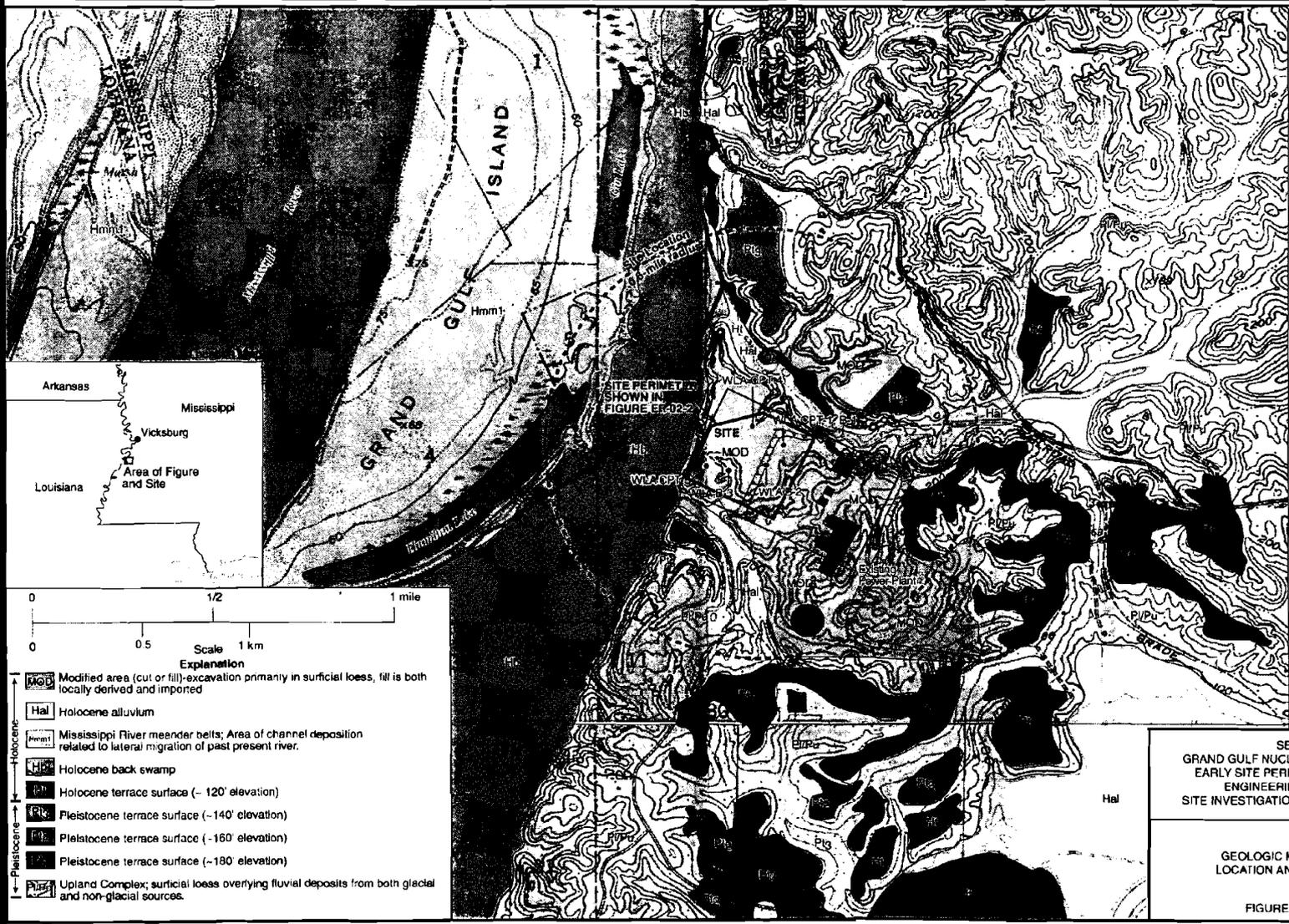
# Grand Gulf ESP Ground Motion Analysis



## ***Goals of ESP Site Exploration***

Characterize subsurface conditions in ESP area with existing and new data

- Perform sufficient new exploration to confirm and refine site stratigraphy
- Evaluate site variability
- Develop site profile for ground motion response
- Identify possible seismic hazards



**Explanation**

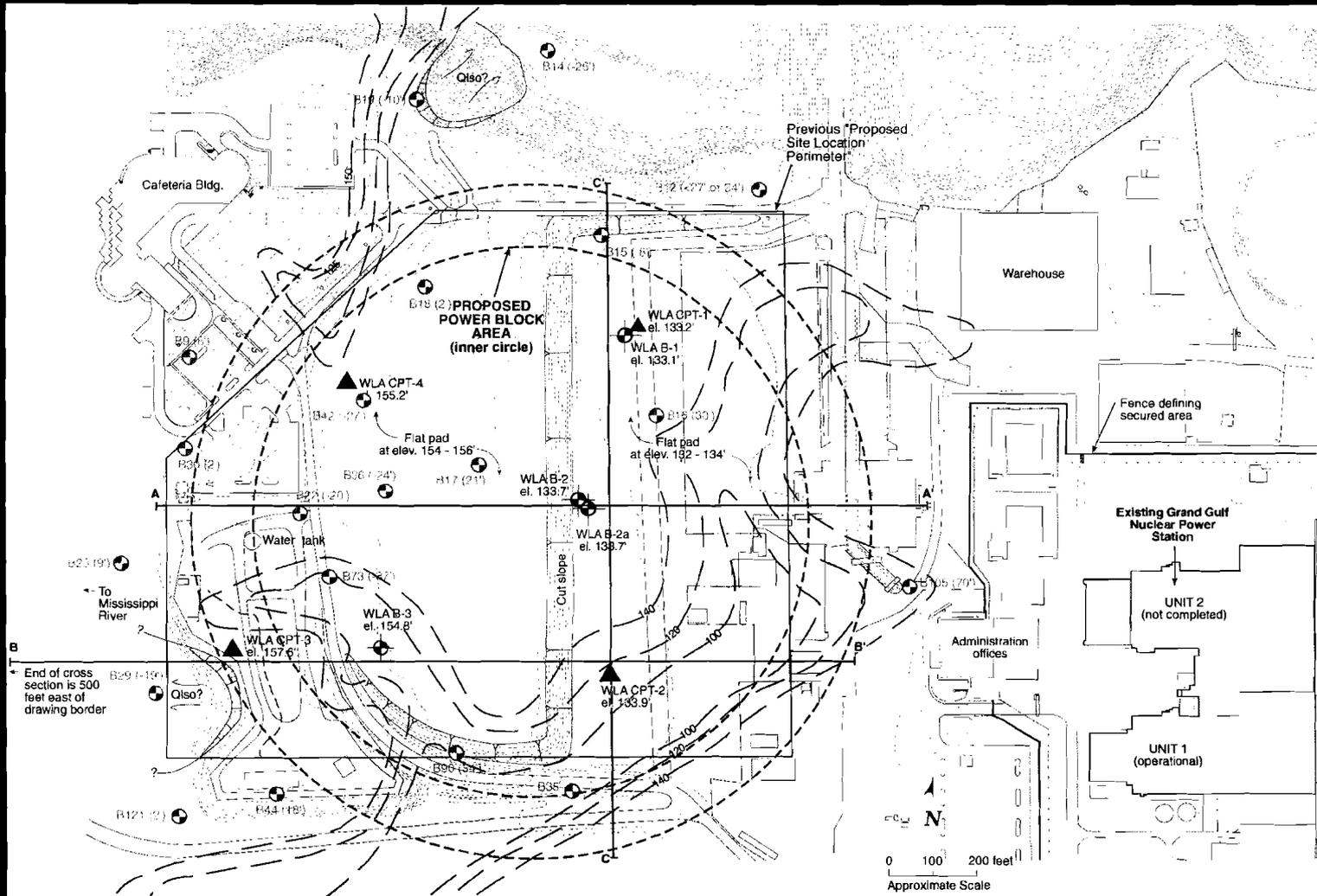
	Modified area (cut or fill)-excavation primarily in surficial loess, fill is both locally derived and imported
	Holocene alluvium
	Mississippi River meander belts; Area of channel deposition related to lateral migration of past present river.
	Holocene back swamp
	Holocene terrace surface (-120' elevation)
	Pleistocene terrace surface (-140' elevation)
	Pleistocene terrace surface (-160' elevation)
	Pleistocene terrace surface (-180' elevation)
	Upland Complex; surficial loess overlying fluvial deposits from both glacial and non-glacial sources.

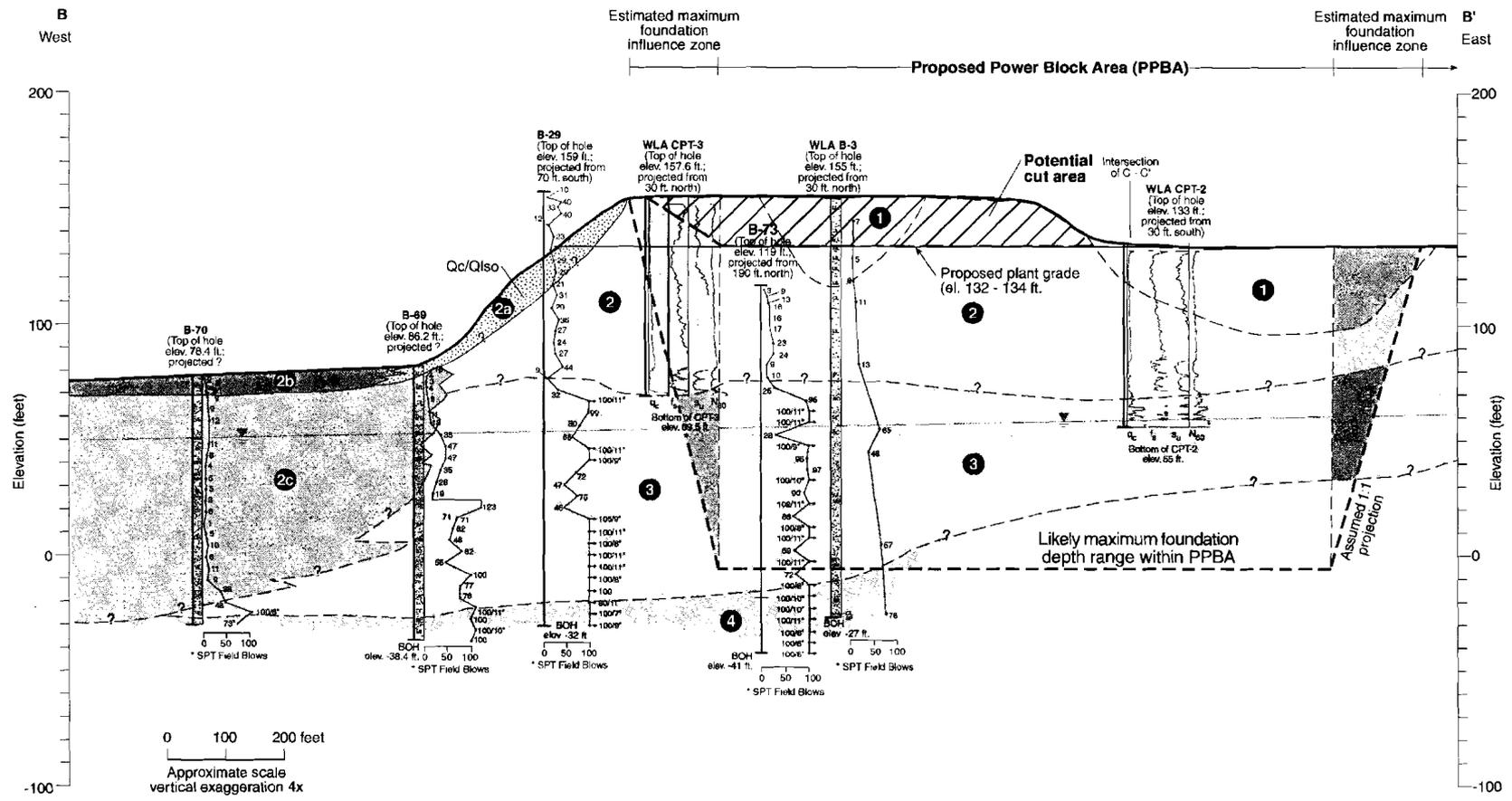
SERI  
 GRAND GULF NUCLEAR STATION SITE  
 EARLY SITE PERMIT APPLICATION  
 ENGINEERING REPORT  
 SITE INVESTIGATION PROGRAM ER-02

GEOLOGIC MAP OF SITE  
 LOCATION AND SITE AREA

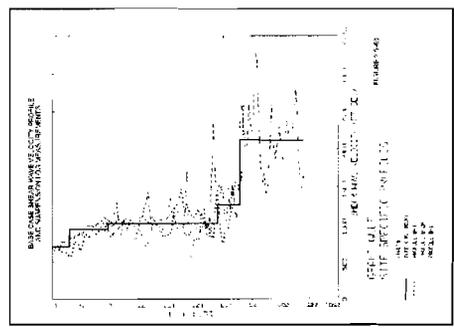
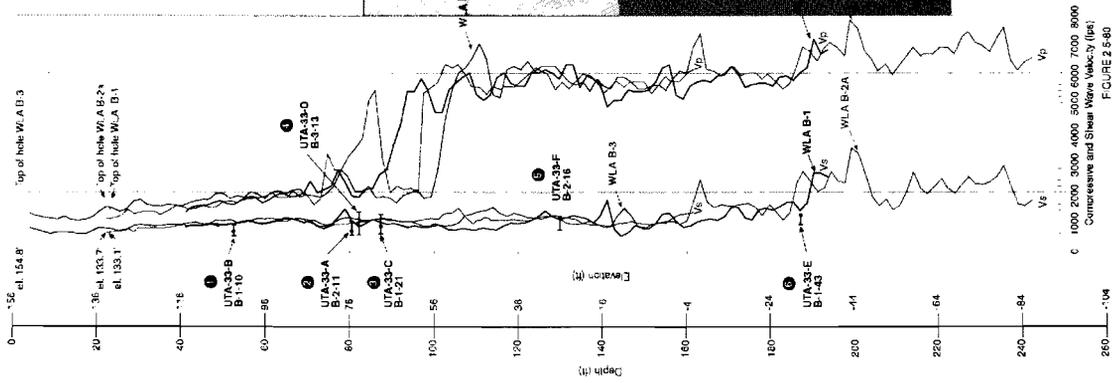
FIGURE ER-02-1 REV. 0

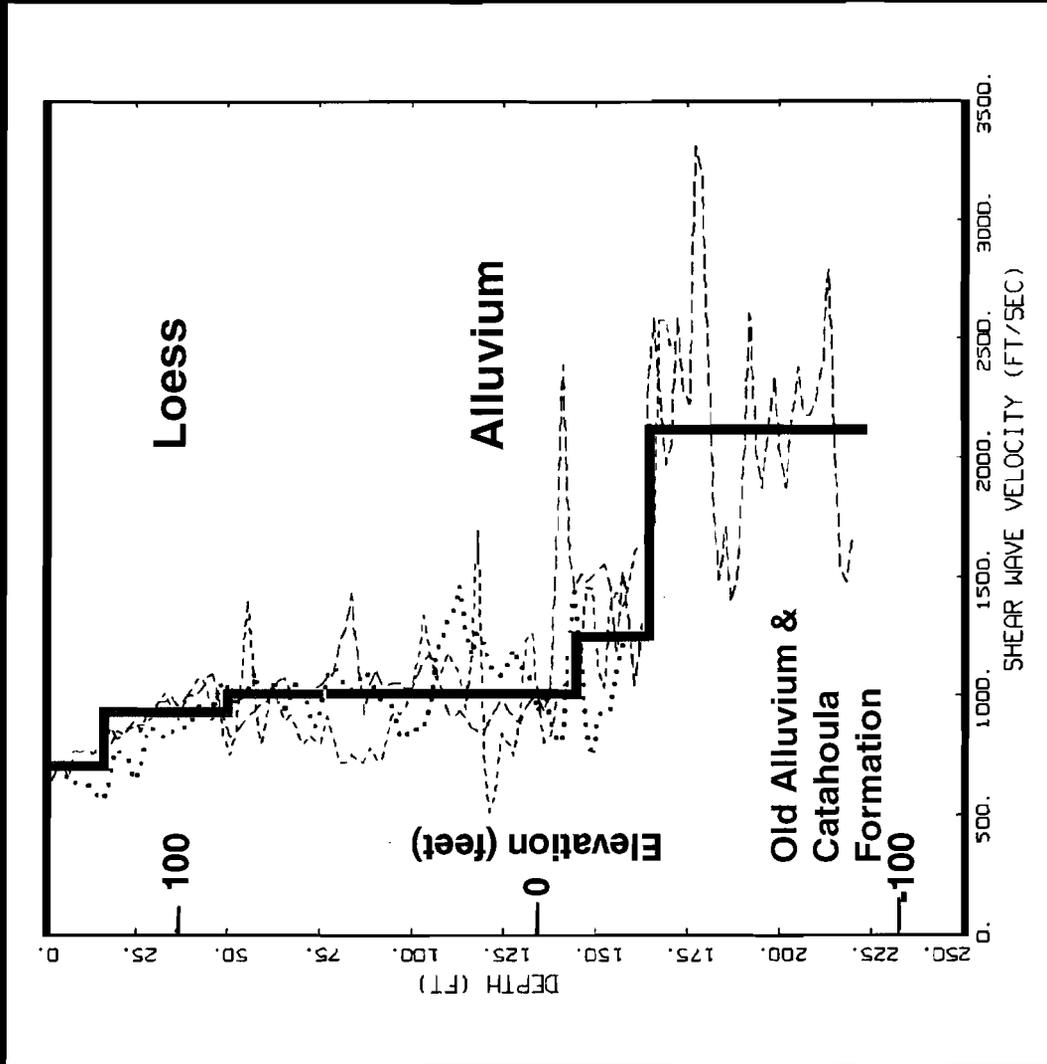
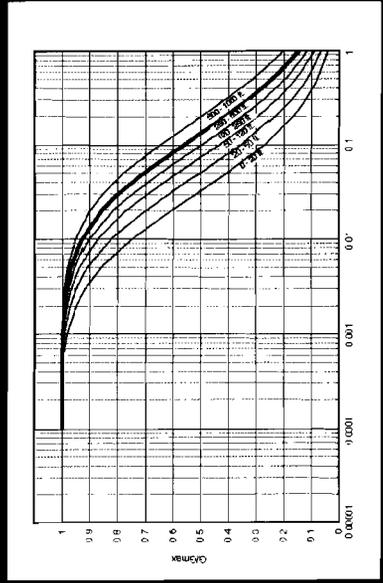
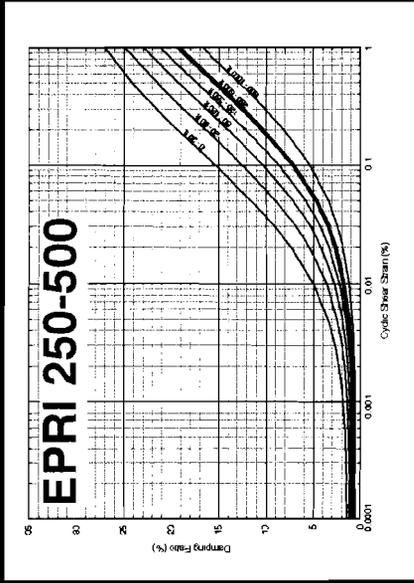
- Data Review (e.g., FSAR, published maps)
- 3 New borings (142 to 238 feet deep)
- 4 CPT soundings (75 to 98 feet deep)
- 3 P-S borehole velocity surveys
- Laboratory index testing (Eustis)
- 6 Dynamic soil tests (UTEXAS)
- Future work in COL phase for facility design





SUMMARY OF P-S VELOCITY PROFILES





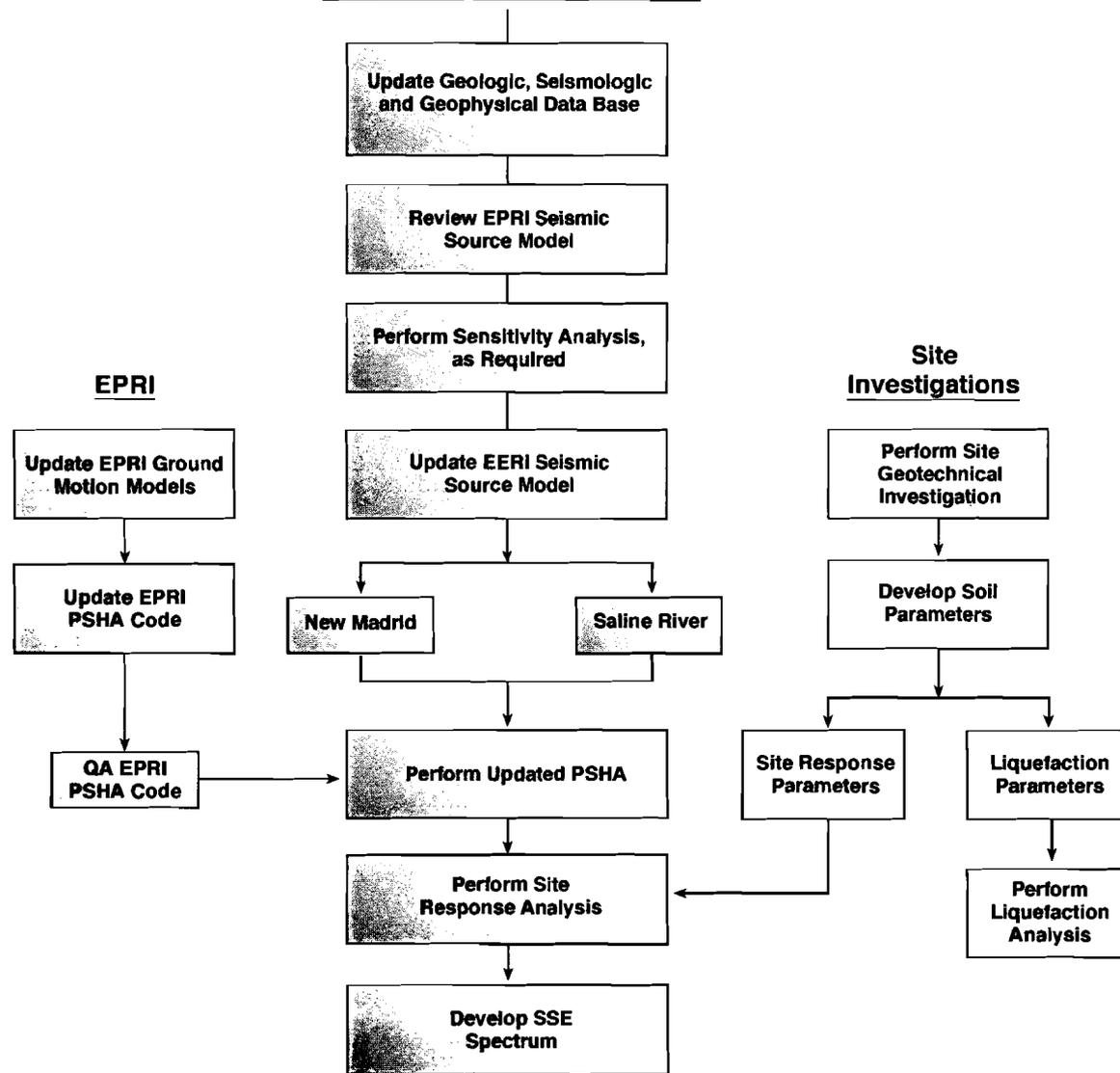
Positive evidence for no significant geologic hazards

Extension of foundations below loess and upper alluvium will mitigate any possible hazards from seismically-induced ground failure, settlements, or slope failure

Old alluvium and Catahoula Formation are resistant to settlement, and have provided good support for existing plant

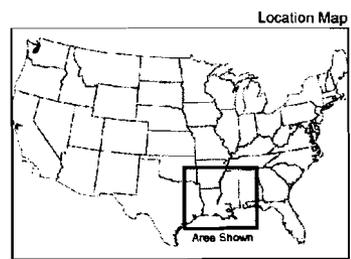
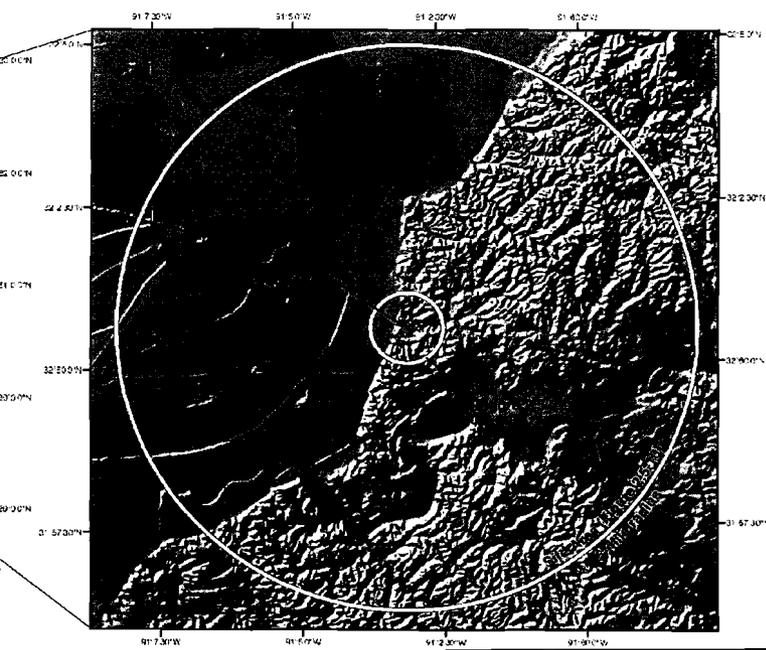
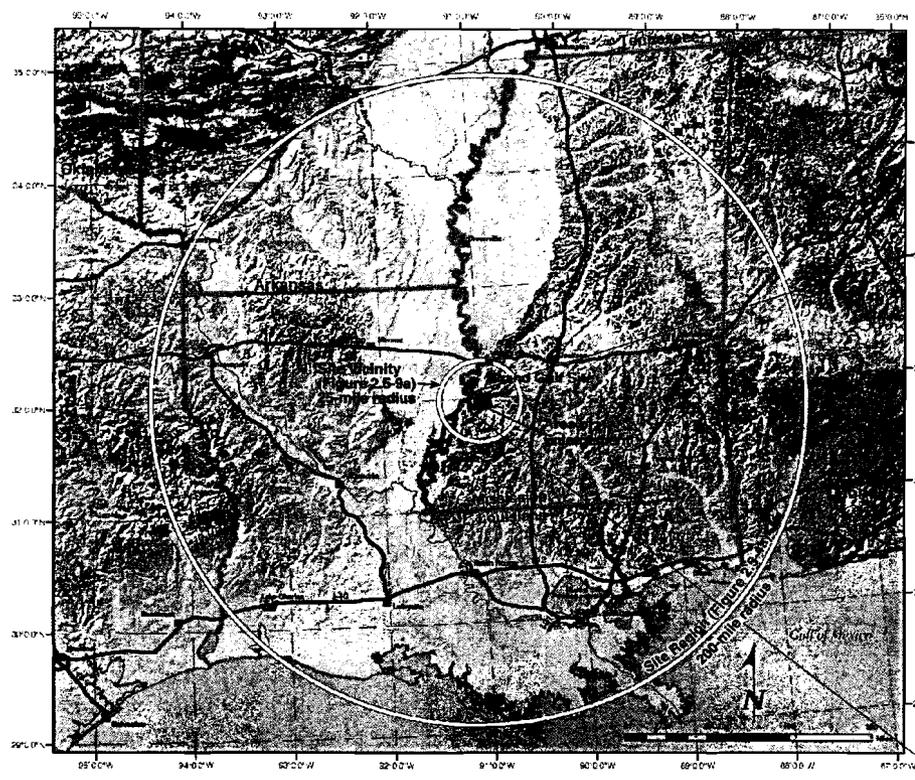
Groundwater dewatering/control procedures will be required

# Grand Gulf ESP Ground Motion Analysis



- Followed guidance provided in US NRC Regulatory Guide 1.165
- Adopted EPRI (1986) methodology to develop SSE ground motions

- Reviewed geological, seismological and geophysical data to update database for area with 200 miles of Grand Gulf ESP site
- Updated seismic source and ground motion models
- Updates include:
  - New Madrid Seismic Zone characterization
  - Saline River Source Zone
  - Ground motion attenuation models



- Explanation**
- Grand Gulf Site
  - Major city
  - Major river
  - Interstate highway
  - State boundary

SERI  
 GRAND GULF NUCLEAR STATION SITE  
 EARLY SITE PERMIT APPLICATION  
 SITE SAFETY ANALYSIS REPORT

DEFINITION OF SITE INVESTIGATION AREAS

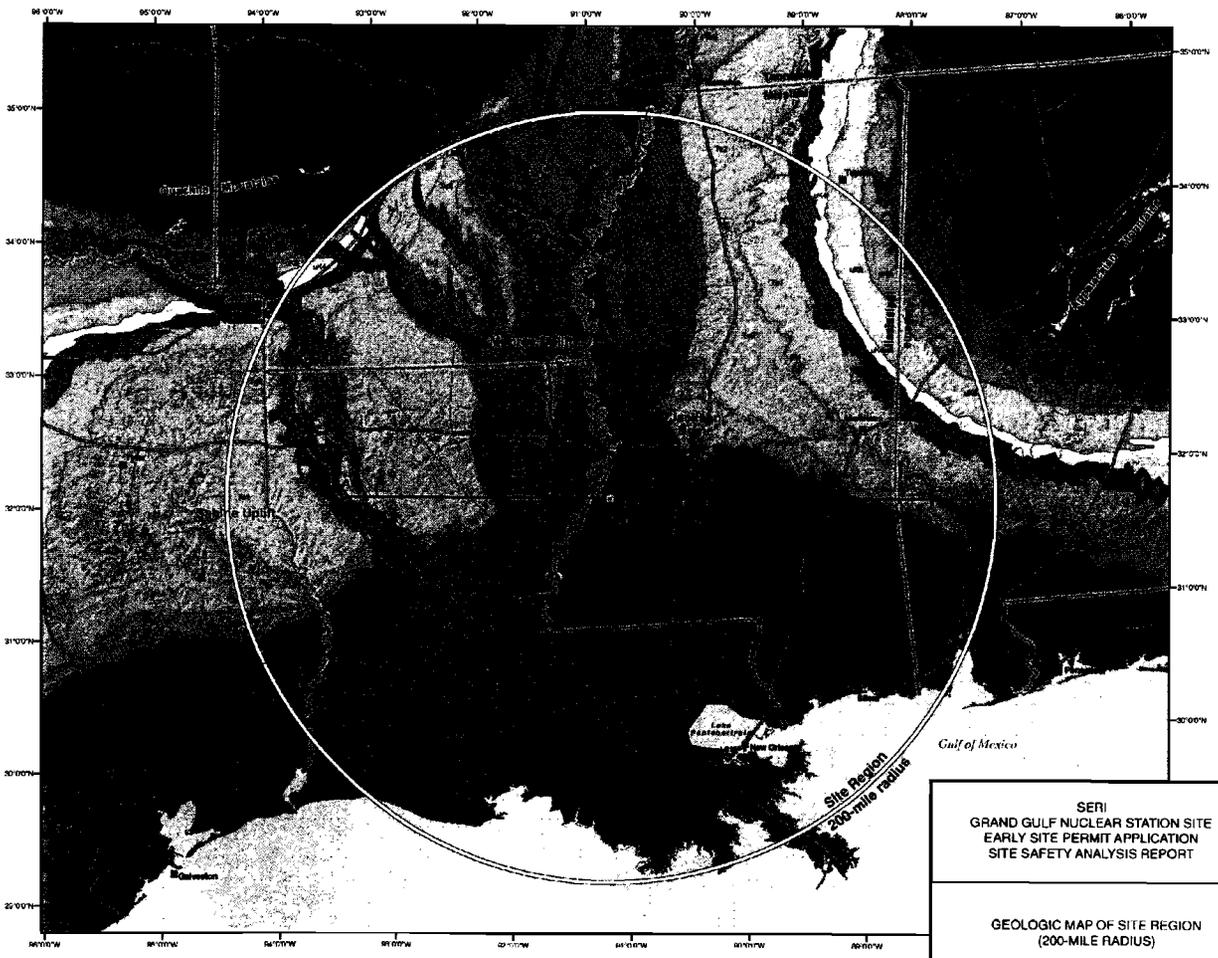
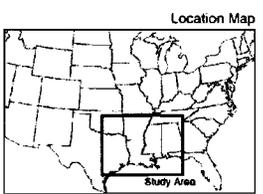
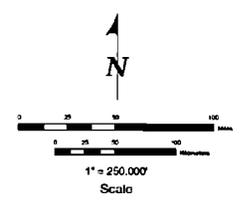
FIGURE 2.5-1 REV. 0

- Explanation**
- Salt dome
  - ⊙ Grand Gulf Site
  - Major city
  - Major river
  - ==== Interstate highway
  - State boundary
  - ↕ Syncline
  - ↕ Anticline
  - A — A' Cross section

Map units are described on Figure 2.5-4b

Geology from Schruben, P.G., Arndt, R.E., Bawiec, W.J., digital representation of King, P.B., and Brinkman, H.M., 1974, Geology of the continental United States at 1:2,500,000 scale, Digital Data Series II, release 2.

Cross-sections are printed to show respective locations only. Cross-sections A and B are from Reference 16. Cross-section C is from Louisiana Geological Survey (1984).



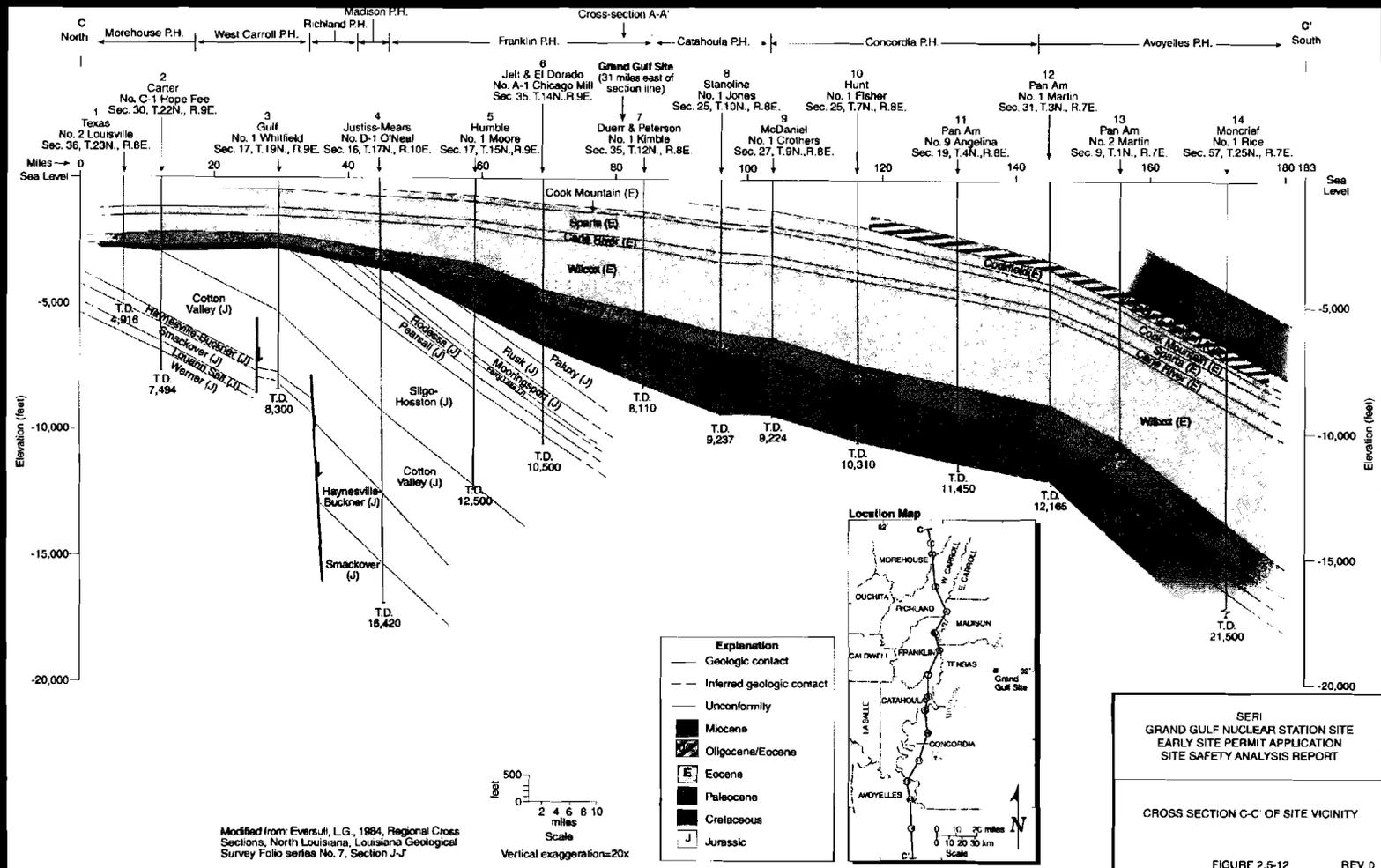
SERI  
 GRAND GULF NUCLEAR STATION SITE  
 EARLY SITE PERMIT APPLICATION  
 SITE SAFETY ANALYSIS REPORT

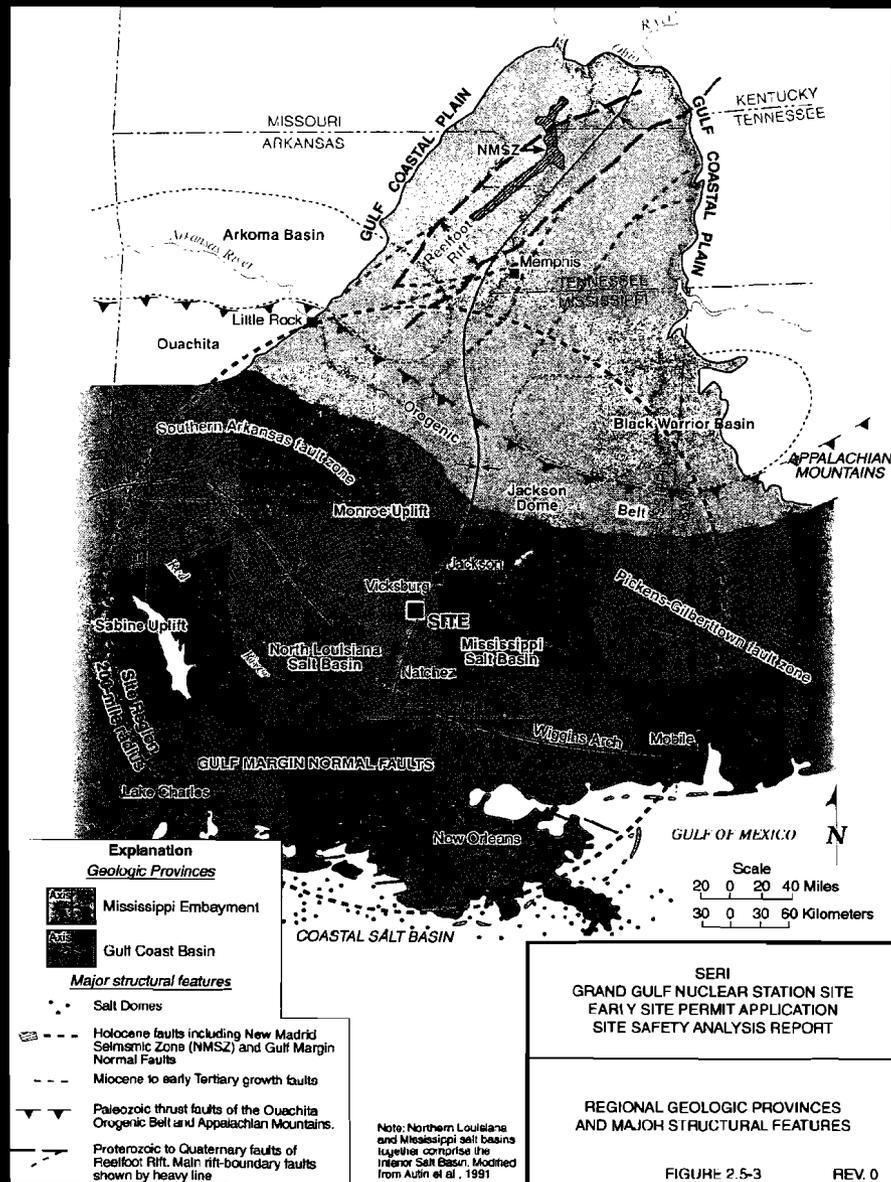
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GEOLOGIC MAP OF SITE REGION  
 (200-MILE RADIUS)

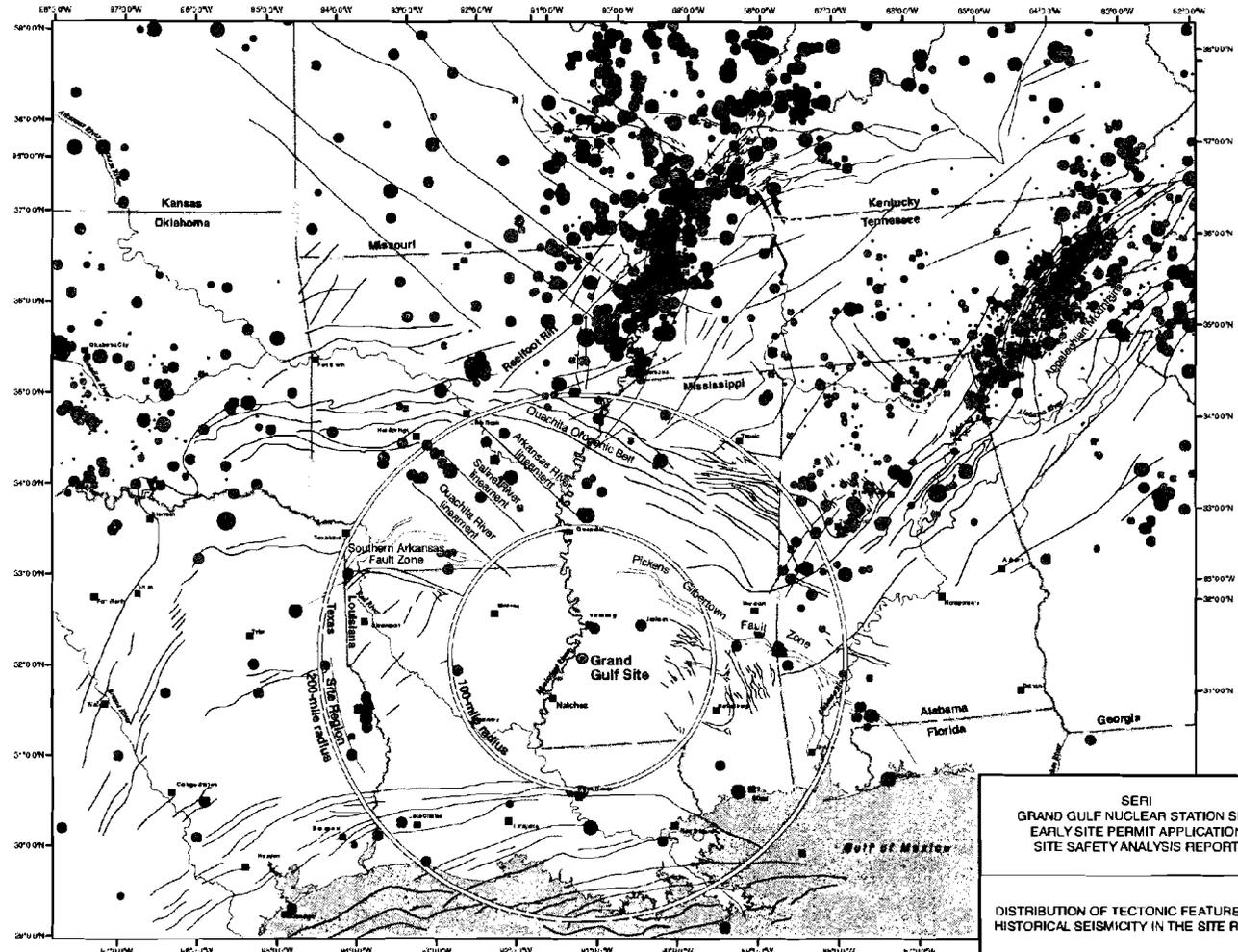
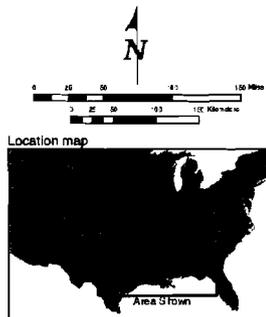
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FIGURE 2.5-4a REV. 0





- Explanation**
- ⊙ Grand Gulf Site
  - Major city
  - Major river
  - - - State boundary
- Fault Zones**
- Quaternary/Holocene
  - Possible Quaternary
  - Miocene
  - Cretaceous
  - Mississippian/Pennsylvanian
  - Proterozoic
  - Undifferentiated
  - likely Paleozoic in North
  - likely Miocene-Pliocene in South
- Seismic Activity (1827 - 1984)**  
Magnitude (Mb)
- 0.00 - 1.99
  - 2.00 - 2.99
  - 3.00 - 3.99
  - 4.00 - 4.99
  - 5.00 - 7.99
- Seismic Activity (1985 - 2004)**  
Magnitude (Mb)
- 0.00 - 1.99
  - 2.00 - 2.99
  - 3.00 - 3.99
  - 4.00 - 4.99
  - 5.00 - 7.99
- Pre-1985 seismicity from EPRI (1986) catalog and post-1984 seismicity from ANSS-CNSS (2004) composite catalog.



SERI  
 GRAND GULF NUCLEAR STATION SITE  
 EARLY SITE PERMIT APPLICATION  
 SITE SAFETY ANALYSIS REPORT

DISTRIBUTION OF TECTONIC FEATURES AND  
 HISTORICAL SEISMICITY IN THE SITE REGION

02/11/05    FIGURE 2.5-5    DRAFTREV. 1

1x22 SSAR Rev 1

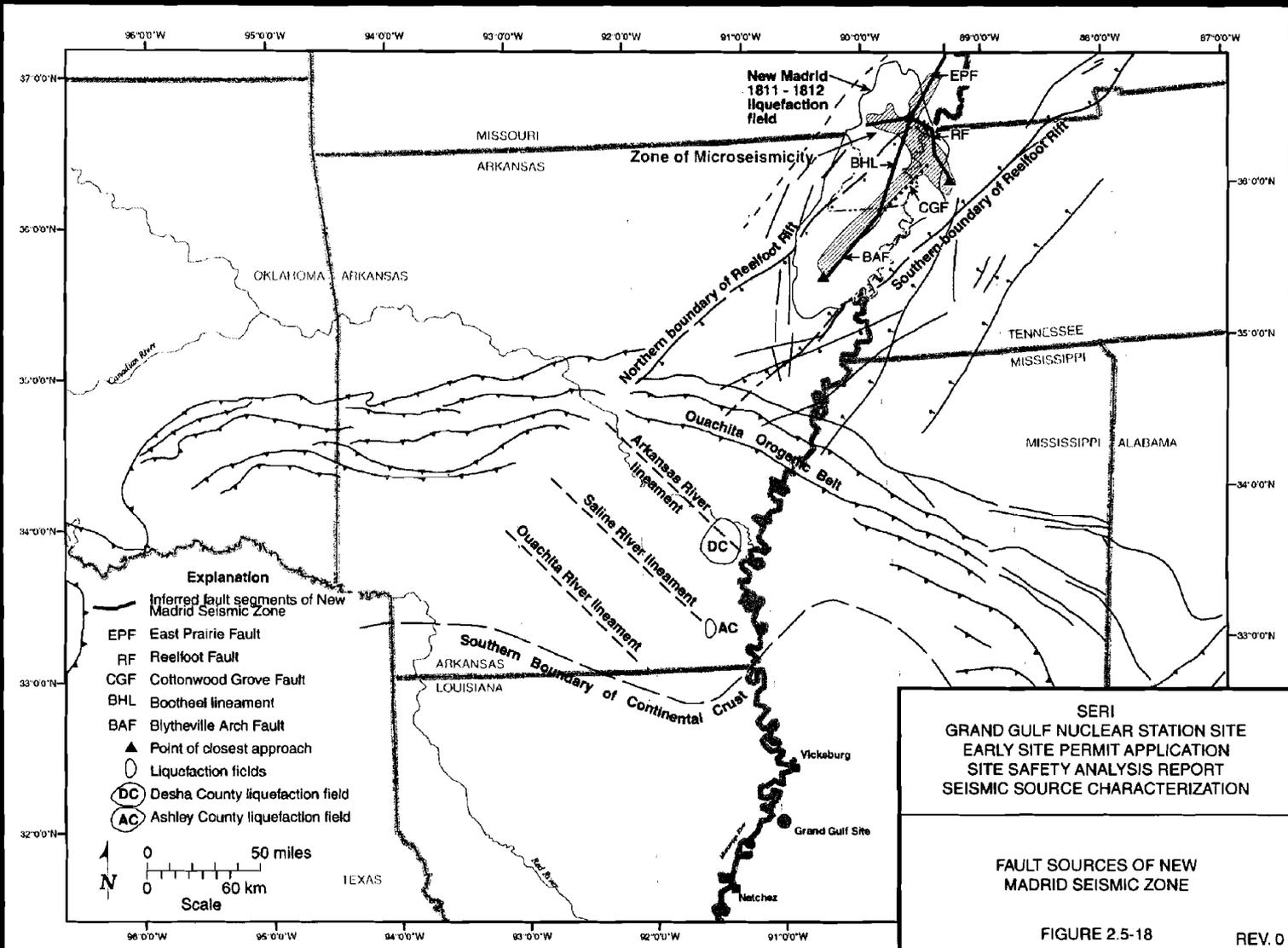
Evaluated source geometry  
Maximum earthquake magnitude  
Earthquake recurrence  
Seismic source model area included 200-  
mile radius Site Region, plus NMSZ

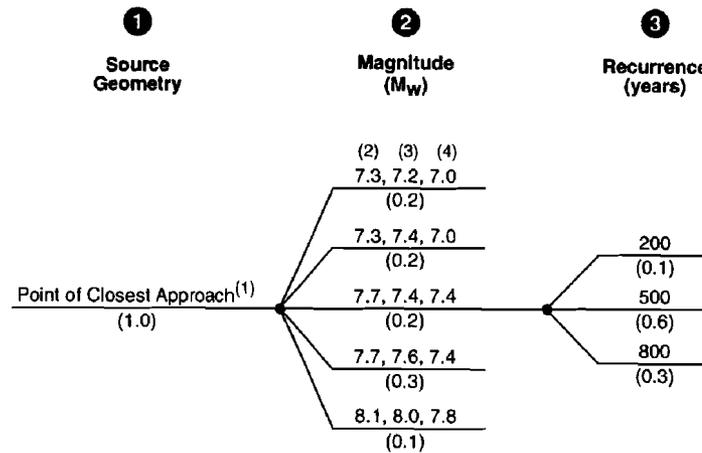
Seismic source model for 1986 EPRI  
SOG Project is acceptable for most of  
model area

Added characteristic earthquake model  
for NMSZ

Added new Saline River Source Zone

Replaced ground motion attenuation  
model





(1) Point of closest approach refers to the point on each of the East Prairie, Reelfoot fault, Blythville Arch segments of the New Madrid Seismic Zone that is closest to the Grand Gulf site. See Figure CP-01-16 for segment and point of closest approach locations.

(2) Blythville Arch: weighted average =  $M_w$  7.6

(3) Reelfoot Fault: weighted average =  $M_w$  7.5

(4) East Prairie Fault: weighted average =  $M_w$  7.3

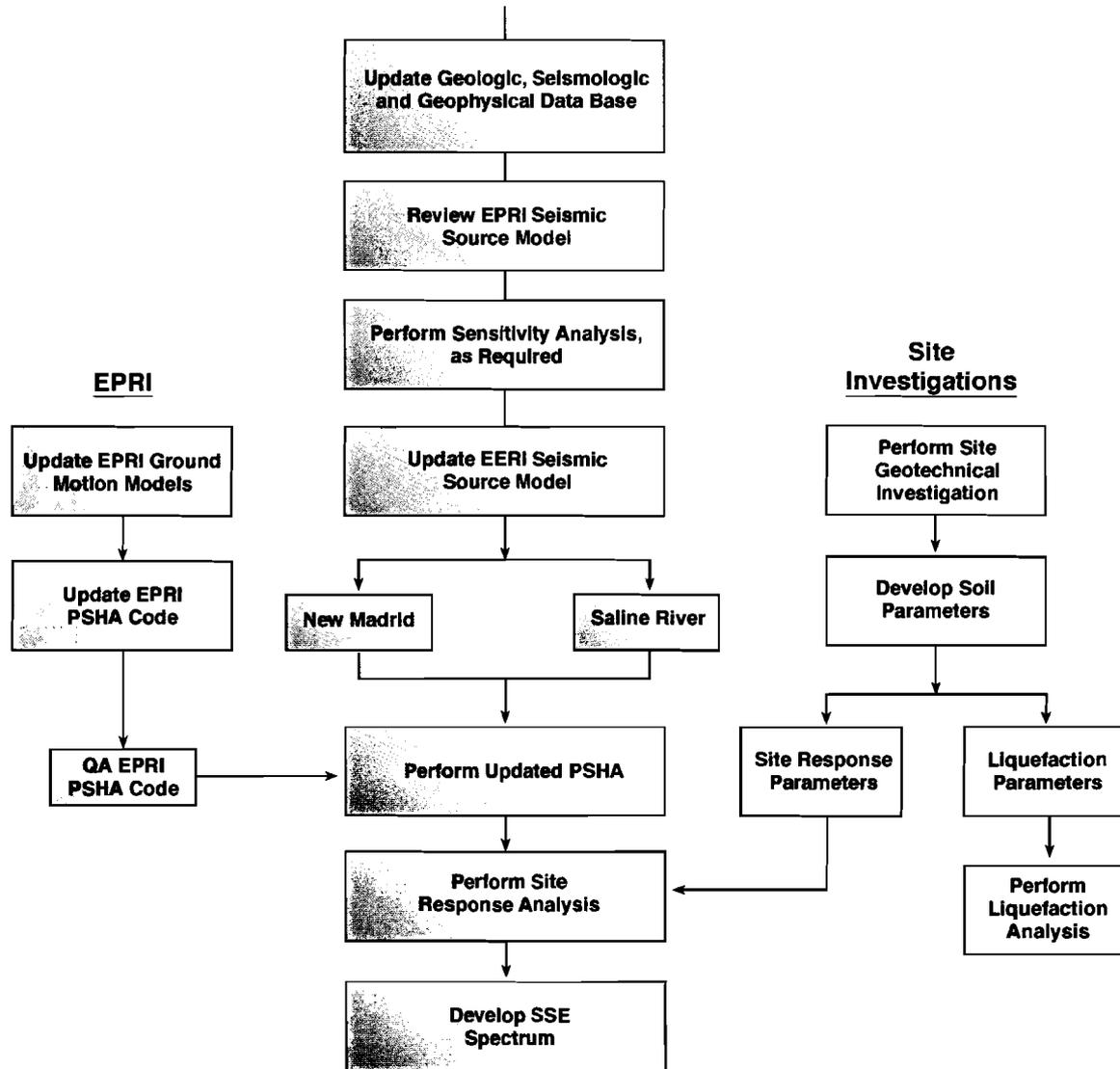
SERI  
GRAND GULF NUCLEAR STATION SITE  
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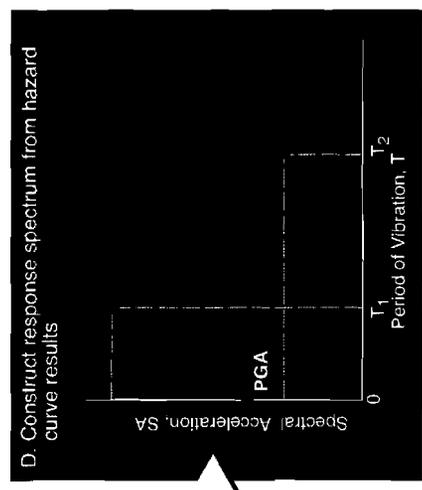
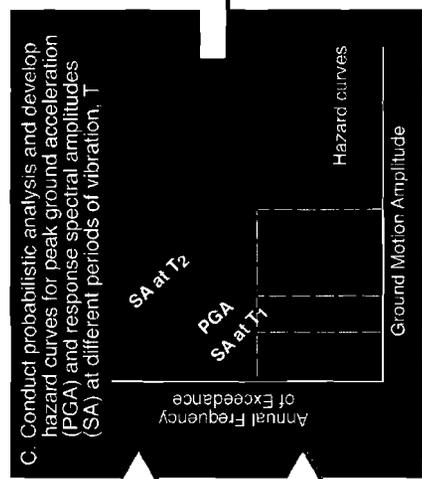
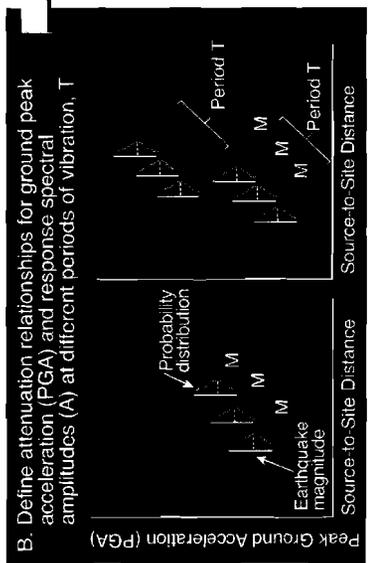
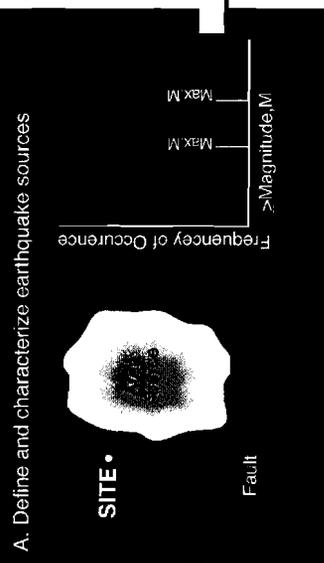
LOGIC TREE  
FOR NEW MADRID SEISMIC ZONE

FIGURE 2.5-45

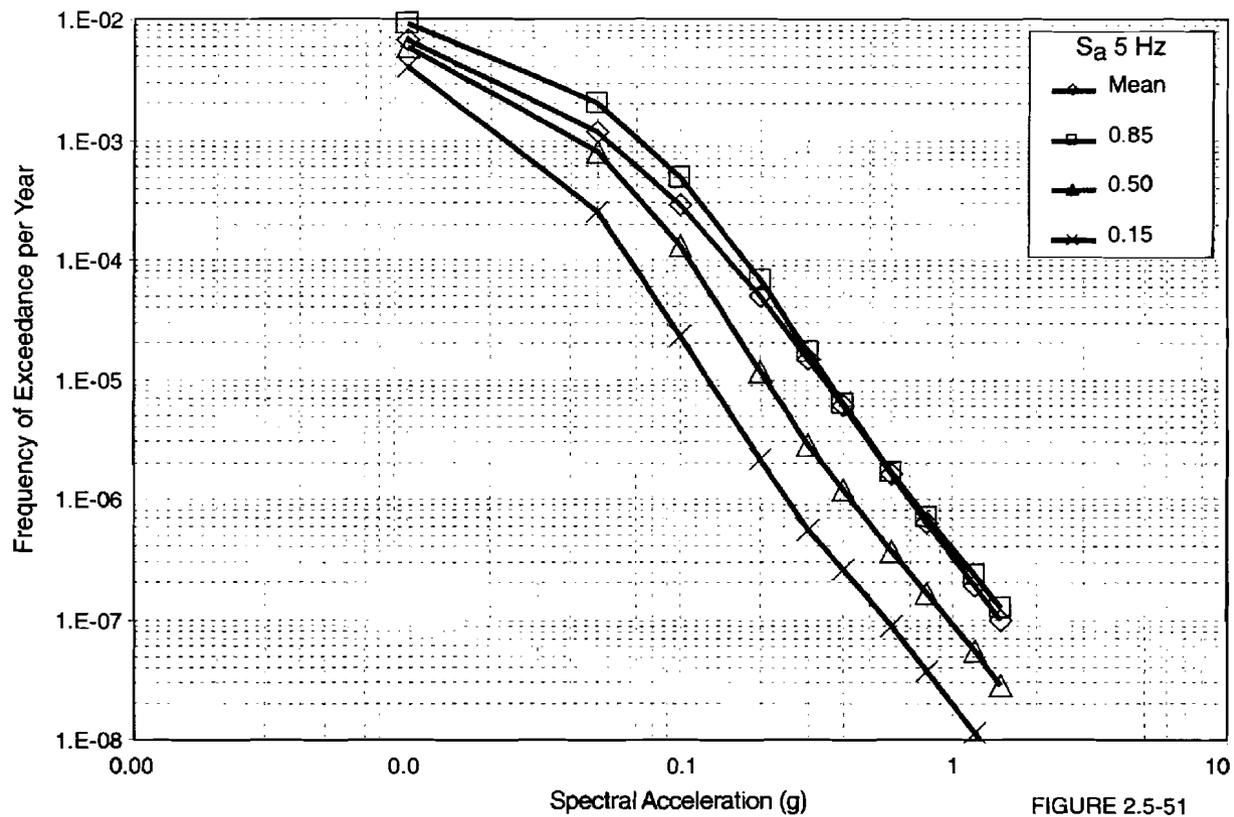
REV. 0

# Grand Gulf ESP Ground Motion Analysis





GGNS SEISMIC HAZARD RESULTS FOR  
Sa(5 Hz) FOR ROCK SITE CONDITIONS



DEAGGREGATION FOR HIGH  
 FREQUENCY ( $S_a(5-10\text{Hz})$ ) GROUND  
 MOTIONS AND AT THE GGNS ESP SITE

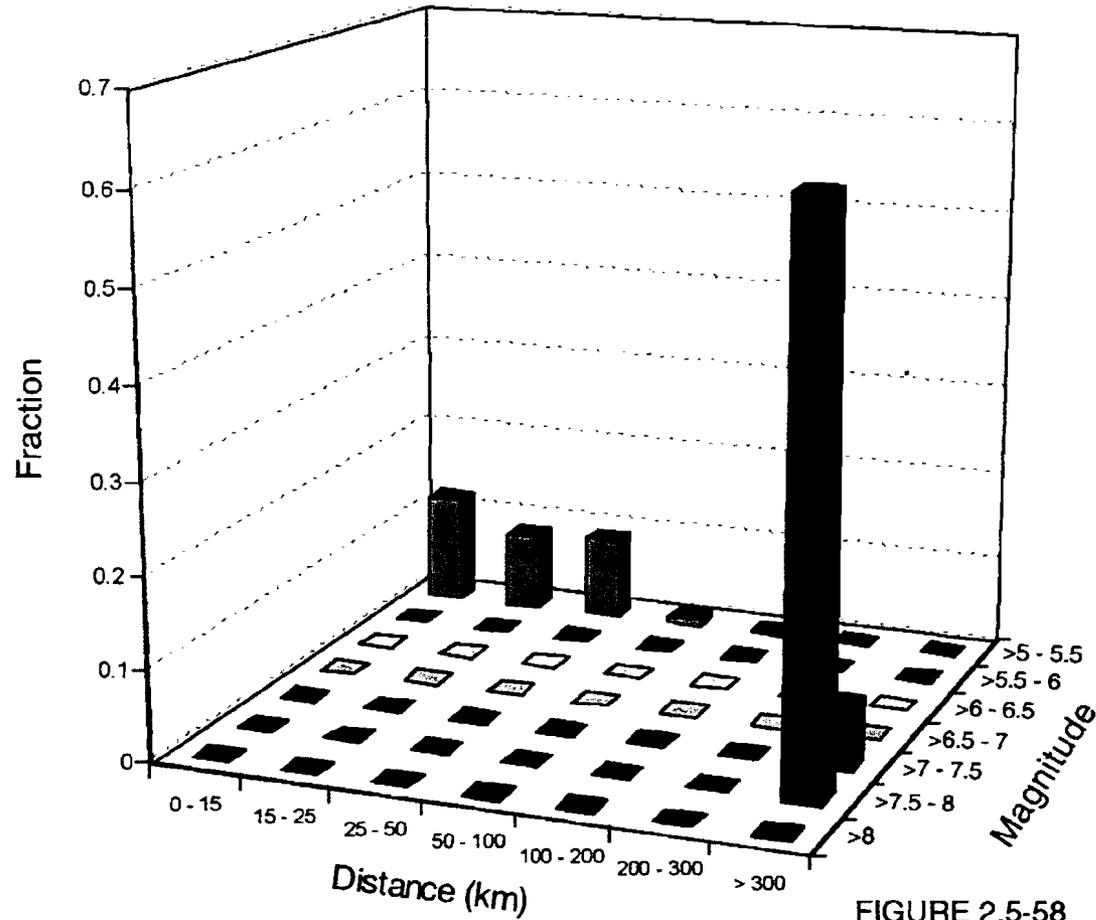


FIGURE 2.5-58

Frequency Range (Hz)	$M_C$	$D_C$
1 – 2.5 (All Distances)	7.55	386.4
1 – 2.5 (Distances > 100km only)	7.68	470.0
5 – 10	6.94	175.5

MEDIAN 10-5 APE HARD ROCK UHS  
AND CORRESPONDING SCALED 1 TO  
2 HZ AND 5 TO 10 HZ SPECTRA,  
EXTENDED TO 0.1 HZ FOR SITE  
RESPONSE ANALYSES.

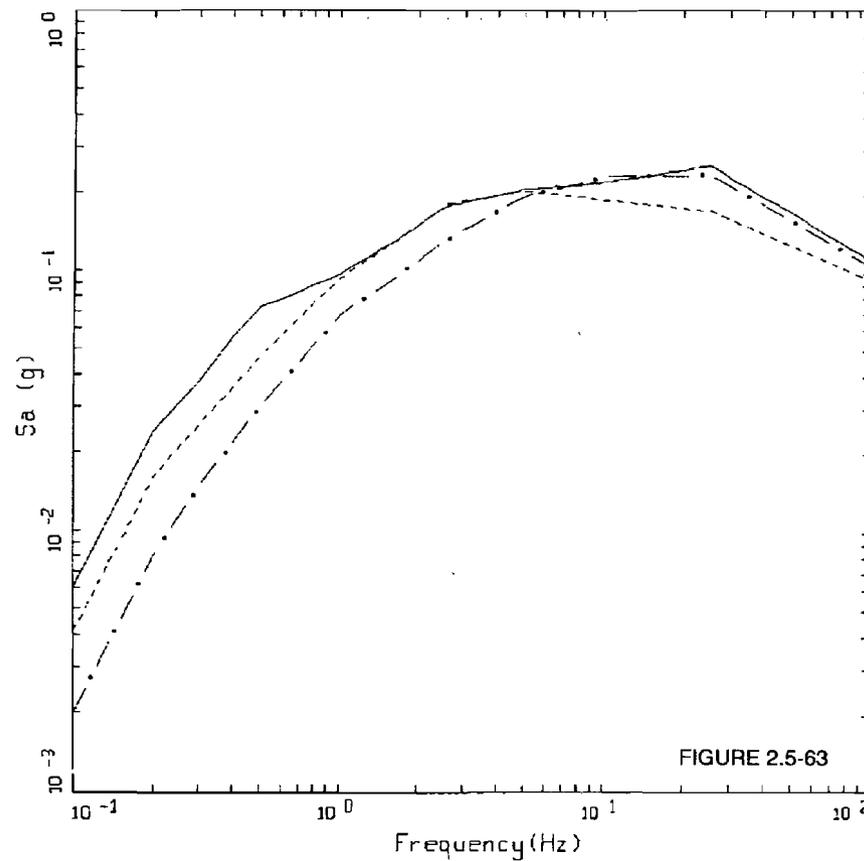
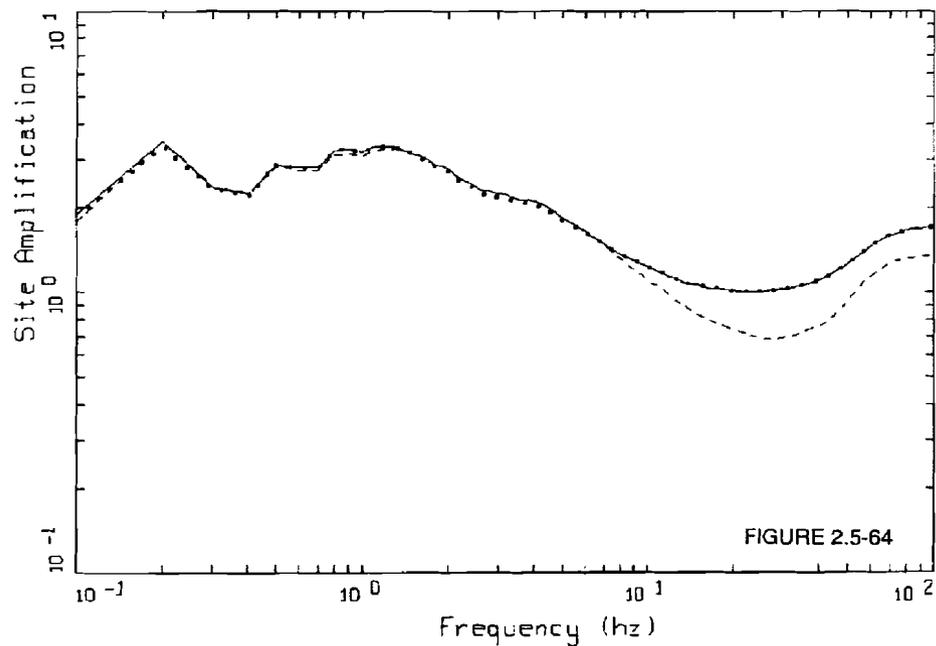


FIGURE 2.5-63

GRAND GULF ROCK MOTIONS  
HORIZONTAL, 10-5 APE

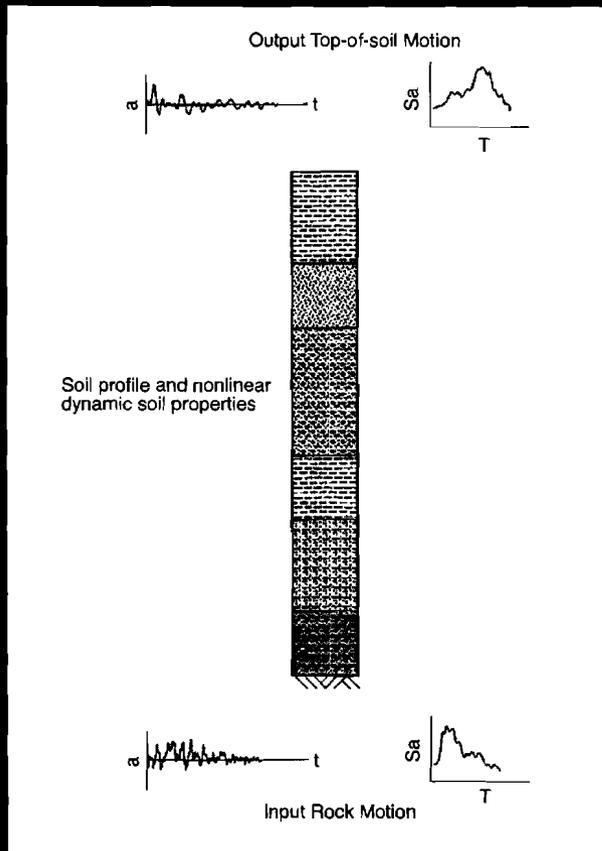
LEGEND  
—— UHS; PGA = 0.113 G  
- - - 1-2 Hz; PGA = 0.095 G  
- · - 5-10 Hz; PGA = 0.107 G

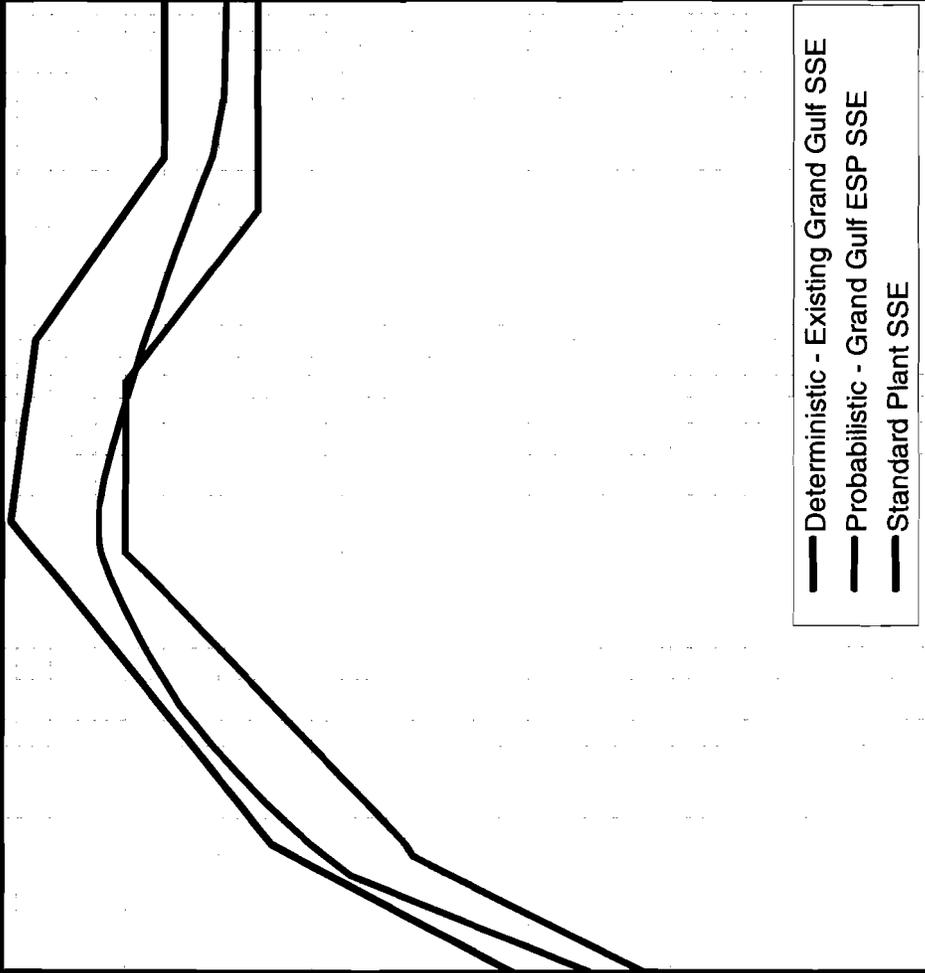
MEAN TRANSFER FUNCTIONS  
CORRESPONDING TO 1 TO 2 HZ AND 5 TO  
10 HZ SCALED SPECTRA (FIGURE 63) AND  
ENVELOP: TOP OF LOESS



TOP OF LOESS  
MEAN AMPLIFICATION

LEGEND  
 ——— ENVELOPE  
 ..... MEAN 1-2 HZ  
 - - - - MEAN 5-10 HZ







# Emergency Planning

- Application based on Major Features option (§52.17(b)(2)(i))
- Proposed location is on site supported by an integrated, operational emergency plan and organization re: GGNS Unit 1
- Full advantage taken of existing On-site and Off-site plans, alert systems, etc.



*Entergy*

## **DSEI Open Items**

- 23 Open Items
- Responses due June 21
- Status matrix attached

Item	OI No.	DSER Section	Subject	Proposed Resolution
1	2.1-1	2.1.2.3	Demonstrate that the applicant has control over the exclusion area or has a right to obtain such control.	Discussing with Staff
2	2.1-2	2.1.3.3	Include weighted transient population data in Tables 2.1-1 and 2.1-2 of the SSAR.	Weighted transient population will be included in the SSAR for distances from 10 miles out to 30 miles from the ESP site; Tables 2.1-1 and 2.1-2 of the SSAR will remain as is for "permanent" resident population data. The 0 – 10 mile transient population distribution is provided in the ESP application Part 4 EPI section, and will not be revised. The response will provide information sufficient to show compliance with Part 100 population center distance criteria and RG 4.7 population density (criteria applies, explicitly for areas out to 20 miles, as noted in DSER).
3	2.3-1	2.3.1.3	Provide acceptable 100-year return period maximum and minimum dry-bulb temperatures.	100-year return maximum and minimum temperatures will be provided in SSAR Section 2.3.2.1.2.
4	2.3-2	2.3.1.3	Provide the 48-hour probable maximum winter precipitation (PMWP) that can be used with the 100-year snowpack to define the extreme winter precipitation load site characteristics.	The SSAR will be revised to provide the 48-hour PMWP to be used with the 100-year snowpack to determine extreme winter precipitation design loads.
5	2.3-3	2.3.1.3	Identify an additional ultimate heat sink (UHS) meteorological site characteristic for use in evaluating the potential for water to freeze in the UHS water storage facility.	Response will specify the number of degree Fahrenheit-days below freezing as a site characteristic based on 72 yrs of data.
6	2.3-4	2.3.1.3	Identify a 3-second gust wind speed that represents a 100-year return period for the ESP site.	Response will specify a 3-second gust wind speed as a site characteristic.
7	2.3-5	2.3.5.3	Identify x/Q and D/Q values for the nearest milk	Atmospheric dispersion and diffusion coefficients

Item	OI No.	DSER Section	Subject	Proposed Resolution
			cow and meat cow.	for the nearest milk and meat cows will be identified in the response, and appropriate sections of the SSAR and ER will be revised.
8	2.4-1	2.4.1	Provide corrected UTM coordinates of the center of the proposed powerblock and/or revise Figure 2.1-1 in the SSAR to show the correct location and coordinates.	Corrected UTM coordinates of N3,543,261 meters and E684,018 meters will be indicated in the response, and will be shown on relevant drawings and in the text of the SSAR, ER and EPI parts of the application.
9	2.4-2	2.4.1	Provide information on the elevation (depth) of the zone that could be disturbed by the construction of the new facility, such that the local subsurface environment and its alignment with the existing hydrogeological environment could be altered.	Information to be provided; primarily a COL issue
10	2.4-3	2.4.1	Provide more details regarding dewatering wells to allow the staff to determine whether ground surface subsidence could affect safety-related structures and piping. Provide information related to the location of dewatering wells in relation to safety-related structures and associated monitoring of the ground water table.	Information to be provided; primarily a COL issue
11	2.4-4	2.4.1	Provide more details regarding the floodwater level estimation, including data and methods used to arrive at the floodwater elevation of 133.25 feet MSL.	Information will be provided
12	2.4-5	2.4.2	Revise and present estimates of the local intense precipitation as shown in Table 2.4-7 of the SSAR using the guidelines of HMR 52.	Response will provide revised local intense precipitation values for the site based on the methodology of HMR 52.
13	2.4-6	2.4.13	Provide further description of the rationale for considering Sr-90 and Cs-137 in the radionuclide transport analysis.	New analysis performed

**DSER OPEN ITEM MATRIX**

Item	OI No.	DSER Section	Subject	Proposed Resolution
14	2.4-7	2.4-13	Factors, such as soil, sediment, and rock characteristics; adsorption and retention coefficients; ground water velocity; and distances to the nearest body of surface water are important to hydrological radionuclide transport. Provide these site characteristics from onsite measurements.	Information to be provided
15	2.5-1	2.5.2	Provide justification for not updating the background seismic source for the ESP site.	Justification to be provided
16	2.5-2	2.5.2	Provide and evaluate the criteria or weights used for ranking of model clusters and the judgments involved in balancing data consistency and adherence to seismological principles in the EPRI 2003 ground motion evaluation. Explain how recordings from a single earthquake can provide well-resolved values of both crustal quality factor (Q) and site kappa, also explain why the Q value of 317 at 1 Hz is much lower than values found in other studies of eastern North American earthquakes, and why other studies find less frequency dependence of Q in the eastern North American than in the western North American.	Generic ESP issue with EPRI work. Generic response submitted on Dominion docket. Generic information will be provided.
17	2.5-3	2.5.2	Provide an explanation why the magnitude and distance bin corresponding to the SRSZ makes no contribution to the hazard deaggregation.	Explanation to be provided
18	2.5-4	2.5.2 & 2.5.4	Provide justification on applying the generic shear wave velocity profile derived from Memphis area to the ESP site and on its applying kappa value derived from ground motion observation on the Mississippi	Justification to be provided

Item	OI No.	DSER Section	Subject	Proposed Resolution
			embayment in the sensitivity test.	
19	2.5-5	2.5.4	Provide the basis for the selection of values of BE, UB, and LB and other parameters for the base case profile.	Information to be provided
20	13.3-1		Provide responses to the following issues related to State and local emergency plans:	NA
	a	13.3.3.7	Describe the communications arrangements with fixed and mobile medical support for the State of Mississippi and with mobile medical support for Claiborne County.	No new information to be provided; resolve at COL
	b	13.3.3.8	Describe the dissemination of information regarding the special needs of the handicapped to the general public in the State of Louisiana on a periodic basis.	No new information to be provided; resolve at COL
	c	13.3.3.11	Describe the means for the use of radioprotective drugs for emergency workers and institutionalized persons within the plume exposure pathway EPZ in the States of Louisiana and Mississippi whose immediate evacuation may be infeasible or very difficult.	No new information to be provided; resolve at COL
	d	13.3.3.12	Describe the State of Mississippi's guidance related to bioassay or whole body counting for determining offsite emergency worker doses from the uptake of radioactive material (e.g., ingestion)	No new information to be provided; resolve at COL
	e	13.3.3.13	Clarify the apparent inconsistencies between the LPRRP and Enclosure I to Attachment 2 to LPRRP Supplement II regarding the description of contacts and arrangements for local and backup hospital services.	No new information to be provided; resolve at COL
	f	13.3.3.13	Describe the special radiological capabilities for	No new information to be provided; resolve at COL

Item	OI No.	DSER Section	Subject	Proposed Resolution
			the hospitals listed in Tab 2 of LPRRP Chapter 10.	
	g	13.3.3.11	Provide information regarding the availability and capacity of school buses or other transportation methods, the availability of drivers, and the process for mobilizing transportation for students, residents, transients, and special needs populations in Claiborne County and Tensas Parish during an evacuation (e.g., evacuations may require a single trip or they may require return trips).	No new information to be provided; resolve at COL
	h	13.3.3.11	Provide a map(s) illustrating evacuation/shelter areas in the State of Mississippi for the MREPP Annex O.	No new information to be provided; resolve at COL
	i	13.3.3.11	Information on shelter capacities is not contained in, and therefore, not evaluated by FEMA under the LPRRP. Provide sheltering capacities for relocation centers in the State of Louisiana or documentation of evaluation performed to determine whether adequate capacity exists.	No new information to be provided; resolve at COL
21	13.3-2	13.3.3.8	Describe in Part 4 the applicant's responsibility for making information available to offsite authorities for distribution consistent with MREPP Annex J.	No new information to be provided; resolve at COL
22	13.3-3	13.3.3.9	Describe the adequacy of the TSC, OSC, and EOF and related equipment used to support emergency response activities, to address, with specificity, such facility and equipment features as location, size, structure, habitability, communications, staffing and training, radiation	No new information to be provided; resolve at COL

## DSER OPEN ITEM MATRIX

Item	OI No.	DSER Section	Subject	Proposed Resolution
			monitoring, instrumentation, data system equipment, power supplies, technical data and data systems, and record availability and management.	
23	13.3-4	13.3.3.11	Address whether discussions on results of the 2003 ETE study were held with officials from the States of Mississippi and Louisiana involved in implementing traffic management plans, according to Appendix 4 to NUREG-0654/FEMA-REP-1 and NUREG/CR-4831, or provide confirmation that State reviews were not required based on discussions with appropriate officials.	No new information to be provided; resolve at COL