AGENDA
EARLY SITE PERMIT (ESP) MEETING WITH NUCLEAR ENERGY INSTITUTE (NEI)
ROOM T-9-A1

OCTOBER 16, 2002

10:30 a.m.	Introductory Comments		NRC / NEI
10:40 a.m.	Follow-up Items from September 25 Meeting		
	• ESP-1	ESP Application Template	NRC
	• ESP-5	Mechanism for Documenting resolution of ESP Issues	NEI/ESP Applicants
	• ESP-10	Use of relevant findings from 10 CFR Part 51, Subpart A, Appendix B (License Renewal GEIS) in an ESP Application	NEI/ESP Applicants
11:50 a.m.	Opportunity for public comment		
12:00 Noon	Lunch		
1:00 p.m.	Seismic Demonstration Project		NRC/NEI/ESP Applicants
3:50 p.m.	Opportunity for public comment		
4:00 p.m.	Adjourn		

OCTOBER 17, 2002

9:00 a.m.	ESP-6: Bounding Plant Parameter Approach ESP-7: 10 CFR 52.17 Requirements	NRC/NEI/ESP Applicants
11:50 a.m.	Opportunity for public comment	
12:00 Noon	Lunch	
1:00 p.m.	ESP-3: QA requirements of ESP information ESP-4: Nominal NRC review timeline	NEI/ESP Applicants NRC
2:30 p.m.	Opportunity for public comment	
2:40 p.m.	Follow-up Items from September 25 Meeting	NRC/NEI/ESP Applicants
3:00 p.m.	Topics for next meeting	
3:30 p.m.	Summary	
4:00 p.m.	Adjourn	

NRC Escorting Requirements

Code Yellow

- Visitors MUST be escorted at all times except on lobby level
- If you leave this room for ANY reason, you must have an NRC employee with you
- We appreciate your cooperation

MECHANISM FOR RESOLUTION OF ESP ISSUES

	Project No. 689		Project Nos. 720/719/718		
NEI/ ESP Applicant	Generic Meetings	NEI Letter	Applicant Meetings		
			Submittals		
NRC Staff	Generic Meetings	Staff Letter	Site Visits	*Inspections	Staff Reports
			Trip Reports	Requests for Information (RAIs)	
OUTCOMES					
	INFORM/ OBTAIN FEEDBACK	GENERIC ISSUE RESOLUTION	(PRE) APPLICATION REVIEW DISPOSITION		

Steps for Issue Resolution

1- Define Problem
2- Discuss the Problem and Implications on Parties Involved
3- Discuss Alternatives
4- Discuss Implementation of Proposed Approach
5- NEI/ Applicant submit proposed resolution
6- Staff issue final position

* IF APPLICABLE

ESP Topics Current Activity

Number	*Title*	*Status*	*Lead*	*Next Action*
1	ESP application templates	DO	NRC	Staff to discuss review standard
2	ESP Inspection Guidance	NFD	NRC	Preapplication activities underway
3	QA requirements of ESP information	DO	NRC	QA plan submittals to be reviewed by staff / NEI to pose additional question
4	Nominal NRC review timeline	DO	NRC	
5	Mechanism for documenting resolution of ESP issues	NFD	NRC	NEI letter submitted 8/10/02
6	Use of bounding plant parameter envelope (PPE) approach	DO	NEI	
7	Guidance for satisfying 52.17(a)(1) requirement for description and safety assessment of the facility	DO	NEI	
8	Use of bounding approach for providing fuel cycle and transportation information required by NEPA (Tables S-3 and S-4)	DO	NEI	
9	Criteria for assuring control of the site by the ESP holder	TBD	NEI	
10	Use of relevant findings from 10 CFR Part 51, Subpart A, Appendix B (License Renewal) in an ESP application	DO	NEI	
11	Criteria for determining the initial duration of an ESP (10 - 20 years)	TBD	NEI	
12	Guidance for NEPA requirement to evaluate severe accident mitigation alternatives	HOLD	NRC	Dependent on disposition of ESP 6
13	Guidance for seismic evaluations required by 10 CFR Part 50, Appendix S	DO	NEI	Seismic Demonstration Project in progress
14	Applicability of Federal requirements to evaluate Environmental Justice	TBD	NEI	
15	The site redress plan	TBD	NEI	

Number	Title	Status	Lead	Next Action
16	Guidance for approval of "complete" emergency plans	TBD	NEI	
17	Duplicative reviews (PRM-52-1)	HOLD		Pending petition disposition
18	Review of alternatives (PRM-52-2)	HOLD		Pending petition disposition
19	Addressing effects of potential new units at an existing site. a) Impacts due to operations of new units, b) Impacts due to construction of new units	TBD	NEI	
20	Practical use of existing site/facility information: a) Incorporation in ESP applications, b) Implications for NRC reviews	DO	NEI	
21	Understanding the interface of ESP with the COL process	TBD	NEI	
22	Form and content of an ESP	TBD	NEI	NEI draft provided 8/22/02

Comparison Between Preliminary Determination of NRC Guidance Applicable to Review of Early Site Permit Applications and Nuclear Energy Institute Standard Table of Contents for Early Site Permit Applications (draft dated 7/10/02)

Site Safety Analysis Report

Primary Source of Review Guidance: NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants" (1981)

NRC Area of Review	SRP Section	NEI TOC Section	NRC Comment / Other applicable guidance
Introduction	--	1.1	Reg Guide 1.70 sec. 1.1
General Plant Description	--	1.2	Reg Guide 1.70 sec. 1.2; site description and general plant design information
Plant Parameter Envelope Approach	--	1.3	Plant parameter envelope approach under NRC/NEI discussion
Identification of Agents and Contractors	--	--	Reg Guide 1.70 sec. 1.4 (limited to discussion of agents and contractors related to ESP work and document)
Conformance with Regulatory Requirements and Standards	--	1.4	Similar to Reg Guide 1.70 sec. 1.8 (below)
Material Incorporated by Reference	--	--	Reg Guide 1.70 sec. 1.6; references to tests and analyses applicable to site
Drawings and Other Detailed Information	--	--	Reg Guide 1.70 sec. 1.7; site-related information only
Conformance to NRC Regulatory Guides	--	--	Reg Guide 1.70 sec. 1.8; site-related Reg Guides only
Site Location and Description	2.1.1	2.1.1	Reg Guide 1.70
Exclusion Area Authority and Control	2.1.2	2.1.2	Reg Guide 1.70
Population Distribution	2.1.3	2.1.3	Reg Guide 1.70

NRC Area of Review	SRP Section	NEI TOC Section	NRC Comment / Other applicable guidance
Identification of Potential Hazards in Site Vicinity	2.2.1 2.2.2	2.2.1 2.2.2	Reg Guide 1.70
Evaluation of Potential Accidents	2.2.3	2.2.3	Reg Guide 1.70
Regional Climatology	2.3.1	2.3.1	Reg Guide 1.70
Local Meteorology	2.3 2	2.3.2	Reg Guide 1.70
Onsite Meteorological Measurements Programs	2.3.3	2.3.3	Reg Guide 1.70
Short-term Dispersion Estimates for Accidental Atmospheric Releases	2.3 4	2.3.4	Reg Guide 1.70
Long-Term Diffusion Estimates	2.3.5	2.3.5	Reg Guide 1.70
Hydrologic Description	2.4.1	2.4.1	Reg Guide 1.70
Floods	2.4.2	2.4.2	Reg Guide 1.70
Probable Maximum Flood (PMF) on Streams and Rivers	2.4.3	2.4.3	Reg Guide 1.70
Potential Dam Failures	2.4.4	2.4.4	Reg Guide 1.70
Probable Maximum Surge and Seiche Flooding	2.4.5	2.4.5	Reg Guide 1.70
Probable Maximum Tsunami Flooding	2.4.6	2.4.6	Reg Guide 1.70
Ice Effects	2.4.7	2.4.7	Reg Guide 1.70
Cooling Water Canals and Reservoirs	2.4.8	2.4.8	Reg Guide 1.70
Channel Diversions	2.4.9	2.4.9	Reg Guide 1.70
Flooding Protection Requirements	2.4.10	2.4.10	Reg Guide 1.70
Cooling Water Supply (Low Water Considerations)	2.4.11	2.4.11	Reg Guide 1.70
Groundwater	2.4.12	2.4.12	Reg Guide 1.70 sec. 2.4.13

NRC Area of Review	SRP Section	NEI TOC Section	NRC Comment / Other applicable guidance
Accidental Releases of Liquid Effluents in Ground and Surface Waters	2.4.13	2.4.13	Reg Guide 1.70 sec. 2.4.12
Basic Geologic and Seismic Information	2.5.1	2.5.1	Reg Guide 1.70
Vibratory Ground Motion	2.5.2	2.5.2	Reg Guide 1.70
Surface Faulting	2.5.3	2.5.3	Reg Guide 1.70
Stability of Subsurface Materials and Foundations	2.5.4	2.5.4	Reg Guide 1.70
Stability of Slopes	2.5.5	2.5.5	Reg Guide 1.70
Embankments and Dams	--	2.5.6	No SRP section; Reg Guide 1.70
Flood Protection	3.4.1	(2.4.10)	SRP section requires obtaining site information needed to evaluate SSCs; could be addressed in section 2.4.10 of safety assessment.
Missiles Generated by Natural Phenomena	3.5.1.4	(2.3.2)	Reg Guide 1.70. 10 CFR 100.10 indicates that the site location, in conjunction with other considerations (such as plant design, construction, and operation), should ensure a low risk of public exposure. Need to evaluate contribution of site at ESP stage. Could be addressed in section 2.3.2 of safety assessment.
Site Proximity Missiles (Except Aircraft)	3.5.1.5	(2.2.3)	Reg Guide 1.70. 10 CFR 100.10 indicates that the site location, in conjunction with other considerations (such as plant design, construction, and operation), should ensure a low risk of public exposure. Need to evaluate contribution of site at ESP stage. Could be addressed in section 2.2.3 of safety assessment.
Aircraft Hazards	3.5.1.6	(2.2.3)	Reg Guide 1.70. 10 CFR 100.10 indicates that the site location, in conjunction with other considerations (such as plant design, construction, and operation), should ensure a low risk of public exposure. Need to evaluate contribution of site at ESP stage. Could be addressed in section 2.2.3 of safety assessment and/or in accident analysis.

NRC Area of Review	SRP Section	NEI TOC Section	NRC Comment / Other applicable guidance
Ultimate Heat Sink	9.2.5	(2.4.11)	Reg Guide 1.70. 10 CFR 100.10 indicates that the site location, in conjunction with other considerations (such as plant design, construction, and operation), should ensure a low risk of public exposure. Need to evaluate contribution of site at ESP stage. Could be addressed in section 2.4.11 of safety assessment.
Ensuring that Occupational Radiation Exposures Are As Low As Is Reasonably Achievable	12.1	--	Reg Guide 1.70. Applies only in cases where new reactor adjacent to existing reactor, and focuses solely on protection of workers at new reactor
Radiation Protection Design Features and Dose Assessment	12.3 12.4	--	Reg Guide 1.70 secs. 12.3 and 12.4. For ESP, only dose assessment aspects apply, and then only in cases where new reactor adjacent to existing reactor, and focuses solely on protection of workers at new reactor
Health Physics Program	12.5	--	Reg Guide 1.70. Applies only in cases where new reactor adjacent to existing reactor, and focuses solely on protection of workers at new reactor
Emergency Planning	13.3	Part 4	Reg Guides 1.70 and 1.101
Physical Security	13.6	--	Required by 10 CFR 100.21(f) to determine that site characteristics are such that adequate security plans and measures can be developed
Radiological Consequence Analyses Using Alternative Source Terms	15.0.1	--	Accident analysis required by 10 CFR 52.17(a)(1), 50.34(a)(1), and 100.21(c)(2).
Quality Assurance During the Design and Construction Phases	17.1	Plan 1	Reg Guide 1.70

Comparison Between Preliminary Determination of NRC Guidance Applicable to Review of Early Site Permit Applications and Nuclear Energy Institute Standard Table of Contents for Early Site Permit Applications (draft dated 7/10/02)

Environmental Report

Primary Source of Review Guidance: NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants" (1999)

Area of Review	SRP Section	Corresponding NEI TOC Section	NRC Comment / Other Applicable Guidance
Introduction to the Environmental Impact Statement	1.0	1.0	
The Proposed Project	1.1	1.1	
Status of Reviews, Approvals, and Consultations	1.2	1.2	
Environmental Description	2.0	2.0	
Station Location	2.1	2.1	
Land	2.2	2.2	
The Site and Vicinity	2.2.1	2.2.1	
Transmission Corridors and Offsite Areas	2.2.2	2.2.2	
The Region	2.2.3	2.2.3	
Water	2.3	2.3	
Hydrology	2.3.1	2.3.1	
Water Use	2.3.2	2.3.2	
Water Quality	2.3.3	2.3.3	
Ecology	2.4	2.4	

Area of Review	SRP Section	Corresponding NEI TOC Section	NRC Comment / Other Applicable Guidance
Terrestrial Ecology	2.4.1	2.4.1	
Aquatic Ecology	2.4.2	2.4.2	
Socioeconomics	2.5	2.5	
Demography	2.5.1	2.5.1	
Community Characteristics	2.5.2	2.5.2	
Historic Properties	2.5.3	2.5.3	
Environmental Justice	2.5.4	2.5.4	
Geology	2.6	2.6	
Meteorology and Air Quality	2.7	2.7	
Related Federal Project Activities	2.8	2.8	
Plant Description	3.0	3.0	
External Appearance and Plant Layout	3.1	3.1	
Reactor Power Conversion System	3.2	3.2	
Plant Water Use	3.3	3.3	
Water Consumption	3.3.1	3.3.1	
Water Treatment	3.3.2	3.3.2	
Cooling System	3.4	3.4	
Description and Operational Modes	3.4.1	3.4.1	
Component Descriptions	3.4.2	3.4.2	
Radioactive Waste Management System	3.5	3.5	

Area of Review	SRP Section	Corresponding NEI TOC Section	NRC Comment / Other Applicable Guidance
Nonradioactive Waste Systems	3.6	3.6	
Effluents Containing Chemicals or Biocides	3.6.1	3.6.1	
Sanitary System Effluents	3.6.2	3.6.2	
Other Effluents	3.6.3	3.6.3	
Power Transmission Systems	3.7	3.7	
Transportation of Radioactive Materials	3.8	3.8	
Environment Impacts of Construction	4.0	4.0	
Land-Use Impacts	4.1	4.1	
The Site and Vicinity	4.1.1	4.1.1	
Transmission Corridors and Offsite Areas	4.1.2	4.1.2	
Historic Properties	4.1.3	4.1.3	
Water-Related Impacts	4 2	4.2	
Hydrologic Alterations	4.2.1	4.2.1	
Water-Use Impacts	4.2.2	4.2.2	
Ecological Impacts	4.3	4.3	
Terrestrial Ecosystems	4.3.1	4.3.1	
Aquatic Ecosystems	4.3.2	4.3.2	
Socioeconomic Impacts	4.4	4.4	
Physical Impacts	4.4.1	4.4.1	
Social and Economic Impacts	4.4.2	4.4.2	

Area of Review	SRP Section	Corresponding NEI TOC Section	NRC Comment / Other Applicable Guidance
Environmental Justice Impacts	4.4.3	4.4.3	
Radiation Exposure to Construction Workers	4.5	4.5	
Measures and Controls to Limit Adverse Impacts During Construction	4.6	4.6	
Environment Impacts of Station Operation	5.0	5.0	
Land-Use Impacts	5.1	5.1	
The Site and Vicinity	5.1.1	5.1.1	
Transmission Corridors and Offsite Areas	5.1.2	5.1.2	
Historic Properties	5.1.3	5.1.3	
Water-Related Impacts	5.2	5.2	
Hydrologic Alterations and Plant Water Supply	5.2.1	5.2.1	
Water-Use Impacts	5.2.2	5.2.2	
Cooling System Impacts	5.3	5.3	
Intake System	5.3.1	5.3.1	
Hydrodynamic Descriptions and Physical Impacts	5.3.1.1	5.3.1.1	
Aquatic Ecosystems	5.3.1.2	5.3.1.2	
Discharge System	5.3.2	5.3.2	
Thermal Description and Physical Impacts	5.3.2.1	5.3.2.1	
Aquatic Ecosystems	5.3.2.2	5.3.2.2	
Heat Discharge System	5.3.3	5.3.3	
Heat Dissipation to the Atmosphere	5.3.3.1	5.3.3.1	

Area of Review	SRP Section	Corresponding NEI TOC Section	NRC Comment / Other Applicable Guidance
Terrestrial Ecosystems	5.3.3.2	5.3.3.2	
Impacts to Man	5.3.4	5.3.4	
Radiological Impacts of Normal Operation	5.4	5.4	
Exposure Pathways	5.4.1	5.4.1	
Radiation Does to Members of the Public	5.4.2	5.4.2	
Impacts to Man	5.4.3	5.4.3	
Impacts to Biota Other than Members of the Public	5.4.4	5.4.4	
Environmental Impacts of Waste	5.5	5.5	
Nonradioactive Waste System Impacts	5.5.1	5.5.1	
Mixed Waste Impacts	5.5.2	5.5.2	
Transmission System Impacts	5.6	5.6	
Terrestrial Ecosystems	5.6.1	5.6.1	
Aquatic Ecosystems	5.6.2	5.6.2	
Impacts to Man	5.6.3	5.6.3	
Uranium Fuel Cycle Impacts	5.7	5.7	
Socioeconomic Impacts	5.8	5.8	
Physical Impacts of Station Operation	5.8.1	5.8.1	
Social and Economic Impacts of Station Operation	5.8.2	5.8.2	
Environmental Justice Impacts	5.8.3	5.8.3	
Decommissioning	5.9	5.9	

Area of Review	SRP Section	Corresponding NEI TOC Section	NRC Comment / Other Applicable Guidance
Measures and Controls to Limit Adverse Impacts During Operation	5.10	5.10	
Environmental Measurements and Monitoring Programs	6.0	6.0	
Thermal Monitoring	6.1	6.1	
Radiological Monitoring	6.2	6.2	
Hydrological Monitoring	6.3	6.3	
Meteorological Monitoring	6.4	6.4	
Ecological Monitoring	6.5	6.5	
Terrestrial Ecology and Land Use	6.5.1	6.5.1	
Aquatic Ecology	6.5.2	6.5.2	
Chemical Monitoring	6.6	6.6	
Summary of Monitoring Programs	6.7	6.7	
Environmental Impacts of Postulated Accidents Involving Radioactive Materials	7.0	7.0	
Design Basis Accidents	7.1	7.1	
Severe Accidents	7.2	7.2	
Severe Accident Design Alternatives	7.3	7.3	
Transportation Accidents	7.4	7.4	
Need for Power	--	8.0	Consideration of need for power excluded by 10 CFR 52.17for ESP Environmental Report
Alternatives to the Proposed Action	9.0	9.0	
No-Action Alternatives	9.1	9.1	

Area of Review	SRP Section	Corresponding NEI TOC Section	NRC Comment / Other Applicable Guidance
Energy Alternatives	9.2	9.2	
Alternatives Not Requiring New Generating Capacity	9.2.1	9.2.1	
Alternatives Requiring New Generating Capacity	9.2.2	9.2.2	
Assessment of Alternative Energy Sources and Systems	9.2.3	9.2.3	
Alternative Sites	9.3	9.3	
Alternative Plant and Transmission Systems	9.4	9.4	
Heat Dissipation Systems	9.4.1	9.4.1	
Circulating Water Systems	9.4.2	9.4.2	
Transmission Systems	9.4.3	9.4.3	
Environmental Consequences of the Proposed Action	10.0	10.0	
Unavoidable Adverse Environmental Impacts	10.1	10.1	
Irreversible and Irretrievable Commitments of Resources	10.2	10.2	
Relationship Between Short-Term Uses and Long-Term Productivity of the Human Environment	10.3	10.3	
Benefit-Cost Balance	--	10.4	Need for assessment of benefits excluded by 10 CFR 52.17(a)(2)
Benefits	--	10.4.1	Need for assessment of benefits excluded by 10 CFR 52.17(a)(2)
Costs	--	10.4.2	Need for assessment of benefits excluded by 10 CFR 52.17(a)(2)
Summary	10.4.3	10.4.3	Consideration of benefits excluded by 10 CFR 52.17(a)(2). Only aspects of section supporting overall summary are applicable.

Feedback on Presentations at
September 25, 2002 Meeting

Comments on ESP-10, Using Applicable Information from the GEIS

During the September 25, 2002 meeting, NEI provided 3 examples of ways to use applicable information identified in NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants," (GEIS) in an early site permit (ESP) application, and requested feedback on their presentation.

The staff has always stated that relevant information with proper justification can be incorporated by reference. However, although insights in the GEIS may be meaningful, they may not be directly applicable to the specific application. The GEIS presents the technical bases that were considered to assess the potential operational and refurbishment impacts on the environment for license renewal actions on currently operating facilities. An ESP applicant must consider that the GEIS was developed with a specific goal in mind: to consider the approximately 100 identified potential environmental impacts of 118 specific reactor designs at specific locations. Therefore, the conclusions reached in GEIS may not necessarily apply to a new design.

There are several considerations that an ESP applicant should consider when referencing the GEIS in its applications. The following is a list of some of the key matters concerning this issue, although this list is not intended to be all inclusive:

- The issues identified in the GEIS can be used to identify potential operational issues of new facilities, but may not be a complete list of operational issues for new facilities or sites. In addition, the GEIS does not include an assessment of the environmental impacts of constructing a nuclear power plant.

- Although the ESP may be on the same footprint as another currently operating plant, the prospective plant design is not one of the 118 considered in the GEIS. Therefore, the environmental impact of the prospective facility may not be the same as the operating plant currently on the site.

- The applicant and staff must look for opportunities for mitigation of environmental impacts of the new facility. The cost-benefit analysis for an operating plant that is already designed, constructed, and operating is a lot different than that for a plant still under design.

- Culmulative impacts must be considered in the application.

- The applicant will be required to address how new information that has been identified since the GEIS was developed in 1996 changes the applicability of the information and analysis presented in that document. The GEIS is being updated, with a planned completion date in 2005, to support the planned update of Table B-1 of 10 CFR Part 51.

In summary, if the applicant finds useful information in the GEIS or any other technical report, then it should outline its rationale and demonstrate its applicability to the application. If it intends to use information in the GEIS, the applicant should address the applicable matters identified above.

ESP Issue #13
Topics for Meeting with NEI on 10/16/02

- Describe the extent of the geological, seismological, and geophysical investigations to characterize seismic sources surrounding the site (Appendix D, RG 1.165).

- Considering the stipulation in Appendix E of RG 1.165 that "major recomputations of the LLNL and EPRI data base are planned periodically (approximately every ten years), or when there is an important new finding or occurrence," and in consideration of the recent 2002 USGS PSHA results, describe the criteria that will be used to determine whether an update of the EPRI (1986) PSHA is warranted for the following inputs:

    - seismic source configurations or boundaries
    - seismic source maximum magnitudes
    - seismic source recurrence rates
    - ground motion attenuation relationships

- Describe procedures for determining the site SSE both for rock and non-rock sites once the controlling earthquakes have been determined using Appendix C of RG 1.165.

NEI

ESP Issue # 13
Seismic Demonstration Project

Nuclear Energy Institute
Early Site Permit Task Force

Presentation to the

U. S. Nuclear Regulatory Commission

October 16, 2002

NEI

Agenda

- Objective
- Topic 1 - Implementation of RG 1.165 - Clinton Example
- Topic 2 - EPRI CEUS Ground Motion Project
- Discussion
- Future Meetings

NEI

Objective

- To brief NRC Staff on approach being taken for seismic assessments
- To reach a consensus with NRC Staff on how RG 1.165 should be interpreted for ESP applications

NEI

Topic 1 - Implementation of RG 1.165 - Clinton Example

Robert R. Youngs

NEI – NRC Meeting

Rockville, MD

October 16, 2002

NEI

Topic 1 Overview

- Review of regulatory requirements
- Summary of EPRI/SOG model for Clinton
- Compilation and evaluation of new data
- Approach for assessing significance of new data
- Approach for developing SSE Spectra

NEI

Summary of Regulatory Requirements

- Applicable Regulations
- Implementation Guidelines
- Integrated Decision Process

NEI

Applicable Regulations

- 10 CFR 100.23 - *Geologic and Seismic Siting Criteria* - applies for ESP applications
  - PSHA is an acceptable basis for determining the design basis ground motion for a site
- 10 CFR Part 50, Appendix S – *Earthquake Engineering Criteria for Nuclear Power Plants* - applies for ESP applications
  - Design basis ground motion is for free-field conditions at the ground surface
  - Applicant may determine the appropriate OBE level

NEI

Implementation Guidance

- Principal guidance for implementation of Part 100.23 requirements for determining design basis ground motions for a site is contained in RG 1 165
- Additional guidance on approaches for assessing hazard-consistent ground motions at a site is contained in NUREG/CR-6728 and NUREG/CR-6769

NEI

Integrated Decision Process for Developing Ground Motions

- Basic Understandings:
  - Median hazard is accepted for determining design basis ground motion at a site
  - Existing EPRI/SOG seismic sources and source parameters are accepted as starting basis for assessing design basis ground motion for site in Central and Eastern United States (CEUS)
    - (per RG 1.165 and NRC's approval letter for EPRI methodology, data, and results)
  - An up-to-date site-specific geological, seismological, and geophysical investigation must be performed

NEI

Integrated Decision Process (Cont'd)

- Basic Understandings - continued:
  - The acceptability of existing EPRI/SOG probabilistic seismic hazard (PSHA) results evaluated as described in RG 1.165 (Appendix C.3), considering current relevant data
- Objectives of Geology, Seismic and Earthquake Engineering:
  - Provide sufficient information necessary to define the seismic characteristics in an ESP

NEI

Specific Guidance for ESP

- Regulatory Guide (RG) 1.165:
  - Published in March 1997
  - Addresses uncertainties in determining seismic design ground motion for a plant
    - Geological, seismologic, geophysical, and geotechnical investigations
  - Probabilistic approach

NEI

Seismic Process for Site with Existing Facility

- Utilize as much existing data as possible
  - Use the existing facility Updated Final Safety Analysis Report (UFSAR) as the starting point
    - Bring the geologic and seismic information in UFSAR up to date
    - Update information in conformance with new regulations (e g , 10 CFR 100 23) and utilize new guidance (e g , RGs 1.165 & 1.132, DG-1101)
- Seismic source interpretations from EPRI/SOG are an acceptable starting basis for site-specific analysis

NEI

Ground Motion Characteristics

- Median reference probability (10^{-5} per year)
- Motions computed for rock
- Site-specific soil effects used to determine SSE

NEI

General Approach for ESP

- Focus of study:
  - Seismic hazard studies
    - Assess appropriate SSE ground motions and potential for surface rupture
  - Geotechnical investigations
    - Assess appropriate site amplification models and site dynamic stability

NEI

Seismic Hazard Evaluation

- Starting Point - Use EPRI/SOG PSHA Database
  - Accepted by US NRC as an appropriate seismic hazard methodology and database
  - Provides well documented set of seismic hazard input interpretations

NEI

Example Application for the Clinton ESP

NEI

Summary of EPRI/SOG Seismic Hazard Model for Clinton

- Seismic Sources
- Maximum Magnitudes
- Earthquake Recurrence
- Ground Motion Models

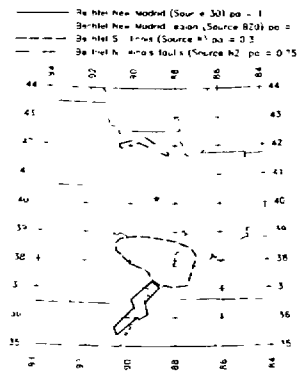
NEI

EPRI/SOG Seismic Sources

- New Madrid Seismic Source Zone
- Surrounding Reelfoot Rift Zone
- Wabash Valley Zone
- St Louis Arm Zone
- Central Illinois / Background
- Northern Illinois Source

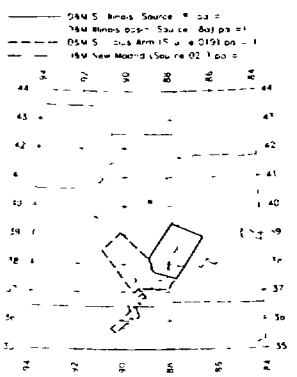
NEI

Controlling EPRI/SOG Seismic Sources



Background source included

Bechtel Team



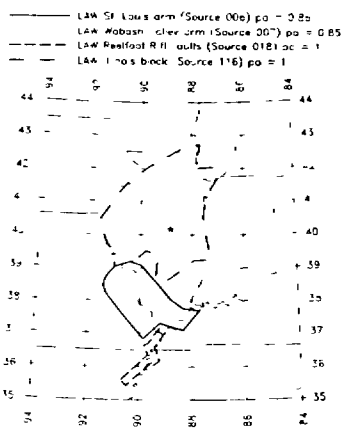
Dames & Moore Team

October 16 2002

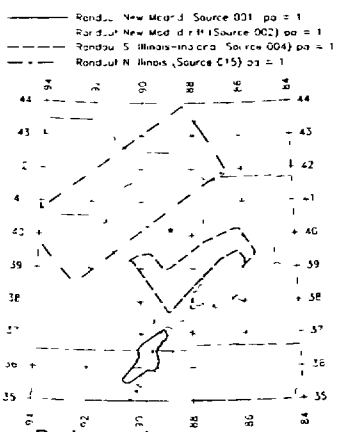
19

NEI

Controlling EPRI/SOG Seismic Sources



Law Team



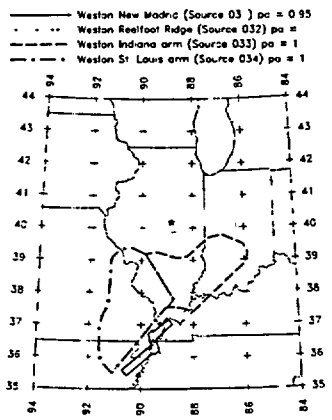
Background source included

Rondout Team

October 16 2002

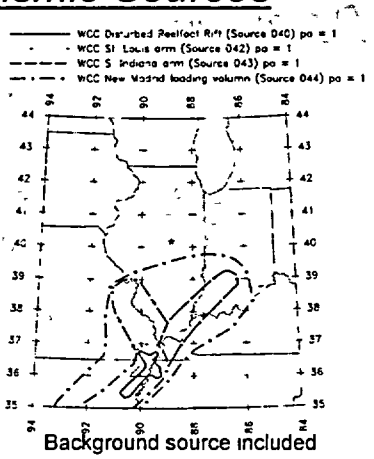
20

Controlling EPRI/SOG Seismic Sources



Background source included

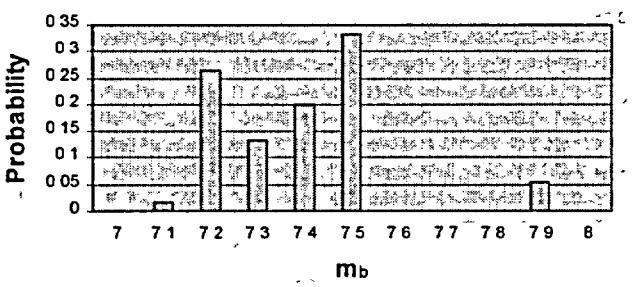
Weston Team



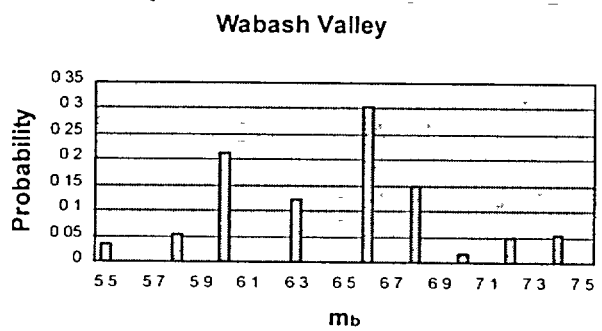
Background source included

Woodward-Clyde Team

Composite EPRI/SOG Maximum Magnitude Distribution



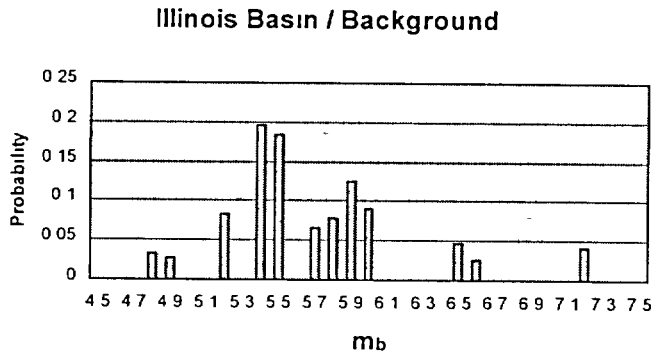
Composite EPRI/SOG Maximum Magnitude Distribution



October 16 2002

23

Composite EPRI/SOG Maximum Magnitude Distribution



October 16 2002

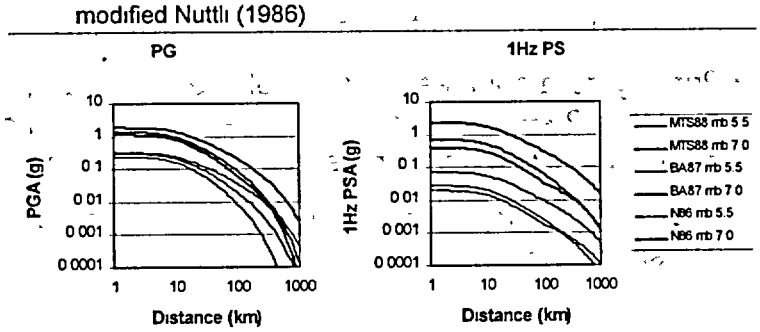
24

EPRI/SOG Earthquake Recurrence Parameters

- Detailed review of catalog for time period 1568-1985
- Uniform magnitude scale - m_b
- Spatial-varying recurrence parameters in 1°×1° cells within sources

EPRI/SOG Ground Motion Models

- Three attenuation models
  - McGuire, Toro, and Silva (1988), Boore and Atkinson (1987), and modified Nuttli (1986)



NEI

Compilation and Evaluation of New Data for Clinton ESP

- Seismicity catalog
- Geological and Geophysical Data
- Field Investigations
  - Paleo-seismic
  - Geotechnical

NEI

Update Seismic Hazard Database

(Regulatory Position 1 of RG-1.165)

- Follow guidance in RG-1.165 Appendix D for types of data needed
- Focus on data and interpretations post-EPRI/SOG
- Primary data sources will be published literature, available PSHA studies for important facilities, and discussions with active researchers in the region
- Newly identified features may require more detailed investigations

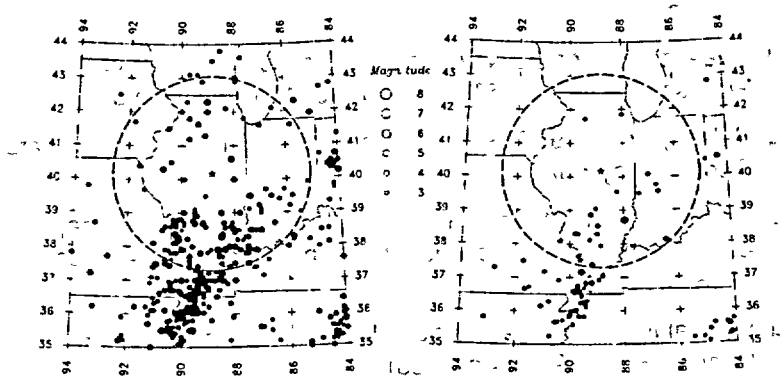
Seismicity Catalogs

- Seeber, L., and J.G. Armbruster, 1991, The NCEER-91 Earthquake Catalog
- Mueller, C., M. Hopper and A. Frankel, 1997, USGS National Hazard Mapping Catalog
- Center for Earthquake Research and Information (CERI), New Madrid Catalog (1974 - 8/1/2002)
- CNSS Catalog (Composite Catalog 1985 - 8/1/2002)

Updates to Seismicity Catalog

EPRI 1777-1985

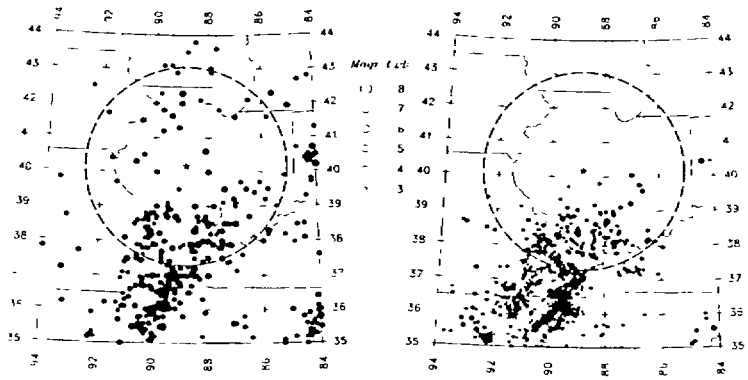
USGS 1985-1995
CNSS 1995-2002



NEI

Updates to Seismicity Catalog

EPRI 1777-1985 CERI 1974-2002



October 16 2002

31

NEI

New Geological and Geophysical Data

- Special Issue The New Madrid Seismic Zone, SRL, 1992 (25 articles)
- Investigations of the New Madrid Seismic Zone, U S G S Professional Paper 1538, 1994-1995 (16 individual volumes)
- Nelson, W J , 1995, Structural features in Illinois Illinois State Geol Survey Bull 100
- Seismotectonic Maps of the Wabash Valley Seismic Zone, U S G S Geologic Investigations Maps I-2583A-D (4 maps), 1996-1997
- Special Issue on Investigations Illinois Basin Earthquake Region, SRL 1997 (14 articles)

October 16 2002

32

NEI

New Geological and Geophysical Data (cont'd)

- Crone, A.J., and R L Wheeler, 2000, Data for Quaternary Faults, Liquefaction Features, and Possible Tectonic Features in the Central and Eastern United States, East of the Rocky Mountain Front
- Earthquake Hazard Evaluation in the Central United States, Special Issue, Engineering Geology, 2001 (16 articles).
- Special Issue on the Illinois Basin. Seismicity, Faulting, and Seismic Hazard, SRL, 2002 (in press, 13 articles).

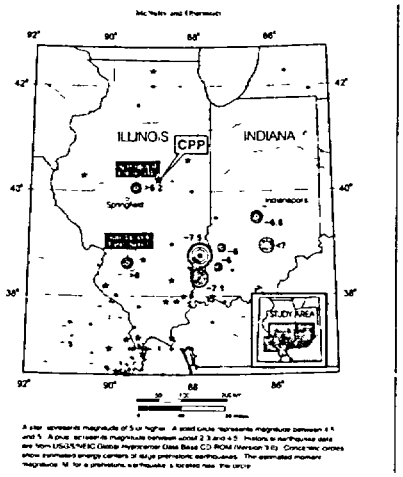
NEI

Paleo-liquefaction Studies

- Mapping and dating of liquefaction features throughout most of the southern Illinois basin, in parts of Indiana, Illinois, and Missouri, have identified epicentral areas of at least eight Holocene and latest Pleistocene earthquakes of estimated moment magnitudes of M_W 6 to ~7.8

NEI

Locations of Paleo-earthquakes



October 16 2002

35

NEI

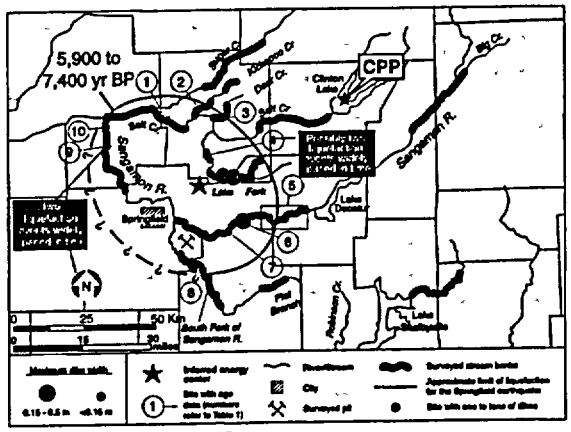
Paleo-liquefaction Studies, Clinton Region

- Springfield event is outside general Wabash Valley source region
- 1996 Study did not extensively cover region in the immediate vicinity of Clinton
- Two-week field program conducted to extend study region along major rivers near the site
- Dr. Steven Obermeier participated in the field program

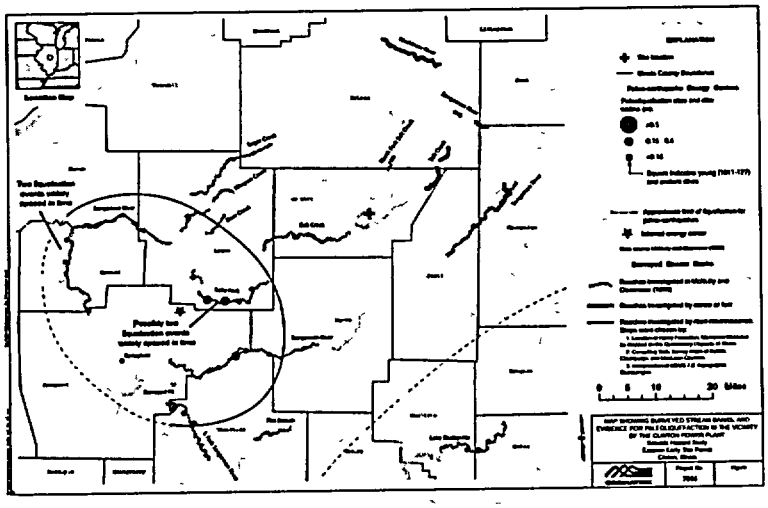
October 16 2002

36

1996 Paleo-liquefaction study region near Springfield



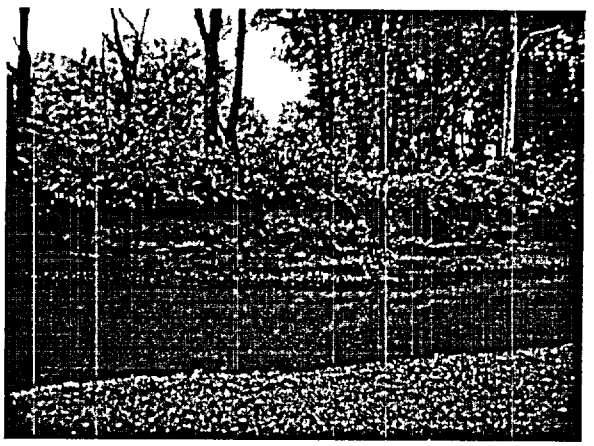
Area of Additional Field Investigation for ESP



Typical stream bank exposure on Salt Creek

below Clinton Lake

Bank shown is approximately 12 feet high.



October 16, 2002

Typical stream bank exposure on Salt Creek

near Farmer City

Bank shown is approximately 9 feet high.

October 16, 2002

40

Current Status of Study

- Field program just completed (October 5)
- No evidence of widespread liquefaction found relative to that seen for the Springfield event
- A few localized features found. Data are being evaluated as to age and probable cause

Recent Ground Motion Attenuation Models

- Frankel et al. (1996) - USGS National Hazard Mapping Project
- Toro et al. (1997)
- Atkinson and Boore (1997)
- Somerville et al. (2001)
- Campbell (2002)
- Silva et al. (2002)

Approach For Assessing Significance of New Data

- Seismic sources
- Maximum magnitudes
- Earthquake recurrence
- Ground motion attenuation

Assess Applicability of EPRI/SOG PSHA Results *(Appendix E of RG-1.165)*

- STEP 1: Assess impact of post-EPRI/SOG data on characterization of seismic sources and ground motion attenuation
- STEP 2: If step 1 identifies potentially significant differences from EPRI/SOG database, perform PSHA sensitivity analyses to assess impact. If not, use existing EPRI/SOG results for rock ground motion
- STEP 3: If significant increases in hazard found, perform updated PSHA. If not, use existing EPRI/SOG results for rock ground motion

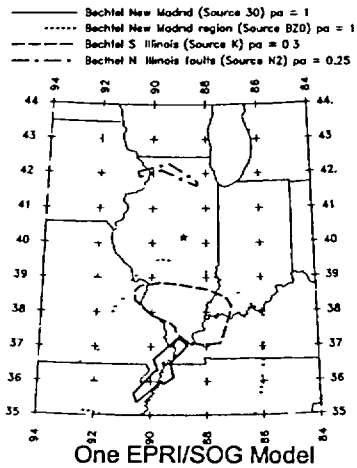
Seismic Source Update

- New Madrid Seismic Source Zone and Southern Illinois Basin/Wabash Valley
  - 1996 National Seismic-Hazard Maps
  - 2002 National Seismic-Hazard Maps
  - Cramer (2001)
  - Toro and Silva (2001)
  - Wheeler and Cramer, 2002 (in press)

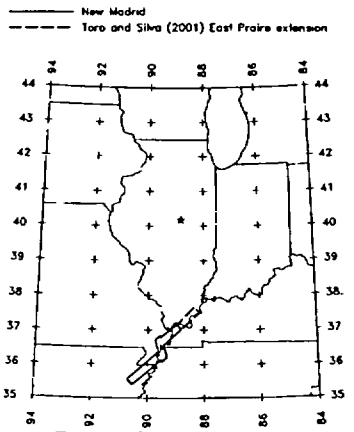
New Madrid Seismic Sources

- Fault sources
  - Reelfoot fault (thrust)
  - Blytheville arch-CGF(NW-trending SS)
  - East Prairie fault (NE-trending SS)
- Source zone (East Prairie extension)

Alternative New Madrid Seismic Sources



One EPRI/SOG Model

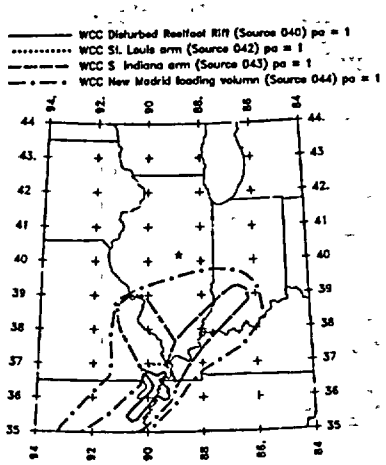


Recent Proposed Sources

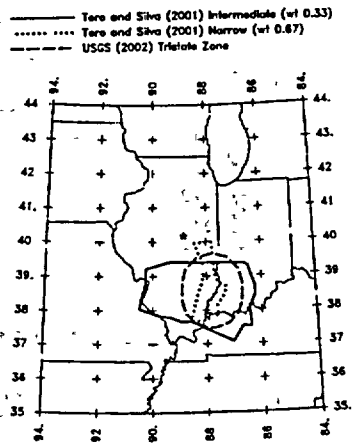
Wabash Valley Source Zone

- Paleo-liquefaction Studies
  - Recurrent $M_w > 6$ earthquakes (M_w 7.1 to 7.8 earthquakes near Vincennes, Indiana)
- Postulated sources
  - Thrusts in basement (seismic reflection)
  - Localized at kink in bedrock structure (Commerce geophysical lineament)
  - Wabash Valley fault zone (WVFZ)

Alternative Wabash Valley Seismic Sources



One EPRI/SOG Model

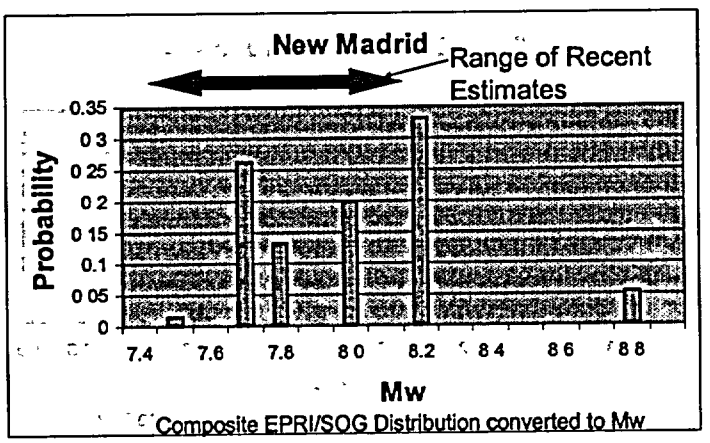


Recent Proposed Sources

October 16, 2002

49

Maximum Magnitude Distributions

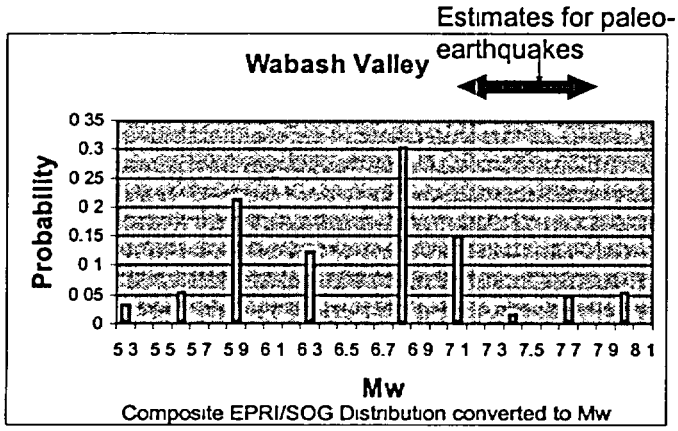


Composite EPRI/SOG Distribution converted to Mw

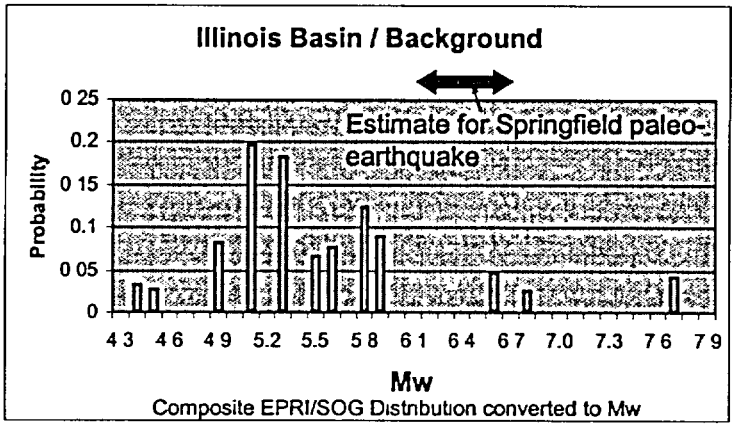
October 16, 2002

50

Maximum Magnitude Distributions



Maximum Magnitude Distributions



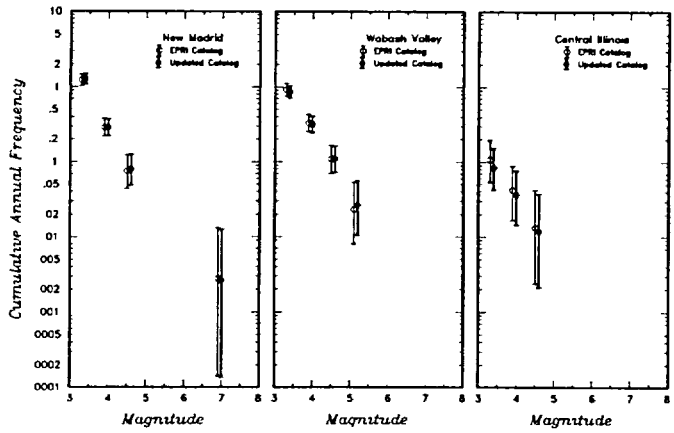
Maximum Magnitudes

- New Madrid
  - M_w 7.8-8.1 (Johnston, 1996)
  - M_w 7.1-7.5 (Hough and others, 1999)
  - M_w 7.3-7.9 (Draft USGS 2002)
  - Similar to EPRI/SOG assessments converted to M_w
- Wabash Valley
  - Paleo-liquefaction evidence for M_w 7.1 to 7.8 earthquakes
  - Upper end of EPRI/SOG assessments converted to M_w

Maximum Magnitudes

- Central Illinois
  - Paleo-liquefaction evidence for M_w 6.2 to 6.7 earthquake
  - Upper end of EPRI/SOG assessments converted to M_w

Earthquake Recurrence Rates *(shown in terms of m_b)*



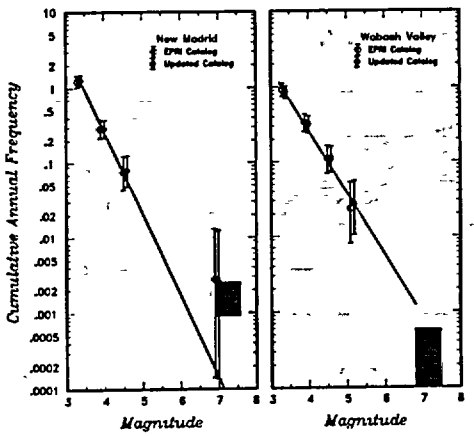
Data points for Updated catalog shifted to the right 0.1 units for plotting

Recurrence for Large Earthquakes

- New Madrid
  - Paleo-liquefaction studies and fault-related deformation on Reelfoot fault indicate ~500 year return period
  - Large seismic-moment release in the New Madrid region involves events on all three NMSZ faults (modeled as dependent events)
- Wabash Valley
  - Two paleo-earthquakes magnitude > 7 in 12,000+ years

Earthquake Recurrence Rates

Historical seismicity compared to paleo-seismicity (shown in terms of m_b)

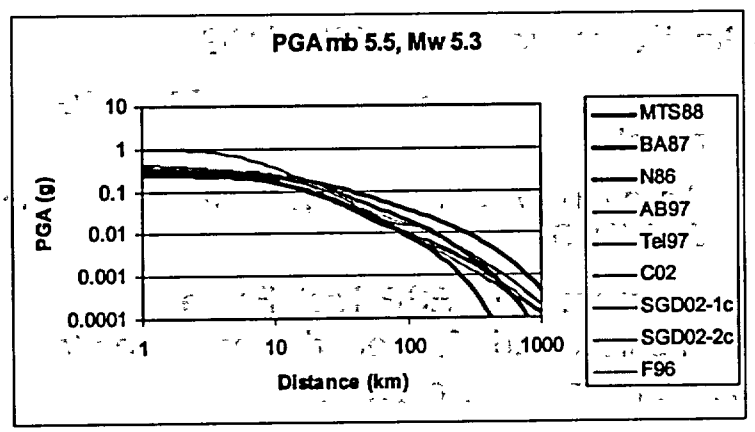


Estimates from paleo-liquefaction

October 16, 2002

57

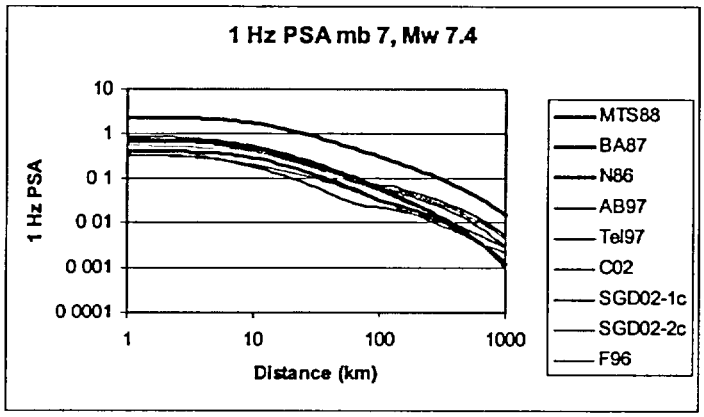
Ground Motion Models



October 16, 2002

58

Ground Motion Models



Ground Motion Models

- Significant Work Post EPRI/SOG
  - Median values in general range of EPRI/SOG models
  - Standard deviations are larger than used with the EPRI/SOG models
- Concurrent EPRI/ESP Task Force sponsored study for generic application to central and eastern U.S. sites

Approach for Developing SSE Spectra

Perform PSHA

(Follow Regulatory Position 3 of RG 1.165)

- ❑ Assess applicability of EPRI/SOG PSHA results to site using 3-step procedure outlined in Appendix E of RG 1.165
- ❑ Obtain median 10^{-5} annual exceedance probability ground motions on rock from either existing EPRI/SOG PSHA results or updated PSHA results
- ❑ Identify controlling earthquakes using procedure given in Appendix C of RG 1.165

Determine SSE Spectra

(Follow Procedures Identified in Reg. Pos. 4 of RG-1.165)

- Define appropriate rock spectrum using spectral shapes for CEUS (e.g., NUREG/CR-6728)
- Assess site amplification characteristics using results of geotechnical investigations
- Perform site response analyses using procedures to develop free-field surface motions (e.g., NUREG/CR-6728, NUREG/CR-6769)
- Develop appropriate smooth SSE free-field spectra

Topic 2 - EPRI CEUS Ground Motion Project Overview

Martin W. McCann, Jr.

NEI – NRC Meeting

Rockville, MD

October 16, 2002

NEI

Project Overview

- Purpose
- Scope
- Project Participants and Roles
- Product
- Schedule

NEI

Project Purpose

The purpose of this project is to perform a Level 3 evaluation of strong ground motion attenuation as described in the SSHAC report (1997) for hard rock site conditions in the CEUS.

Project Scope

The evaluation will be carried out to estimate the uncertainty in ground motion that represents "the composite distribution of the informed technical community."

The project will involve a series of workshops with experts and an evaluation process performed by a technical integrator to develop the composite distribution on ground motion.

Project Scope *(cont'd)*

The focus is on using available models together with the support/expertise of the Expert Panel (EP) and Technical Integrator (TI) to quantify the current level of scientific understanding for estimating CEUS ground motions on hard rock sites.

Project Participants

- Technical Integrator
- Ground Motion Expert Panel
- Peer Review

Technical Integrator

- Norm Abrahamson - PG&E
- Jim Marrone - Bechtel National, Inc.
- Martin McCann - Jack R. Benjamin & Associates, Inc.
- Bob Youngs - Geomatrix Consultants, Inc.

Ground Motion Expert Panel

- Gail Atkinson - Carlton University
- Ken Campbell - ABS Consulting, Inc.
- Richard Lee - Bechtel Savannah River Company
- Walt Silva - Pacific Engineering
- Paul Somerville - URS Corporation
- Gabriel Toro - Risk Engineering, Inc.

Peer Review

- Carl Stepp - Earthquake Hazard Solutions
- Allin Cornell - Stanford University

SSHAC Level 3 – Roles

- The evaluation will be carried out the Technical Integrator (TI) team
- Expert Panel acts as a resource to the TI for all aspects of the assessment
  - Identification of models
  - Identification of issues
  - Guidance on a process for evaluating available models

Expert Panel Role

- Contribute expertise with regard to available models, modeling issues, etc.
- Support the TI's effort to develop an evaluation process to consider available ground motion attenuation models for the CEUS

EP Role (cont'd)

- EP provides guidance to the TI on:
  - What are the relevant ground motion models
  - What are the important issues
  - What are the important attributes of a ground motion model
    - Consistency with recorded strong motion data (primarily at small magnitudes in CEUS)
    - Seismological basis for scaling relationships
    - Adequacy of representation of variability and uncertainty

EP Role (cont'd)

- Provide guidance on questions such as:
  - How should model attributes be used to evaluate available models?
  - Is the set of available models sufficient to capture the full range of epistemic uncertainty?

TI Role

- The evaluator is responsible for assessing the relative credibility of alternative ground motion models
- The evaluator recognizes no single model is the ultimate truth, only a current representation

TI Role (cont.)

- The evaluator will:
  - consider all potential models
  - the technical basis for the models (from proponents & resource experts)
  - question the technical basis for conclusions and challenge proponent positions

Product

- Project report
  - Complete documentation of the evaluation process, the results and their basis
  - Documentation of workshops
  - Documentation will be complete, transparent & traceable (SSHAC, 1997)
- Published as an EPRI report
- The product is intended to provide a current consensus on strong ground motion for rock sites in the CEUS.

Schedule

Milestone	Dates
Workshop No. 1	September 24 & 25, 2002
Workshop No. 2	December 10 (11?), 2002
Workshop No. 3	Mid January, 2003
Issue Draft Report for Review	End of January, 2003
Issue Final Report	End of February, 2003

STAFF QUESTIONS REGARDING
THE NEI EARLY SITE PERMIT TASKFORCE 9/25/02 PRESENTATION
ENTITLED
"OVERVIEW AND PRACTICAL APPLICATION OF
PLANT PARAMETERS ENVELOPE (PPE) APPROACH FOR
EARLY SITE PERMIT APPLICATIONS"

Slide 10 - The subject slide states that the PPE Approach "provides NRC with the technical basis for its review and issuance of ESPs." Do the ESP Applicants plan to submit any other technical information/analyses other than the PPE Worksheet to support the PPE values?

Slide 11 - Is it NEI's view that the PPE design parameters should be treated with the finality of an ESP?

Slide 14 - Does "sufficient" mean that the design parameters presented in the subject ESP Application will meet the applicable staff review guidance (NUREG-0800, NUREG-1555)? What information listed in the staff review guidance will not be provided in ESP Applications?

Slide 16 - Will NEI or ESP Applicants submit the applicable documents which provide the technical basis for the development of the PPE Approach.

Slide 17 - What regulatory criteria was used to select the appropriate plant parameters?

Slide 18 - What type of design certification-related information was screened out?

Slide 26 - Will the technical basis for margin added to a plant parameter be dicussed and explained in the ESP Applications?

PPE Values

- Design parameter values are chosen to bound a range of possible future facilities that might one day be built, including
  - NRC certified designs
  - Designs in progress
  - Future designs

NEI

Dual Advantages of PPE Approach

- Provides essential flexibility to future COL applicants to select the best technology at the time a decision to build is made
  - ESPs are valid for up to 20 years and are renewable
- Provides NRC with the technical basis for its review and issuance of ESPs

NEI

ESP/Part 52 Terminology

Term	Definition
Site parameters	The postulated physical, environmental and demographic features of an as-yet unidentified site
Design parameters	The postulated features of the reactor or reactors that could be built
Site characteristics	The real physical, environmental and demographic features of the proposed facility location
Design characteristics	The real features of a reactor or reactors

NEI

ESP Applications

- ESP applications will include two main types of info:
  - Site characteristics: The real physical, environmental and demographic features of the proposed facility location.
    - Established through data collection and/or analysis
    - Developed in accordance with NRC requirements and guidance
  - Design parameters: The postulated features of the reactor or reactors that could be built.
    - Design information that is necessary to prepare and review an ESP application.
- ESP applications, including the site characteristics and the PPE, must provide sufficient information to support required safety and environmental reviews by NRC

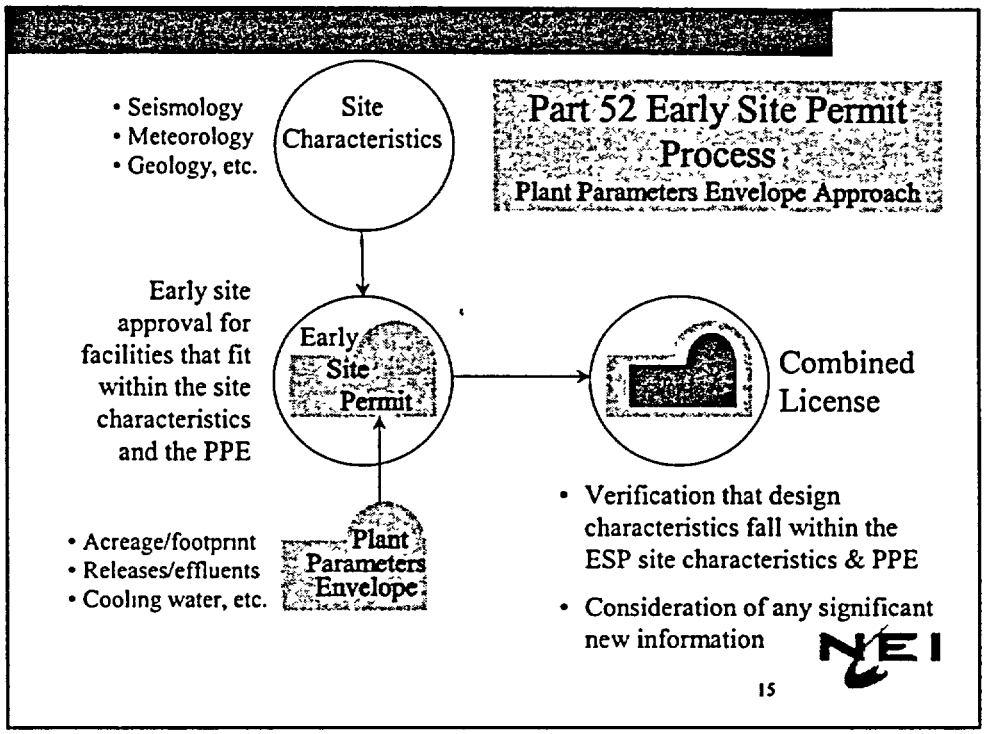
NEI

Envisioned Focus of NRC Reviews

- "Site characteristics" will be reviewed to ensure they completely and accurately describe the site
- Bounding "design parameters" (PPE values) will be used to determine that associated safety and environmental impacts are acceptable for the site

Key Expected NRC Findings for ESP

- **Site characteristics are complete and accurate**
- **Design parameters are sufficient** for purposes of required site safety and environmental reviews
- **The site is acceptable** for construction and operation of reactor(s) having characteristics that fall within the identified site characteristics and design parameters



Origin of PPE

- Need for the PPE approach was recognized in the early 1990s
- Developed by the joint industry/DOE Early Site Permit Demonstration Project (ESPDP)
- Current pilot ESP applicants are picking up where the ESPDP left off

NEI

16

Systematic Development of PPEs

- Appropriate plant parameters were developed through a systematic review of
  - Regulatory criteria
  - Application content criteria
  - Consideration of previous site studies
  - Design and construction experience

Systematic Development (cont.)

- Design certification-related information was screened out. The remaining information related more to siting, and formed an initial group of design parameters
- Quantitative values were assigned to the design parameters using available information
- The resulting PPE worksheet effectively became a representation of the SSCs that would comprise a surrogate facility for siting purposes

Example #1a

Plant Parameter: Height

Definition: The height in feet from finished grade to the top of the tallest power block structure (excluding cooling towers)

	ABWR	AP-1000	IRIS	GT-MHR	PBMR	ACR-700	Bounding Value	Usage
Height	123'8"	234'0"	105'	81.5' Reactor Cavity Cooling Stack 95 8'	134 48'	197'	197'	ER

This applicant selected four technologies to establish a different bounding parameter value of 197 ft.

Example #2 (cont.)

- The plant parameter is "cooling tower height"
- There are different types of cooling towers. The bounding value differs based on type
- In one instance, margin is added
- The parameter is used in environmental evaluations involving aesthetics and non-radiological plume analyses

Environmental Effects of Cooling Water Usage

Nuclear Energy Institute
Early Site Permit Task Force
Presentation to the
U. S. Nuclear Regulatory Commission

1

Background

- Section 52.17(a)(1) states that the applicant should describe types of cooling systems, intakes and outflows
- Section 52.17(a)(2) requires preparation of a complete environmental report

2

Background (Cont)

- Applicable sections from NUREG 1555
  - Section 3.3, Plant Water Use
  - Section 3.4, Cooling Systems
  - Section 5.2, Water Related Impacts
  - Section 5.3, Cooling System Impacts

3

Evaluation Process

- Determine possible cooling system configurations for ESP
  - Considered bounding thermal discharge for a range of reactor technologies for the site. For cooling systems, this is determined to be the limiting design parameter
  - For one applicant's site, heat rejection would necessitate either mechanical or natural draft cooling towers

4

Evaluation Process (Cont)

- Select design parameters from PPE:
  - Cooling tower makeup requirements (e.g. flow rate and monthly average usage)
  - Cooling tower performance characteristics (e.g. evaporation rate, temperature rise, heat rejection to atmosphere, heat rejection in blowdown)
  - Approach temperature
  - Blowdown constituents and concentrations

5

Evaluation Process (Cont)

- Determine Site Characteristics
  - Maximum temperature for tower makeup
  - Drybulb and wetbulb temperatures under limiting conditions
  - Limiting air temperature profile
  - River flow and/or river/lake level extremes
  - Ecological data to evaluate tower effects
  - Geographic and demographic data to evaluate tower effects

6

Evaluation Process (Cont)

- Perform Analyses
  - Demonstrate that water withdrawal under most adverse conditions does not produce unacceptable environmental effects
  - Discharge of cooling tower blowdown does not produce unacceptable environmental effects
    - Temperature distributions
    - Dilution of chemical constituents in discharge

7

Evaluation Process (Cont)

- Perform analysis
  - Impact of cooling tower operation does not produce unacceptable environmental effects, e.g.
    - Salt deposition
    - Plume dispersion

8

NEI

Conclusions

- Sufficient cooling water is available from site to support range of plants considered
- Environmental effects on cooling water source from plant usage under limiting conditions are acceptable
- Environmental effects from limiting heat rejection to atmosphere by cooling towers are acceptable

9

Early Site Permit Application Review Schedule

Stephen S. Koenick,
Project Manager, NRLPO
October 17, 2002

Industry proposed schedule

- May 29, 2002, Commission Meeting, industry emphasized, "It's not necessarily so much what the actual timeframe is as a reasonable certainty that the timeframe that's advertised will indeed be met."
  - Proposed 17 months SER, 16 months EIS
  - Low-end of timeframe in which products were issued for license renewal

Staff Considerations

- Present a reasonable and achievable schedule
  - Issuance of staff products consistent with scheduled commitments
  - Mandatory hearing schedule influenced by number and nature of contentions and parties
  - License renewal is a successful model in that it has been achievable

Staff Considerations (Continued)

- Factors influencing the schedule
  - Review Standard
  - Pre-application activities
  - Scope/depth of application
  - Competing activities
- Industry commitments
  - Keep staff informed of expected submittal date
  - Meet scheduled milestones
  - Content and quality of application

(Transmitted via e-mail to R. Jenkins from R. Bell on 10/11)

QA Requirements for ESP (ESP-3)

Description of Issue and Industry Perspective for Discussion on October 17

As expressed in public meetings on May 28 and June 13, ESP applicants are committed to implementing effective quality processes to provide adequate confidence in the completeness, accuracy and general quality of ESP information to facilitate efficient ESP application review by NRC. During these meetings the industry described its view that ESP applicants may apply 10 CFR Part 50, Appendix B, or they may apply non-Appendix B alternative quality processes to achieve these objectives.

In follow-up interactions with at least one ESP applicant, the NRC staff has indicated that ESP applications may be reviewed for compliance with Appendix B (and associated Regulatory Guides, ANSI Standards, ASME NQA-1) and that justifications for departures will be required. This view had not been previously expressed by the NRC and is not consistent with the earlier discussions because if non-Appendix B alternative quality processes are used, it would be inappropriate to review ESP applications for compliance with Appendix B or to require justifications for departures from specific Appendix B requirements, Regulatory Guides, and ASME NQA-1.

The acceptability of using either Appendix B or alternative quality processes for ESP is based on our conclusions that (1) Appendix B is not necessary to assure quality and by its terms does not apply to ESP activities; and (2) NRC regulations do not specify QA program requirements (e.g., Appendix B) for ESP applications. A summary of our basis for these conclusions is as follows:

- Section 52.17, Contents of Applications, does not specify QA requirements for ESP applications. This is in marked contrast with clear requirements that Appendix B be applied to Construction Permits, Operating Licenses, Design Certifications and Combined Licenses.

- Similarly, Appendix B does not apply to ESP applicants because ESP activities are not within the scope of Appendix B. By its terms, Appendix B establishes quality assurance requirements for the design, fabrication, construction, testing and operation of nuclear plant structures, systems and components (SSCs) that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. Appendix B applies to the activities affecting the safety-related functions of those SSCs.

- Notwithstanding the absence of specific requirements for ESP quality assurance programs, the completeness and accuracy of ESP applications are assured by 10 CFR 50.9, which requires that licensing submittals to NRC be complete and accurate in all material respects, and by quality processes employed by the applicant. Completeness and accuracy are further assured by the NRC Regulatory Guides and Standard Review Plans which outline methods and sources of data acceptable to the staff for the technical information provided in the ESP.

QA Requirements for ESP (ESP-3) - Continued

The lack of specific QA program requirements for ESP applications is appropriate and consistent with the limited scope of ESP activities. As discussed with the NRC staff, the pilot ESP applicants have committed to and are implementing effective quality processes to (1) help provide adequate confidence in the completeness and accuracy of information contained in ESP applications, as required by 10 CFR 50.9, and (2) ensure an overall level of quality that facilitates efficient ESP application review by the NRC. We intend to update NEI 01-02, Industry Guideline for Preparing an Early Site Permit Application, to reflect that ESP applicants should establish appropriate quality processes to achieve these objectives.

Summary of industry views for discussion with NRC on October 17, 2002

1. ESP applicants may apply Appendix B or non-Appendix B alternative quality processes to provide adequate confidence in the completeness and accuracy of ESP information

2. The NRC should review ESP applications for completeness and accuracy of the information presented. Unless the ESP applicant commits to use Appendix B, NRC reviews for compliance with Appendix B would not be appropriate.

3. ESP applicants may, but are not required to describe their quality processes in ESP applications. To promote understanding of ESP applicant quality processes and help ensure that ESP application reviews are completed in a timely manner, ESP applicants may provide description of their quality processes to NRC for pre-application review and feedback.

4. ESP information approved by the NRC is appropriate for use in COL applications, in the same way that a design certification may be used/referenced.

ESP Issue #8
9/25/02 Meeting Follow-up Regarding References

The additional references that might be useful to NEI /ESP Applicants for ESP-8 are:

NUREG/CR-6703
NUREG/CR-5009
NUREG 0170

NOTE: The above documents may or may not be necessary for ESP purposes. They represent the list of documents currently under review for applicability to future rulemaking on the subject issue.

QUALITY ASSURANCE ISSUE BACKGROUND

Meeting Summary / Staff Letter/Communication

May 15, 2001	The staff had established a practice of early interaction with CP applicants to review the data gathering methodologies and activities, including the **quality assurance** program applied to those activities. The staff has a need to ensure that its regulatory guidance is being acceptably followed, as the agency will likely embrace this site characterization information (from the meteorological measurements program, soil sampling program, and terrestrial and aquatic ecology walkdowns) during its evaluation of the ESP application. The staff concludes that early interaction is prudent to help ensure that the data gathered during this period is acceptable for use in the ESP application. Conversely, the applicant can accept the risk of proceeding with the site characterization activities without early interaction with the staff.
January 10, 2002	NEI stated that they believe that 10 CFR Part 52 does not require that an ESP be prepared under the full quality assurance requirements of Appendix B of 10 CFR Part 50. The staff stated that in order for the NRC to rely on the data acquired and calculations performed to support an ESP application, **an appropriate quality assurance program** needed to be applied to these activities. There must be a high degree of assurance that the information has been obtained and analyzed correctly. The staff requested NEI to identify the differences between Inspection Manual Chapter 2511 and 2512 and what the industry proposed to apply. There may be some circumstances where it is not necessary to apply Appendix B quality control procedures. NEI indicated that there were some administrative concerns as well, such as any concerns with regulated companies (subsidiaries) providing data to unregulated companies for analysis.
February 22, 2002	As you know, there was a meeting with NEI on January 10, 2002, related to early site permits (ESPs). During this meeting **quality assurance (QA) issues** for the application were discussed. The staff had an internal meeting in early February to discuss, among other things, the inspection procedures that would be used for an ESP application and identified a concern related to QA. Specifically, the staff believes that some of the guidance contained in Inspection Manual Chapter (IMC) 2511, .Light Water Inspection Program - Pre-CP Phase,. and its associated inspection procedures is relevant to an ESP. The guidance contained in these documents suggest early interactions with applicants to discuss the ESP and QA related to the application. The staff would like to engage industry and other stakeholders as it develops the inspection guidance for ESPs.
April 24, 2002	NEI stated that all applicants will have programs and plans to provide for the **quality assurance** of the data used in ESP applications.
May 20, 2002	NEI sends letter responding to staff letter on **QA** dated 2/22/02.

QUALITY ASSURANCE ISSUE (ESP-3) BACKGROUND (CONT'D)

May 28, 2002	NEI and the staff then discussed **QA** issues. In a February 22, 2002, letter, (ADAMS Accession Number ML020590120) the staff provided a proposed process for interactions with the applicants to resolve issues associated with ESP data collection QA as soon as possible. NEI responded to the NRC's proposed process in a May 20, 2002, letter (ADAMS Accession Number ML021680023). During the meeting, NEI explained that a blanket use of an existing operating plant QA program was problematic for several reasons including: QA program and procedures were written specifically for operating plant structures, systems and components, and not for siting studies; organizational differences between operating company and entities exploring ESPs; and intra-company restrictions. NEI then provided an example based on Entergy's ESP application to illustrate the point. The staff indicated that high-level discussions regarding QA for ESP data collection made it difficult for the staff to identify potential issues. The staff stated that although there is no requirement for an NRC pre-application review of an applicant's QA plan, the staff believes that such a review would be beneficial for ensuring that the ESP review is completed in a timely matter. The applicants took an action to consider whether or not to submit a pre-application QA data collection plan, and if such a plan were submitted, what level of NRC review the applicants would request.
June 13, 2002	On the action to consider whether or not to submit a pre-application **Quality Assurance** (QA) data collection plan, the applicants responded that they would submit their plan to the staff on the following timetable: Exelon - August 2002; Entergy - 3 to 4 weeks from the date of the subject meeting; and Dominion - September 2002. Each applicant will request the level of NRC review to be applied to their individual QA Plan in their letter of submittal.
August 15, 2002	Entergy Letter submittal containing ESP **Quality Assurance** Project Planning Document for Grand Gulf ESP application.
September 11, 2002	Teleconference meeting between NRC Staff and Entergy regarding letter submittal dated 8/15/02.
October 17, 2002	NEI requested meeting regarding QA requirements for ESP applications.

NUCLEAR REACTOR INSPECTION PROGRAM
EARLY SITE PERMIT

2501-01 PURPOSE

The Early Site Permit (ESP) inspection program establishes guidance for NRC inspection activities directed towards an ESP application, its review, and the related applicant activities governed by NRC regulations. The program is applicable to the applicant and their consultants, and to all activities related to NRC regulations. Specifically, the applicable principal regulations for this phase are those described by 10 CFR Part 52, 10 CFR Part 50 Appendix B and 10 CFR Part 100 (see Section 05.05 below). The ESP phase is implemented when the NRC receives formal notification under 10 CFR Part 52 of an applicant's intention to apply for an ESP. It continues until the ESP expires after 20 years or a combined operating license or construction permit is issued (See Figure 1).

Where the performance and/or surveillance of activities associated with the ESP phase have been contracted to other organizations, these instructions are applicable to the organizations conducting the activities for the applicant organization.

2501-02 OBJECTIVES

The principal objective of the ESP phase is to verify that the ESP application meets the requirements specified in 10 CFR Part 52 and is of a quality suitable for docketing. Additional objectives are to (1) reduce unnecessary regulatory burden, and optimize the efficiency and effectiveness of docketing, (2) explain to the public the contents of an ESP application, and the opportunities for public intervention, (3) explain the NRC licensing process, and (4) ascertain whether the appropriate elements and standards to assure quality are being applied to ongoing project activities, as will be required during the NRC post-application review.

To achieve these objectives, substantial emphasis will be placed on verifying the quality and accuracy of data collected and the analysis and the evaluation of information used in support of the application. Where applicable elements which assure quality cannot be applied or there are no applicable requirements, inspection and audits will verify that data is collected using industry accepted methodologies such as NUREGS or other guidance listed in the NRC Standard Review Plan (NUREG 0800).

2501-03 DEFINITIONS

Definitions of terms used in this inspection program are as follows:

03.01 Audit. An applicant/contractor activity to determine through investigation the adequacy of/and adherence to, established procedures, instructions, specifications, codes, and other applicable contractual and licensing requirements, and the effectiveness of implementation.

03.02 Contractor. Any organization under contract to furnish items or services to an organization operating under the requirements of Appendix B of 10 CFR Part 50 or the commitments made in the application. It includes the terms Consultant, Vendor, Supplier, Fabricator, Constructor, and subtier levels of these, where appropriate.

03.03 Documentation. Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

03.04 Inspection. An NRC activity consisting of examination, observation or measurements to determine the conformance with requirements and/or standards.

03.05 NRC QA Guidance. Guidance endorsed by NRC through issuance of regulatory guides or national standard documents which discuss acceptable methods of implementing portions of 10 CFR 50, Appendix B QA program requirements.

03.06 Objective Evidence. Any direct observation or documented statement of fact, information, or record, either quantitative or qualitative, pertaining to the quality of an item or service based on observations, measurements, or tests which can be verified.

03.07 Quality Assurance. Quality Assurance (QA) comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system or component will perform satisfactorily in service. QA includes quality control.

03.08 Quality Assurance Manual. The collection of internal procedures and instructions established by each organization delegated QA Program authority and whose objective is to assure acceptable implementation of the QA Program.

03.09 Quality Control. Quality control (QC) comprises those QA actions related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component, or system to predetermined requirements.

03.10 Quality Assurance Program/QA Commitments. The terms QA program and QA commitments relate to the description of the QA program, or any part thereof, as required by 10 CFR 50.34(a)(7).

03.11 The Tendered/Docketed Application. As used by this instruction, the tendered application consist of the ESP application, 10 CFR 52.17 (a) - (c) general information; 10 CFR 50.33 a - d, information required by 50.34(a)(12) and (b)(10); and to the extent approval of emergency plans is sought under paragraph (b)(2) (ii) of 10 CFR Part 52, the 10 CFR 51.45 and Part 51.50, Environmental Report.

Where the term docketing is used by this instruction it refers to the docketing of the ESP application.

2501-04 RESPONSIBILITIES AND AUTHORITIES

The Commission has the overall responsibility to make a determination regarding the acceptability of the ESP application. The applicable Regional Administrator has the responsibility to make a recommendation to the Director, Office of Nuclear Reactor Regulation, regarding denial or approval of the ESP application (see Enclosure 2).

The Director, Division of Inspection and Program Management has the responsibility to review and make a determination regarding the acceptability of the QA program description document if presented with the applicant's application and for ascertaining whether the applicant has established and executed acceptable QA controls.

The Director, New Reactor Licensing Project Office, has the responsibility to make a determination regarding the acceptability of the technical information in support of the ESP application and to determine whether to docket the application.

2501-05 DISCUSSION

05.01 Pre-Application. During the pre-application phase the NRC primarily gathers information regarding the quality of site suitability data and environmental data collected in support of the application.

Prior to the application, and as early as possible after notification of the applicant's intention to submit an ESP, the NRC will conduct meetings with the applicant to (1) meet the primary contacts for the various technical disciplines, (2) review the applicant's schedule for collection of data, and related ESP activities, (3) arrange for observation of data collection methodology, (4) arrange for a preliminary walk-down of the prospective site and (5) review the applicant's QA controls/program description.

Additionally, the NRC will coordinate schedules with the applicant and gather information in preparation for public meetings, schedule public meetings to introduce the local community to the NRC licensing process, and arrange meetings with state and local officials.

The pre-application QA program review will be performed as early as possible before the tendering of an ESP application. Representatives from the Office of Nuclear Reactor Regulation (NRR) and the respective region will meet with the applicant's representatives approximately 6–12 months prior to tendering the ESP application. A clear understanding of what is expected in a QA Program Description, the accepted methodologies for data collection, and the critical parameters the NRC expects to observe relative to the applicant's schedule should be discussed. The pre-application review will place particular emphasis on the areas of organization, the QA program, document control, and methodologies for data collection, analysis, and evaluation. Departures from accepted QA principles or deviations from accepted industry standards may require independent evaluations, request for additional information, and additional communications with the applicant, thus extending the NRC review and evaluation process. Significant deviations from accepted industry standards without justification may result in the denial of the ESP application.

Additionally, the ESP inspection program provides for a review of applicant oversight of contracted activities and inspection of those activities. The direct inspection of contractor work activities may be performed, as necessary, to ensure the effective control of all work and the proper implementation of the required elements of the QA program.

05.02 Post-Application Review. Once received, the application will be reviewed according to 10 CFR Part 50 Appendix B, as required by 10 CFR Part 52.18 (see 03.06 below). During the post-application period (See Figure 1), inspections are conducted primarily to support testimony for the Atomic Safety and Licensing Board (ASLB) hearing required by 10 CFR 52.21. Based on the information provided by the applicant and the results of the inspections, safety evaluation reports (SER)s will be issued and the ASLB hearing will be conducted prior to making the determination whether to grant the ESP.

05.03 Inspections. Inspections will be accomplished by the regional office having geographical jurisdiction with technical support from NRR. Inspections will be lead by the responsible region after coordinating the effort with the responsible NRR PM. Technical support will be provided by various divisions within NRR as requested by the PM. The technical staff will evaluate the applicant's methodologies for data collection using the guidance provided in the NRC Standard Review Plan (NUREG-0800), the NRC Environmental Standard Review Plan, and ASTM Standards where applicable. Inspections will be consolidated to minimize impact on the applicant. Within 5 days of the conclusion of the inspection, the NRR technical staff and/or its contractors will forward their findings to the inspection team leader for integration into a trip report.

Site visits and meetings conducted exclusively by the NRR Project Manager or NRR technical staff should as a minimum be documented in a trip report with the cognizant regional management on distribution.

ESP Phase Inspection Guidance, Enclosure 1 to MC-2501, provides guidance which may be applicable during inspections, audits, or site visits.

05.04 Enforcement. Enforcement actions associated with an ESP application are not anticipated in the pre-application phase. However, as stated in Part 52.21, an early site permit is a partial construction permit and is therefore subject to all procedural requirements in 10 CFR Part 2 applicable to construction permits. The information submitted with the application will become subject to NRC regulations including enforcement actions for willful wrongdoings or fraudulent information.

05.05 Quality Assurance. 10 CFR 52.18 requires that applications filed under Part 52 be reviewed according to the applicable standards set out in 10 CFR Part 50 and its appendices and Part 100 as they apply to applications for construction permits for nuclear power plants. Section 50.55, "Conditions of a Construction Permit" states in (f)(1) that each construction permit holder subject to the QA criteria in appendix B shall implement, pursuant to 50.34(a) a QA plan. 10 CFR Part 50.34 states that an applicant is required to submit a QA program description discussing how the applicable requirements of Appendix B will be satisfied. Accordingly, those portions of the ESP application which are applicable to the requirements of 10 CFR Part 50 Appendix B will be inspected and reviewed pursuant to Appendix B (and if provided with the ESP application), the QA program description. The quality and pedigree associated with those parts of the ESP application not applicable to Appendix B will be reviewed to recognized industry codes and standards.

Notwithstanding the above, with the initial tendering of the ESP application and until the completion of reviews of the application, it is recognized that certain aspects of the QA commitments initially submitted may not fully describe the 18 criteria of Appendix B, because not all criteria are applicable to ESP activities. However, the application should provide an adequate basis for evaluation of the acceptability of the QA program implementation. Data collected using methodologies fully complying with a QA program will expedite the inspection, evaluation, and licensing process.

The inspector will review the description of the QA program provided in the application and assess the consistency of the implemented instructions and procedures with the QA Program. Inspections

and the evaluation and resolution of identified problem areas should be accomplished consistent with the referenced guidance in Enclosure 1. In no case should NRC inspectors inform the applicant of what effect identified QA problem areas might have on a docketing decision prior to discussion with headquarters.

a. Quality Assurance Applicability. The applicable criteria of 10 CFR 50 Appendix B are those criteria which can directly relate to the pedigree or genesis of any safety- related or risk-significant structure, system, or component (SSC). For example, for an ESP application, Appendix B criteria must be applied to the methodology for data collection, analysis, and evaluation for soil composition, geology, hydrology, and seismology determinations for the foundations of safety-related SSCs. When information is received from organizations like the Census Bureau or the National Oceanic and Atmospheric Administration (NOAA) ,etc., controlling the records received from the organization and the evaluation and analysis, and storage of the records is considered "applicable" and subject to Appendix B criteria.

   All information submitted with the ESP application will be reviewed and is subject to Appendix B controls. Inspection will be limited to only the information presented in the application and performed on a sampling basis to provide added confidence that the application contents is in conformance with the regulations.

b. NRC Process Relating to Inspection of QA Program. The NRC process relating to inspection of the QA program implementation and documentation of findings is as follows:

   1. As part of the inspection preparation, prior to conducting the program implementation inspection at the offices of the applicable organization, the review of the applicable elements of the QA program shall be performed in the regional office. Findings shall not be formally documented in an inspection report until after conduct of the QA program implementation inspection at the applicant/contractor offices (and at the site, as appropriate).

   2. Significant findings relating to the QA program may be forwarded to NRR for review and resolution with DIPM/IEHB at any time during the performance of the inspection activity.

05.06 Limited Work Authorization (LWA). If an early site permit contains a site redress plan, the holder of the permit may perform the activities at the site allowed by 10 CFR 50.10(e)(1). A limited work authorization under § 50.10(e) is informally termed LWA-1. Under 10 CFR 50.10(e)(1), the Director of NRR may authorize site preparation work, installation of temporary construction support facilities, excavation for nuclear and non-nuclear facilities, construction of service facilities and construction of structures, systems and components which do not prevent, or mitigate the consequences of postulated accidents. This may include the extension of previously permitted activities subject to 10 CFR Part 50, Appendix B, such as the continuance of site exploration and the receipt and storage of items resulting from procurement permitted prior to issuance of the construction permit. An LWA-1 may be granted only after the ASLB has made all of the National Environmental Policy Act (NEPA) findings required by 10 CFR Part 51 for the issuance of a construction permit and has determined that there is reasonable assurance that the proposed site is a suitable location for a nuclear power reactor of the general size and type proposed from a

radiological health and safety standpoint. In each case the LWA-1 will clarify which of the requested activities may be conducted at the site and the conditions that must be met. If the LWA-1 is granted, special precautions should taken if an existing operating plant is in close proximity as overhead power lines may be impacted by cranes, and earth moving activities may impact flooding of the existing facility etc.

END

Enclosures:

1. INSPECTION GUIDANCE

2. SAMPLE LETTER

3. EARLY SITE PERMIT TIME-LINE

ENCLOSURE 1

INSPECTION GUIDANCE

INSPECTION PROCEDURE	INSPECTION GUIDANCE
30001	NRC/Applicant Corp. Management Meeting consistent with the date set by NRR
35002	Applicant Early QA Meeting
35003	QA manual review
35004	Initial Pre-Docket QA Inspection
35006	Pre-docketing Assessment and Conclusions
35008	NRR/ NRC/Applicant Meeting - Substantive QA Findings
35016	Initial ESP QA Inspection
35020	Audit of Applicant's Surveillance of Contractor QA/QC Activities (if required)
35022	NRC ESP Summary SER Position Statement
35024	Followup ESP SER or SER Supplement QA Inspection (if required)
35026	NRC ESP Summary SER Position Statement Supplement (if required)
45051	Geo-Technical Foundation Activities procedure Review

INSPECTION PROCEDURE	INSPECTION GUIDANCE
45053	Site Preparation - Observation of Work Activities
45055	Geo-Technical Foundation Record Review
80210	Environmental Protection Initial Inspection
94700	Participation in ACRS Meetings (if required)
94010	NRC Testimony for ASLB or ASLAB Hearings (if required)

ENCLOSURE 2

SAMPLE LETTER

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION XX, Address

Memorandum To:_____, Director
Office of Nuclear Reactor Regulation

FROM: _____,
Regional Administrator

SUBJECT: (Site name) EARLY SITE PERMIT APPLICATION

(XXX) Corporation , by letter dated (XXXXX) , requested an Early Site Permit (ESP) for (XXX) Nuclear Station, Units (X) in accordance with Title 10 of the. Code of Federal Regulations Part 52 . We have completed our inspections in accordance with the guidance contained in Manual Chapter (MC) 2501 and in close coordination with the Office of Nuclear Reactor Regulation. The inspections verified that (XXXX) has implemented programs in conformance with the descriptions contained in (XXXX' s) application.

Additionally, the inspections compared statements in the safety evaluation report with (XXXX's) implementation in the field confirming the accuracy of assumptions used by the Office of Nuclear Reactor Regulation (NRR) to form technical positions. Details of the scope of our inspections and results are contained in the following Inspection Trip Reports (XXX) dated (XXXXX)....

Based on the results of our inspection efforts, we have determined that (Company's) programs and activities related to the ESP at (Company) have been completed in agreement with docketed commitments and regulatory requirements. Within the above inspection scope, we have determined that (Company) has met the applicable criteria for site suitability, emergency preparedness and environmental impact. We, therefore, conclude there is reasonable assurance that (Company) has provided an adequate foundation for the granting of an early site permit.

Early Site Permit Timeline

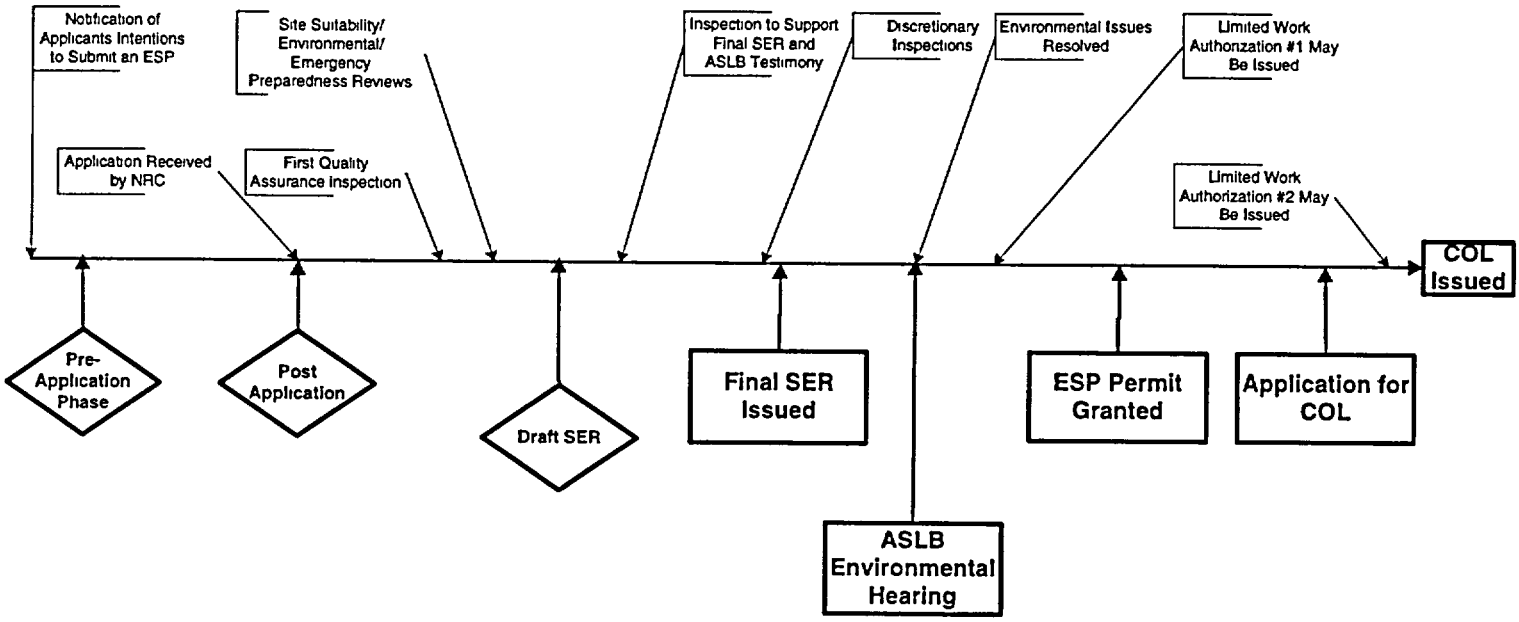


Figure 1