EARLY SITE PERMIT
DEMONSTRATION PROGRAM
Regulatory Criteria Evaluation Report

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Prepared by the *Joint Contractors* (Southern Electric International, Commonwealth Research Corporation, and Public Service Corporation of New Jersey), in cooperation with the Electric Power Research Institute, the Nuclear Management and Resources Council, the U.S. Department of Energy and Sandia National Laboratories.

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REGULATORY CRITERIA EVALUATION REPORT

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EARLY SITE PERMIT DEMONSTRATION PROGRAM (ESPDP)

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REGULATORY CRITERIA EVALUATION REPORT

March 1993

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ABBREVIATIONS AND ACRONYMS

ACRS	Advisory Committee on Reactor Safeguards
ALWR	Advanced Light Water Reactor
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
COL	Combined Operating License
CRC	Commonwealth Research Corporation
DOE	U.S. Department of Energy
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
EPRI-USC	EPRI's ALWR Utility Steering Committee
EPZ	Emergency Planning Zone
ER	Environmental Report
ESP	Early Site Permit
ESP ³	Early Site Permit Program Plan
ESPDP	Early Site Permit Demonstration Program
FEMA	Federal Emergency Management Agency
FSAR	Final Safety Analysis Report
ISG	Industry Siting Group
ITAAC	Inspection, Tests, Analysis, and Acceptance Criteria
JC	Joint Contractors
NEPA	National Environmental Policy Act
NPOC	Nuclear Power Oversight Committee
NRC	U.S. Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
NUMARC	Nuclear Management and Resources Council
OBE	Operating Basis Earthquake
OL	Operating License
PAG	Protective Action Guides
PIRG	Public Interest Research Group
PMC	Program Management Council
PPE	Plant Parameters Envelope
PRA	Probabilistic Risk Assessment
PSC of NJ	Public Service Corporation of New Jersey
SAMDA	Severe Accident Mitigation Design Alternatives
Sandia	Sandia National Laboratories
SAR	Safety Analysis Report
SEI	Southern Electric International, Inc.
SER	Safety Evaluation Report
SNL	Sandia National Laboratories
SOWG	Standardization Oversight Working Group
SRP	Standard Review Plan
SRM	Staff Requirements Memorandum
SSE	Safe Shutdown Earthquake
TID	Technical Information Document
URD	Utility Requirements Document

EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) recently added a new part to its regulations entitled, *Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors* [Title 10 of the Code of Federal Regulations, Part 52 (10CFR52)]. This regulation provides for issuance of early site permits (ESPs) for future construction and operation of advanced light water reactors (ALWRs). Such permits are expected to make possible the early resolution of site-related issues before combined construction permit/operating license (COL) proceedings.

In November 1990, a *Strategic Plan for Building New Nuclear Power Plants*^a was issued by the Nuclear Power Oversight Committee (NPOC), an organization comprised of senior executives representing utility organizations, reactor suppliers, architect engineers, and utility companies. One of the building blocks (Building Block 5) of this strategic plan is to obtain NRC approval of suitable site(s) for new nuclear power plants. This plan may be implemented either through early site permitting or through submission and NRC approval of a COL application to build and operate the plant to a certified design under the NRC standardization rule. Building Block 5 also calls for the formation of an Industry Siting Group (ISG) to assist in implementation of the site approval plan(s). The overall nuclear utility industry lead is shared by Electric Power Research Institute (EPRI) and Nuclear Management and Resources Council (NUMARC). These organizations formed the ISG in January 1991.

In order to demonstrate the practical implementation of the regulations concerning ESPs, the U.S. Department of Energy (DOE) through Sandia National Laboratories (Sandia) initiated a demonstration project.

On behalf of the nuclear industry, the Joint Contractors (JC) [composed of Southern Electric International, Inc. (SEI); Commonwealth Research Corporation (CRC); and Public Service Corporation of New Jersey (PSC of NJ)] have entered into a contract with Sandia/DOE for the performance of the demonstration project.

DOE and the JC reached agreement on the elements of the Early Site Permit Demonstration Program (ESPDP) as comprised by the following three phases:

- PHASE I Technical and Regulatory Analysis
- PHASE II Applicant Selection and Planning for Phase III
- PHASE III Site-Specific Activities.

^aUpdated in November, 1992.

These three phases are further broken down into tasks, subtasks, and parts (activities) and were initiated in July 1991.

Program objectives and overall direction have been set by mutual agreement among the JC, DOE, and Sandia. Sandia is assigned the responsibility for providing technical/program management oversight on behalf of DOE; while the JC (in collaboration with EPRI and NUMARC), representing the interests of the U.S. nuclear industry, are responsible for execution and management of the program.

The primary objective of the ESPDP is to demonstrate successfully the use of 10CFR52 to obtain ESPs for one or more U.S. sites for one (or more) ALWR nuclear power plants. It is anticipated that preparation of the ESP application and interaction with NRC during the application review process will result not only in an ESP for the applicant(s) but also in the development of criteria and definition of processes, setting the precedent that facilitates ESPs for subsequent ESP applications.

Because siting regulatory processes and acceptance criteria are contained in over 100 separate documents, comprehensive licensing and technical reviews were performed to establish whether the requirements and documentation are self-consistent, whether the acceptance criteria are sufficiently well-defined and clear, and whether the licensing process leading to the issuance of an ESP is unambiguously specified.

The three-phased approach (previously discussed) was determined to provide for the earliest identification and potential resolution of both technical and regulatory issues and uncertainties, thus providing a greater degree of assurance that the combined industry/DOE ESPDP objectives could be met. Further, the three-phased approach brings to bear nuclear industry resources currently engaged in related activities under the coordination of Building Block 5 of the NPOC plan. EPRI and NUMARC have provided, as agreed in *Memoranda of Understanding*, support to the JC for accomplishing the objectives of the ESPDP. In addition, the JC are utilizing (in an advisory capacity) the expertise of ISG members. The ISG coordinates its activities with the EPRI ALWR Utility Steering Committee and the NUMARC Standardization Oversight Working Group.

The ESPDP and the support structures described in the preceding paragraphs take advantage of a broad base of participation throughout the U.S. nuclear industry. This approach secures the highest possibility that a site(s) will be identified upon completion of Phase II, so that all aspects of the ESPDP objective can be accomplished.

The results of the technical and licensing evaluations are presented in this report. The purpose, background, and organization of the ESPDP is delineated in Section I. Section II contains flowcharts defining siting application requirements, environmental report requirements, and

emergency planning/preparedness requirements for ALWRs. The licensing and technical review results are presented in Section III. Appendices are also included to supplement the report: Appendix A contains a list of regulations, regulatory guidance, and acceptance criteria; Appendix B contains a cross-reference index of siting-related documentation; Appendix C contains data from the licensing and technical reviews; Appendix D contains technology toolkit data sheets; and Appendix E contains a population density report.

The results presented in this report are based on complimentary licensing and technical reviews. From the licensing perspective, concentration was placed on (1) ambiguities in the regulations and regulatory guidance resulting from inactivity in the siting arena for nearly 20 years and from the new language and concepts of 10CFR52 and (2) the ability of future applicants to follow (logically) the site selection and ESP processes from beginning to end. The technical review concentrated on the currency and consistency of the body of regulations, regulatory guidance, and acceptance criteria from (1) a technical methodology perspective, (2) the timing and availability of required technical information, and (3) differences in the technical requirements of ALWRs that should be considered when siting and licensing new nuclear power plants. The results of these complimentary reviews have received a thorough, independent industry and program review.

The following general conclusions resulted from the licensing and technical reviews:

1. For the most part, current siting-related regulations, regulatory guides, and acceptance criteria are workable.
2. The majority of areas which require revision or clarification are identified in the NRC Early Site Permit Program Plan (ESP³).
3. Technical/Licensing reviews identified some areas not covered in ESP³.
4. All issues identified are resolvable within the framework of planned or ongoing activities.

I. INTRODUCTION

A. BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) recently added a new part to its regulation entitled, *Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors* [Title 10 of the Code of Federal Regulations, Part 52 (10CFR52)]. This regulation provides for issuance of early site permits (ESPs) for future construction and operation of advanced light water reactors (ALWRs). Such permits are expected to make possible the early resolution of site-related issues before combined construction permit/operating license (COL) proceedings.

In November 1990, a *Strategic Plan for Building New Nuclear Power Plants*^a (outlined in Figure I-1) was issued by the Nuclear Power Oversight Committee (NPOC), an organization comprised of senior executives representing utility organizations, reactor suppliers, architect engineers, and utility companies. One of the building blocks (Building Block 5) of this strategic plan is to obtain NRC approval of suitable site(s) for new nuclear power plants. This plan may be implemented either through early site permitting or through submission and NRC approval of a COL application to build and operate the plant to a certified design under the NRC standardization rule. Building Block 5 also calls for the formation of an Industry Siting Group (ISG) to assist in implementation of the site approval plan(s). The overall nuclear utility industry lead is shared by Electric Power Research Institute (EPRI) and Nuclear Management and Resources Council (NUMARC). These organizations formed the ISG in January 1991.

In order to demonstrate the practical implementation of the regulations concerning ESPs, the U.S. Department of Energy (DOE), through Sandia National Laboratories (Sandia) initiated a demonstration project.

On behalf of the nuclear industry, the Joint Contractors (JC) [composed of Southern Electric International, Inc. (SEI); Commonwealth Research Corporation (CRC); and Public Service Corporation of New Jersey (PSC of NJ)] have entered into a contract with Sandia/DOE for the performance of the demonstration project.

^aUpdated in November, 1992.

PREREQUISITES FROM ONGOING PROGRAMS

CURRENT NUCLEAR PLANT PERFORMANCE
{Building Block 1}
(Licensees)

LOW-LEVEL RADIOACTIVE WASTE
{Building Block 12}
(EEI-ACORD)

HIGH-LEVEL WASTE
{Building Block 11}
(EEI-ACORD)

ADEQUATE ECONOMIC FUEL SUPPLY
{Building Block 13}
(EEI)

GENERIC SAFETY/ENVIRONMENTAL REGULATION AND INDUSTRY STANDARDS

PREDICTABLE LICENSING & STABLE
REGULATION {Building Block 2}
(NUMARC)

ALWR UTILITY REQUIREMENTS
{Building Block 3}
(EPRI-USC)

PROJECT-SPECIFIC ACTIVITIES

NRC DESIGN CERTIFICATION
{Building Block 4}
(Plant Designers)

SITING
{Building Block 5}
(EPRI-USC/NUMARC)

FIRST-OF-A-KIND ENGINEERING
{Building Block 6}
(ARC-EPRI)

ENHANCED STANDARDIZATION BEYOND DESIGN
{Building Block 7}
(INPO)

INSTITUTIONAL STEPS

ENHANCED PUBLIC ACCEPTANCE
{Building Block 8}
(USCEA)

CLARIFICATION OF OWNERSHIP & FINANCING
{Building Block 9}
(EEI)

STATE ECONOMIC REGULATORY ISSUES
{Building Block 10}
(EEI)

ENHANCED GOVERNMENTAL SUPPORT
{Building Block 14}
(ANEC)

Figure I-1. NPOC Building Block Summary.

Figure I-2. Early Site Permit Demonstration Program (ESPDP) Participants.

The major organizations involved in the Early Site Permit Demonstration Program (ESPDP) include Sandia representing DOE and the JC representing the nuclear industry. The Electric Power Research Institute (EPRI) and the Nuclear Management and Resources Council (NUMARC) provide program management and technical contributions to the ESPDP. SEI (of the JC) will also provide certain contract administration services for the JC. Figure I-2 illustrates the key relationships between the ESPDP participants.

DOE and the JC reached agreement on the elements of the ESPDP as comprised by the following three phases:

- PHASE I Technical and Regulatory Analysis
- PHASE II Applicant Selection and Planning for Phase III
- PHASE III Site-Specific Activities

These three phases are further broken down into tasks, subtasks, and parts (activities). The industry-funded portion of these ESPDP phases was initiated during July 1991; whereas the DOE-funded portion commenced during September 1991.

The objective of the ESPDP is to demonstrate successfully the use of 10CFR52 to obtain ESPs for one or more U.S. sites for one (or more) ALWR nuclear power plants. With Phase III, it is anticipated that preparation of the ESP application and interaction with NRC during the application review process will result not only in an ESP for the applicant(s) but also in the development of criteria and definition of processes, setting the precedent that facilitates ESPs for subsequent ESP applications.

The three-phased approach (previously discussed) was determined to provide for the earliest identification and potential resolution of both technical and regulatory issues and uncertainties, thus providing a greater degree of assurance that the combined industry/DOE ESPDP objectives could be met. Further, the three-phased approach brings to bear nuclear industry resources currently engaged in related activities under the coordination of Building Block 5 of the NPOC plan. EPRI and NUMARC have provided, as agreed in *Memoranda of Understanding*, support to the JC for accomplishing the objectives of the ESPDP. SEI contract administration services will be performed under a contractual agreement with the JC. In addition, the JC are utilizing (in an advisory capacity) the expertise of ISG members. The ISG coordinates its activities with the EPRI ALWR Utility Steering Committee (EPRI-USC) and the NUMARC Standardization Oversight Working Group (SOWG).

The ESPDP and the support structure described in the preceding paragraphs take advantage of a broad base of program participation throughout the U.S. nuclear

industry. This approach provides the highest possibility that a site(s) will be identified upon completion of Phase II, so that all aspects of the ESPDP objective can be accomplished.

The overall JC responsibility for ESPDP program management and direction is exercised through a Program Management Council (PMC), which is depicted in Figure I-3. The PMC is composed of a representative from each of the three JC organizations and two senior-management-level representatives (one each from NUMARC and EPRI). The chairperson of the PMC, who is one of the three JC representatives, functions as the single-point, spokesperson for the JC.

In execution of its responsibilities, the PMC is supported by various staff responsible for carrying out the day-to-day direction of the project activities:

1. The contracts administration staff is responsible for the project's contract processing and financial management of the DOE-funded portion of the ESPDP. This responsibility is carried out by SEI under an agreement with the JC.
2. The technical program management staff is responsible for technical reviews and integration of all project activities. This responsibility is carried out by EPRI under a *Memorandum of Understanding* with the JC. The EPRI staff is also responsible for the performance of EPRI-funded contracts under the ESPDP.
3. Regulatory interface management is carried out by NUMARC under a *Memorandum of Understanding* with the JC. The NUMARC staff also has the responsibility for the performance of NUMARC-funded contracts under the ESPDP.

The PMC is also supported by an Executive Director, who is responsible for overseeing day-to-day activities to ensure that PMC guidance and direction is appropriately implemented. The Executive Director also acts as the principal point-of-contact for the PMC on matters related to the ESPDP.

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Figure I-3. Early Site Permit Demonstration Program (ESPDP) Program Management.

DOE and Sandia (with JC concurrence) set program objectives and overall direction for the ESPDP. Sandia has responsibility for providing technical/program management oversight on behalf of DOE; while the JC (in collaboration with EPRI and NUMARC) represent the interests of the U.S. nuclear industry and are responsible for execution and management of ESPDP. The ISG provides technical and licensing advisory expertise to the PMC. Further, each member of the JC has representation on the ISG.

B. PURPOSE OF THE REVIEWS

Siting regulatory processes and acceptance criteria are contained in over 100 separate documents. Many of these documents had not been reviewed or used in over a decade, and some have been or are in the process of being updated by both NRC and industry. Comprehensive reviews were performed to establish whether the siting requirements and documentation for an ESP or a COL are self-consistent, whether the acceptance criteria are sufficiently well-defined and clear, and whether the licensing process leading to the issuance of an ESP is unambiguously specified. In addition, methodologies that can be used by nuclear utilities to show compliance with applicable ALWR siting requirements, regulatory guidance, and acceptance criteria were linked to the technical and licensing reviews.

The complimentary licensing and technical reviews provide the bases for the results presented in this report. From the licensing perspective, concentration was placed on (1) ambiguities in the regulations and regulatory guidance resulting from inactivity in the siting arena for nearly 20 years and from the new language and concepts of 10CFR52, and (2) the ability of future applicants to follow (logically) the site selection and ESP processes from beginning to end. The technical review concentrated on the currency and consistency of the body of regulations, regulatory guidance, and acceptance criteria from (1) a technical methodology perspective, (2) the timing and availability of required technical information, and (3) differences in the technical requirements of ALWRs that should be considered when siting and licensing new nuclear power plants. The results of these complimentary reviews have received a thorough, independent industry and program review.

C. PURPOSE OF THIS REPORT

This report is intended to accomplish two objectives:

1. Update utilities' (and other potential permit holders') understanding of the Federal regulatory (in particular, NRC) requirements, regulatory guidance, and acceptance criteria for submittal of ESP applications and site-specific licensing.
2. Facilitate NRC and industry interaction with respect to technical and licensing review findings. This includes maximizing coordination of and provision of the industry's position and comments on the NRC ongoing effort to review and update the regulations and regulatory guidance associated with 10CFR52 activities.

In addition to these two objectives, this report represents the deliverables as required by Tasks 1 and 2.5 of the Overall Program Scope of the ESPDP as defined in the Program Management Plan.

II. SITING REQUIREMENTS, REGULATORY GUIDANCE, AND ACCEPTANCE CRITERIA

A. INTRODUCTION

In this section, requirements for site licensing of new nuclear power plants are identified. The approach used to identify the requirements involved four activities:

1. Compilation of a comprehensive list of current siting-related documentation (presented in Appendix A).
2. Development of a cross-reference index of the documentation contained in the compiled listing (presented in Appendix B).
3. Conduct of regulatory analysis (summarized in the flowcharts included at the end of this section).
4. Development of a generic timeline for siting applications and approvals (presented as part of the section discussion).

B. DISCUSSION

The results obtained from each of the four activities summarized above are discussed in the following paragraphs supplemented by attachments, figures, and appendices as indicated.

1. LIST OF SITING-RELATED DOCUMENTATION

A listing of over 100 siting-related documents were compiled and reviewed to ascertain current applicability to the siting process. This review resulted in the comprehensive document list provided in Appendix A.

2. *CROSS-REFERENCE INDEX*

An index that provides a cross-reference between siting-related regulations, regulatory guidance, and acceptance criteria was developed to enhance the usefulness of the information gathered during the conduct of this project. This cross-reference index provides primary information associated with the source documents and the referenced documents (e.g., title and type of reference). The cross-reference index is presented in Appendix B.

3. *REGULATORY ANALYSIS*

Regulatory analysis flowcharts have been developed to assist future applicants in understanding the requirements for application, permitting, and licensing of sites. The summary flowcharts, presented in the following sections, are separated into three functional categories:

- (a) **Siting Application Requirements (ESP and COL):** This series of flowcharts presents the current siting requirements for various combinations of ESP, COL, and Appendix Q siting applications [i.e., ESP application requirements (10CFR52), COL with ESP application (10CFR52), COL without ESP application (10CFR52), Appendix Q pre-application (10CFR52), reactor site criteria (10CFR100), and Final Safety Analysis Report (FSAR) and inspection, tests, analysis, and acceptance criteria (ITAAC) (10CFR52)].
- (b) **Environmental Report Regulations:** This series of flowcharts presents the requirements for preparing and submitting an Environmental Report pursuant to current Regulatory Guide 4.2 criteria.
- (c) **Emergency Planning/Preparedness Regulations:** This series of flowcharts presents the requirements for ESP and/or COL siting applications with respect to emergency planning/preparedness.

4. *GENERIC TIMELINE*

A generic timeline was developed to provide an indication of the planning, activities, and timing associated with the siting application and approval process. Two generic timelines are presented in Figures II-1 and II-2. The first shows the timing of the ESP application and approval process. The second shows the ESP timing, as well as the timing for COL application and plant construction.

EARLY SITE PERMIT TIMELINE

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Figure II-1A

EARLY SITE PERMIT TIMELINE

* Includes Environmental Report, Site Safety Report, Emergency Plan (optional at ESP stage), and Site Redress Plan (required only if advanced work authorization desired).

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Figure II-1B

ALWR GENERIC TIMELINE

Note: Evolutionary Plant construction duration is 4 years, and Passive Plant construction duration is 3 years.

Figure II-2A

ALWR GENERIC TIMELINE

* Construction environmental monitoring duration depends on site preparation time and plant design (passive design = 36 months construction; evolutionary design = 48 months construction).

** Includes Environmental Report, Site Safety Report, Emergency Plan (optional at ESP stage), and Site Redress Plan (required only if advanced work authorization desired).

*** Includes Safety Analysis Report, Plant Specifications, ESP Parameters Conformance Demonstration, and Emergency Plan.

Figure II-2B

II. SITING REQUIREMENTS, REGULATORY GUIDANCE, AND ACCEPTANCE CRITERIA

Summary Flowcharts for Site Application Requirements

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- 52 (1)(i) The number, type, and thermal power level of the facilities for which the site may be used.
- 52.17(a)(1)(ii) Boundaries of the site. → RG - 1.70, Chapter 2, Section 2.1
- 52.17(a)(1)(iii) The proposed general location of each facility on the site. → RG - 1.70, Chapter 2, Section 2.1
- 52.17(a)(1)(iv) The anticipated maximum levels of radiological and thermal effluents each facility will produce.
- 52.17(a)(1)(v) The type of cooling systems, intakes, and outflows that may be associated with each facility.
- 52.17(a)(1)(vi) The seismic, meteorological, hydrological characteristics of the proposed site. → 10 CFR Part 100, Appendix A
- 52.17(a)(1)(vii) Location and description of any nearby industrial, military, or transportation facilities and routes. → RG - 1.70, Chapter 2, Section 2.2
- 52.17(a)(1)(viii) The existing and projected future population profile of the area surrounding the site. → RG - 1.70, Chapter 2, Section 2.1.3

[RG 4.7]

- 52.17(a)(2) A Complete Environmental Report → 10 CFR Part 51, Section 51.45 and 51.50 → Continued in Environmental Report Package
- Report need not include an assessment of benefit, (for example, need for power) of the proposed action, but must include an evaluation of alternative sites to determine whether there is any obviously superior alternative to the site proposed.

- 52.17(b)(1-3) Emergency preparedness requirements for different options. → Continued in Emergency Preparedness Package

- 52.17(c) If applicant wishes to perform limited construction after ESP approval. → 50.10(e)(1) May commence construction as follows:

Applicant must submit site redress plan for the event that activities are preformed and the ESP expires.

- (i) Preparation of the site for construction of the facility (including such activities as clearing, grading, construction of temporary access roads and narrow areas).
- (ii) Installation of temporary construction support facilities (including warehouses, shop facilities, utilities, concrete mixing plants, docking and unloading facilities and construction support building).
- (iii) Excavation for facility structures.
- (iv) Construction of service facilities (including roadways, paving, railroad spurs, fencing, exterior utility and lighting systems, transmission lines, and sanitary sewage treatment facilities).
- (v) The construction of structures, systems and components that do not prevent or mitigate the consequences of postulated accidents.

- 52.19 → 10 CFR Part 170.12 Fees are set for filing and review; also condition for payment

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Combined Operating License (COL) with Early Site Permit (ESP)

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Combined Operating License (COL) without Early Site Permit (ESP)

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10 CFR Part 52

Early Site Permits; Standard Design Certification; and Combined Licenses for Nuclear Power Plants

Part 52, Appendix Q

Pre-Application Early Review of Site Suitability Issues

Provide Information

50.33(a-c)

- Name of Applicant;
- Address of Applicant;
- Description of Business or Occupation of Applicant;

50.33(e)

The class of license applied for.

10 CFR 170

Fees are set for filing and review.

Issue(s) of site suitability for which early review may be sought.

50.34(a)(1)

- Description of Safety Assessment
 - Site and Facility Interrelations
 - 10 CFR Part 100 Site Evaluation Factors
 - Analysis and Assessment of:
 - major structures
 - systems and components

10 CFR Part 100

R.G. - 1.70

50.30(f)

Environmental Report

10 CFR Part 51, Subpart A

50.4 & 50.30

Submittal Administrative Requirements

Continued on Page 8

Continued on Page 10

Continued in Environmental Report Package

Information with respect to operation of the facility at the projected power level need not be supplied

Upon completion of review by the staff and, if 50.34(a)(1) safety review is requested, the ACRS, the staff shall prepare a Staff Site Report. Any Staff Site Report prepared and issued IAW this appendix may be incorporated by reference, as appropriate, in a application for construction permit for a utilization facility which is subject to 51.20(b) of this chapter and is of the type specific is 50.21(b)(2) or (3) or 50.22 of this chapter. A staff site report shall not constitute a commitment to issue a permit or license.

March 1993

10 CFR Part 100 (Reactor Site Criteria)

March 1993	→ 100.10(a) Characteristics of reactor Design and Proposed Operation	→ 100.10(a)(1)	Intended use of reactor, including proposed maximum power level and nature of contained radioactive materials	Part 100, Appendix A →	Continued on Page 9
		→ 100.10(a)(2)	The extent to which generally accepted engineering standards are applied to the design of the reactor		
		→ 100.10(a)(3)	The extent to which the reactor incorporates unique and unusual features.		
		→ 100.10(a)(4)	The safety features that are to be engineered into the facility and those barriers that must be breached as a result of an accident before release of radioactive material to the environment		
	→ 100.10(b) Population density and use characteristics of the site environs, including the exclusion area, low population zone, and population center distances				
	→ 100.10(c) Physical characteristics of the site, including seismology, meteorology, geology, and hydrology	→ 100.10(c)(1)	Seismic and Geologic Siting Criteria for Nuclear Power Plants		
		→ 100.10(c)(2)	Meteorological conditions at the site		
		→ 100.10(c)(3)	Geological and Hydrological characteristics of the proposed site		
	→ 100.10(d) Compensating engineering safeguards for unfavorable physical characteristics				
	→ 100.11 Determination of exclusion area, low population zone, and population center distances	→ 100.11(a)(1)	Exclusion Area	→ RG-4.7, Section 3
Population Consideration	
	→ 100.11(a)(2)	Low Population Zone			
	→ 100.11(a)(3)	Population Center Distance	→ RG 1.3, 1.4, 1.5, 1.24 and 1.25 provide calculation methods		
	→ 100.11(b)	Sites with multiple reactors	→ 100.11(b)(1)	Demonstrate that reactors are independent; or	
			→ 100.11(b)(2)	Demonstrate that if not independent; an accident at one reactor would not affect safety of operation at any other	
			→ 100.11(b)(3)	Demonstrate that simultaneous operation of multiple reactors at the site will not result in total radioactive effluent releases beyond the allowable per applicable regulations	

Seismic/Geologic characteristics of site

- 10CFR Part 100, Appendix A [Seismic and Geologic Siting Criteria for Nuclear Power Plants]
- RG - 1.70, Section 2.5 (identifies safety-related site characteristics)
- RG - 1.29 (discusses plant safety features which are to be controlled by engineering design)

Required Investigation → APPENDIX Vibratory and Motion
→ Surface Faulting

Application to Engineering Design

Meteorological conditions at the site

- RG - 1.70 [Section 2.3]
- RG - 1.23 [Onsite Meteorological Programs]
- RG - 1.3 [Assumptions used for evaluating the potential radiological consequences of a loss of coolant accident for BWR]
- RG - 1.4 [Assumptions used for evaluating the potential radiological consequences of a loss of coolant accident for PWR]
- RG - 1.5 [Assumptions used for evaluating the potential radiological consequences of a steam line break accident for BWR]
- RG - 1.24 [Assumptions used for evaluating the potential radiological consequences of a PWR radioactive gas storage tank failure]
- RG - 1.25 [Assumptions used for evaluating the potential radioactive consequences of a fuel handling accident in the fuel handling and storage facility for BWR & PWR]

Seismic and Geologic Design Bases → Design Base for Vibratory Ground Motion

Determination SSE
Determination OBE

→ Determine need to design for surface faulting

Determine zone requiring fault investigation

→ Determine design bases for seismically induced flood and water waves

→ Determine other design considerations

Soil and slope stability

Cooling water supply

Distant structures

Geological and Hydrological characteristics of the proposed site

- 10CFR Part 100, Appendix A → (see Appendix A)
- RG 1.59 [Design Basis Floods for Nuclear Power Plants]
- RG 1.70 [Section 2.4]
- 10CFR 50, Appendix A [General Design Criterion 2]
- RG 1.27 [Ultimate Heat Sink for Nuclear Plants]

NOTE: 10 CFR Part 100 will be revised in 1992.

March 1993

→ 52.79 (b) Provide technically relevant information required of applicants for an operating license

→ 10 CFR Part 50.34 (b) **Final safety Analysis Report**

→ 52.47 (a)(1) Content of Design Certification → 52.47(a)(1)(i)

Technical information required for construction permit and operating license by 10 CFR Part 20, Part 50 and its appendices, Part 73 and Part 100, which is technically relevant to the design and not site specific

Continued on Page 8

Technical information incorporated from certified design into an FSAR (plant design specific) at COL submittal as required by 10 CFR Part 50.34(b)(2), (3), (4) and (5), 50.34(f)

52.47(a)(1)(ii) Three Mile Island requirements set forth in 10CFR 50.34(f)

52.47(a)(1)(iii) The site parameters postulated for design, and the analysis and evaluation of the design in term, of such parameters

52.47(a)(1)(iv) Proposed technical resolution of unresolved safety issues and medium and high-priority Generic Safety Issues of NUREG - 0953 relevant to the design

52.47(a)(1)(v) Design specific PRA

52.47(a)(1)(vi) ITAAC necessary to demonstrate design will be built and operate as required

(52.47(a)(1)(vii) The interface requirements that must be met by those portions of the plant which are not certified)
(52.47(a)(1)(viii) Justification that requirements of 52.47(a)(1)(vii) can have ITACs (Tier 1))

52.47(a)(1)(ix) A representative conceptional design for portions of of plant not certified

at COL: demonstrate compliance with interface requirements have been met by design.

→ 52.47(a)(2) Have available for audit procurement specifications and installation and construction specifications

March 1993

Continued on Page 11

May be incorporated
by reference from ESP

→ 50.34(b)(1) Set current information such as the results of the environmental and radiological monitoring program

→ 50.34(b)(6) Facility Operation

(i) Applicant's organizational structure, allocation of responsibility and authority, and personnel qualification requirements

(ii) Managerial and Administration control to be used to a more safe operation. Appendix B "QA Criteria for Nuclear Power Plants" sets forth the requirements

(iii) Plans for preoperational testing and initial operation

(iv) Plans for conduct of normal operations

(v) Plans for coping with emergencies (items specified in Appendix E)

(vi) Proposed technical specifications prepared IAW 50.36

(vii) Multiple unit sites: management and controls to ensure safety impact of construction on operating plant

→ 50.34(b)(7) Technical qualifications of applicant to engage in proposed activities

→ 50.34(b)(8) Description of plans for operator requalification program (Part 55)

→ 50.34(b)(9) Description of protection provided against pressurized thermal shocks [50.61(b)(1) and (b)(2)]

→ 10CFR Part 50.34(c) [Physical Security Plan] → IAW Part 73 and Part 11 submit Part I:

- vital equipment
- vital areas
- isolation zones

Part II:

- tests
- inspections
- other means used to demonstrate compliance

March

Continue on Page 12

93

→ 10CFR Part 50.34(d) (Safeguards Contingency Plan) → IAW P. , Appendix C provide plan that complies with 73.50, 73.55, and 73.60

Page 12

→ 10CFR Part 50.34(e) Protection against unauthorized disclosure of security and safeguards contingency plans

→ 10CFR Part 50.34a Design Objectives for Equipment to Control Releases of Radioactive Material in Effluents Nuclear Power Reactors

→ 50.34a(a) Addressed in Design Certification

→ 50.34a(b)(1) Addressed in Design Certification

→ 50.34a(b)(2)(i)(ii) Addressed in Design Certification

→ 50.34a(b)(3) General description of packaging, storage and shipment offsite of solid radioactive waste

- 50.34a(c)
- Description of equipment, maintenance and use of equipment for the control of gaseous and liquid radioactive effluents
 - Revised estimates of effluents if the expected releases and exposures differ from estimates submitted in the ESP

NOTE:
Regulatory Guide 1.70 Specify the "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants"

March 1993

II. SITING REQUIREMENTS, REGULATORY GUIDANCE, AND ACCEPTANCE CRITERIA

Summary Flowcharts for ER Requirements

March 1993

10 CFR, Part 52 Subpart A - Early Site Permit (ESP)

52.17 Contents (pages 2, 3, 4)

The report need not include an assessment of the benefit (for example, need for power) of the proposed action, but must include an evaluation of alternative sites to determine whether there is any obviously superior alternative to the site proposed

Site activities are allowed IAW 10 CFR 50.10(e)(1) if site redress plan is submitted with ESP

10 CFR, Part 52 Subpart C - Combined Licenses (COL)

COL with ESP

52.79 Contents (page 8)

COL without ESP

52.79 Contents (page 8)

52.79(a)(2) → 50.30(f)

Must fully comply with Subpart A, Part 51

A supplement to "Applicant's Environmental Report - Operating License (OL) Stage" to the "Applicant's Environmental Report Construction Permit (CP) Stage" must be submitted with the OL. Report must discuss or reflect new information in addition to that discussed in the CP stage environmental impact statement.

March 1993

**SECTION A
INTRODUCTION**

1. National Environmental Goals (NRC Action)

National Environmental Policy
Act of 1969

"...it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may -

"(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

"(2) assure for all American safe, healthful, productive, and aesthetically and culturally pleasing surrounding;

"(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

"(4) preserve important historic, cultural, and natural aspects of national heritage, and maintain, wherever possible, and environment which supports diversity and variety of individual choice;

"(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

"(6) enhance the quality of renewable resources and approach the maximum of attainable recycling depletable resources."

**2. Federal Water Pollution
Control Act Am. of 1972**

The responsibilities of the NRC and EPA under NEPA as affected by the FWPCA are the subject of a MOU

R.G. - 4.2
Section A.3(c)(1)

**Regulatory Guide 4.2
Rev. 2)**

Preparation of
Environmental Reports
for Nuclear Power
Stations

**SECTION B
STANDARD FORMAT
AND CONTENT OF
ENVIRONMENTAL REPORTS**

Purpose of Proposed
Facility and Associated
Transmission

The Site and
Environmental
Interfaces

The Plant

Environmental Effects
of Site Preparation,
Plant Construction, and
Transmission Facilities

Er
o:

3. NRC Implementing Actions
Concerning the Environment

R.G. 4.2.A.3(a) → 10CFR Part 51

R.G. 4.2.A.3(b) → Appendix I to
10 CFR Part 50

R.G. 4.2.A.3(e)(1) → MOU between NRC
and EPA for NEPA
and FWPCA
(40 FR 60115)
12/31/75

R.G. 4.2.A.3(c)(2) → MOU between NRC
and Corps of Eng.,
USA (40 FR 37110)
8/25/75

a) coastal erosion
and other shoreline
modification,
shoaling and scour-
ing

b) siltation and
sediment processes

c) dredging activities
and disposal of
dredged materials

d) location of struc-
tures in or affecting
navigable waters

4. Commission Action on
Environmental Reports

51.20

51.22

51.25

51.26

- distribution of
report
- public announcement
and comment
- NRC preparation of
Final Environmental
Impact Statement

Environmental Effects
Plant Operations

Effluent and Environmental
Measurements and
Monitoring Programs

Environmental
Effects of
Accidents

March 1993

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References

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REGULATORY GUIDE 4.2 (B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

CHAPTER 2
THE SITE AND
ENVIRONMENTAL
INTERFACES

Environment
Review Plan

NUREG-0555

tel Standard
ns
May 1979

March 1993

REGULATORY GUIDE 4.2 (B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

Note: Benefit assessment is not required for ESP submittal. (52.17(a)(2))

CHAPTER 1

PURPOSE OF THE PROPOSED FACILITY AND ASSOCIATED TRANSMISSION

NUREG-0551
Section 8.
8.2.2, 8.3
9.1.2

, May. 1979
1, 8.2.1,
, 8.4, 9.1.1,

Environmental
Standard Review
Plans

1.3
CONSEQUENCES
OF DELAY

■ the effects of 1, 2
3 years delay in
construction on
applicant's system,
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REGULATORY GUIDE 4.2 (B) STANDARD AND CONTENT OF ENVIRONMENTAL REPORTS

REGULATORY GUIDE 4.2 (B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

activity

D-0555
ion 4.5, 5.4.1

PR Part 20
PR Part 50
- 8.8

4.5
Construction Impact
Control Program

NUREG-0555
Section 4.1.1
4.1.2, 4.2.1,
4.2.2, 4.3.1,
4.3.2, 4.4.1,
4.5, 4.6, 5.1.2,
6.6, 6.7

AIF/NESP-003
10 CFR Part 423

March 1993

REGULATORY GUIDE 4.2 (B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

CHAPTER 5
ENVIRONMENTAL
EFFECTS OF PLANT
OPERATION

Environmental
Review I

NUREG-05

5 May 1979

REGULATORY GUIDE 4.2(B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

Environmental and Standard
Review Plans

—NUREG-0555, May 1979

7.3
Other Accidents

↓
Accidents identified
as a result of
Section 2.2 of PSAR,
R.G. - 1.70

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REGULATORY GUIDE 4.2 STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

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5, May 1979

March 1993

REGULATORY GUIDE 4.2 (B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

Environmental Standard
Review Plans

NUREG-0555, May 1979

8
Costs

↓
NUREG-0555
Sect. 4.4.2, 5.8.2,
9.1.3, 10.4.2

Sect. 8.2 of R.G. - 4.2
For Internal and External
Cost Studies

March 1993

REGULATORY GUIDE 4.2(B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

Environmental Standard
Review Plant

NUREG-0555, May 1979

9.3
Cost-Effectiveness
Analysis of Candidate
Site-plant Alternatives

NUREG-0555
Section 9.2

9.4
Cost of Alternative
Power Generation
Methods

NUREG-0555
Section 9.2

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March 1993

REGULATORY GUIDE 4.2(B) STANDARD FORMAT AND CONTENT ENVIRONMENTAL REPORTS

**CHAPTER 10
STATION DESIGN
ALTERNATIVES**

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MUREG

Considerations:

1. Range of Alternatives
2. Normalization of Cost Comparisons
3. Effect of Capacity Factor
4. Monetized Costs
5. Environmental Costs
6. Supporting Details
7. Presentation of Alternative Designs

10.1 Circulating System (excluding of intake and discharge) MUREG-0555 Section 9.3.1, 9.3.2	10.2 Intake System MUREG-0555 Section 9.3.2(A)	10.3 Discharge System MUREG-0555 Section 9.3.2(B)	10.4 Chemical Waste Treatment MUREG-0555 Section 9.3.2(D), 9.3.3	10.5 Biocide Treatment MUREG-0555 Section 9.3.2(D), 9.3.3	1 8 8 M 8 9
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- Fish and Wildlife Coordination Act of 1958 Marine Sanctuaries Act of 1972 Coastal Zone Management Act of 1972
- Federal Water Pollution Control Act Amendments of 1972
- Endangered Species Act of 1973 MOU NRC/EPA, December 1973
- MOU NRC/Army Corps of Engineers, August 1973
- Federal/State/Local regulations on water use, water quality and effluent discharge.

Environmental Standard
Plan

0555, May 1979

ys

← 40 CFR 423

← Federal Water Pollution
Control Act, Public Law 92-500
Section 301, 306, 316(a), 316(b)

6 Military Waste Systems	10.7 Liquid Radwaste Systems	10.8 Gaseous Radwaste Systems	10.9 Transmission Facilities	10.10 Other Systems
EG-0555 Section 9.3.2(D), .3	↓ Appendix 1, 10 CFR Part 50 where design objectives and limiting conditions of operation are within numeric guides of Appendix 1, no further consideration need be given to reduction of radiological impact in formulating alternative plant designs.		MUREG-0555 Section 9.3.4	MUREG-0555 Section 9.3.2(C)

March 1993

REGULATORY GUIDE 4.2 (B) STANDARD FORMAT AND CONTENT OF ENVIRONMENTAL REPORTS

**CHAPTER 11
Summary
Cost-Benefit
Analysis**

**NUREG-0555
Sect. 10.4**

**CHAPTER 12
Environmental
Approvals and
Consultation**

**NUREG-0555
Section 1.2, 2.8**

**Provide status of
licenses, permits,
and other approvals
station construction
and operations
required by Federal,
State, Local and
regional authorities
for the protection of
the environment.**

CHAPTER 13
References

Submit a
bibliography
of sources.
Sources should
be cited by numerical
designation and
listed at the end
of the chapter to
which they refer.

March 1993

II. SITING REQUIREMENTS, REGULATORY GUIDANCE, AND ACCEPTANCE CRITERIA

Summary Flowcharts for Emergency Planning/Preparedness Requirements

March 1993

Emergency Preparedness Regulatory Summary

Subpart A Early Site Permits

52.17 Contents (page 2, 3, 4)

↓
52.17(a)(1) (page 2) → 50.33(a)-(d) (page 2)
→ 50.34(a)(1) (page 2) → Part 100 - RG. 4.7
Reactor Siting Criteria, TID 14844
(page 2 & 6)
→ 50.33(g) & (j) (page 2)
→ 50.34 (b)(6)(v) (page 2) → Part 50 Appendix E → NUREG-0654, 0396, 0696
(page 11, 12, 13)
52.17(2)(b)(ii) (page 2) → 50.47(b)-(d) (7, 8, 9, 10) → NUREG-0654, 0696, 0737, EPA 520/1-78-016
Part 50. App. E I
0737 Supp. 1
↳ RG. 1.97

COL without ESP (page 4)

52.79
52.79(a)(1)
52.79(a)(2) → 50.30(f)
→ Part 51 Subpart A
52.79(a)(3) → 52.17(c)
52.79(b) → 50.34 → 50.47(b) (page 7, 8, 9, 10)
Part 50 Appendix E → NUREG-0654, 0396, 0696
(pages 11, 12, 13)

COL with ESP (page 4 & 5)

52.79(c) → ITAAC
52.79(d) → 50.47(b) Part 50 Appendix E → NUREG-0654, 0396, 0696
52.79(2)(iii) → Part 50 Appendix E → NUREG-0654/REP-1 Rev. 1 Supp. 1
(pages 11, 12, 13)

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Subpart A - Early Site Permits

52.17 Contents of Applications

- (a)(1) Information required by 10 CFR 50.33(a)-(d), first three sentences of
- 50.33(a)-(d) Contents of Application general information
- 50.34(a)(1) & 52.17(b)(2)(ii) 50.34(a)(1) - description & safety assessment of site, features effecting facility design
- 50.33(g) & (j) 50.34(b)(6)(V) - site evaluation factors Part 100 -> Part 100 Reactor Site Criteria (See General Submittal Document)
- analysis & evaluation of major structures, components which bear on site acceptability identified in Part 100.
- 50.33(g) & (j) - submit response plans of State & local government wholly or partially within plume pathway
- if State & local emergency plans have been previously provided the applicant need only reference NUREG-0396 EPA 520/1-78-016 Planning Basis for Radiological Response Plans
- define EPZ 10/50 miles -> Plans
- 50.34(b)(6)(j) - plans for coping with emergencies shall include items in Appendix E -> Appendix E
- PSAR
- FSAR
- contents of plan
- implementing procedures
- 52.17(a)(1)(i) Type, number & thermal power level of facility
- (a)(1)(ii) site boundaries
- (a)(1)(iii) proposed general location of each facility
- (continue page 3)

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52.17(a)(1)(iv) anticipated maximum
level of radiological
& thermal effluents

(a)(1)(v) type of cooling systems, intakes and outflows

(a)(1)(vi) seismic, meteorological,
hydrological and
geologic characteristics

52.17(a)(1)(vii) location and description
of nearby industrial,
military, or
transportation facilities
and routes

52.17(a)(1)(viii) existing & projected
future population
surrounding the site

52.17(b)(1) Must identify:

- physical characters
unique to site; e.g., egress
limitations that could pose
a significant impediment to
the development of emergency
plans

52.17(b)(2) may also

52.17(b)(2)(i) - propose major features of the
emergency plans, such as EP2,
reviewed and approved by NRC
in consultation with FEMA or

52.17(b)(2)(ii)

- propose complete & integrated
emergency plan
- approved by NRC in consultation
with FEMA
- in accordance with 50.47

50.47
(see page 7)

52.17(b)(3) under 52.17(b)(1) and (2)(i)

- include description of contacts
- arrangements with local, State &
federal government agencies with
EP responsibilities
- under 52.17(b)(2)(ii) make good
faith efforts to obtain certifications
from governmental agencies that:

52.17(b)(3)(i) proposed plans are practicable

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52.17(b)(3)(ii) agencies are committed to participating in further development, including any field demonstrations

52.17(b)(3)(iii) agencies are committed to executing —————→ 44 CFR 352
their responsibilities,
application must contain certifications
if obtained, if not obtained application
must contain information including a
utility plan; providing reasonable
assurance that adequate protective measures
can and will be taken in a radiological
emergency

COL without ESP

52.79 Contents of applications;

Technical Information

- (a)(1) - reference ESP, but provide additional information required
- information sufficient to demonstrate design falls within ESP parameters
- resolve any significant environmental issue not considered

(2) does not reference ESP must comply with 50.30(f) in accordance with Part 51 Subpart A —————→ 50.30(f)

Part 51

Subpart A Environmental Protection Regulations for Domestic Licensing Related to Regulatory Functions

(3) does not reference ESP redress plan —————→ 52.17(c) (if provisions of 50.10(e)(1) are utilized)

(b) applicant must meet relevant information required by 10 CFR 50.34

50.34 —→ 50.47(b)

Part 50 Appendix E - NUREG-0654

- NUREG-0396

I

- NUREG-0696

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(see Part 50 Appendix E page 11)

52.79(a)(1)

52.79(d)(2)

If ESP not referenced or no prior approval of emergency plan then applicant shall:
- make good faith efforts to obtain certification from State/locals

(2)(i) plans are practicable

(2)(ii) agencies are committed, to development, field tests

(2)(iii) agencies are committed to executing their responsibilities in an emergency

- if certifications are not obtained applicant must contain information including utility plan
- providing reasonable assurance protective measures

→ Part 50

NUREG-0654 Rev. 1
Supp. 1

→ 44 CFR 352

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DOL with ESP

52.79(a)(1)

- reference ESP, but provide additional information required
- information sufficient to demonstrate design falls within ESP parameters
- resolve any significant environmental issue not considered

52.79(c)

- propose test, inspections, and analyses (ITAAC) if test inspections and analysis are performed and acceptance met, the facility has been constructed and will operate in conformity with the combined license.

52.79(d)

Application must contain emergency plan.

→50.47(b)

Part 50 Appendix E

NUREG-0654

NUREG-0696

NUREG-0396

(see Part 50 Appendix E page 11)

52.79(d) (1)

Applicant may incorporate by reference the emergency plan or major EP features approved in the ESP permit.

(2) If ESP not referenced or no prior approval of emergency plan then applicant shall:

- make good faith efforts to obtain certification from State/locals

(2)(i) plans are practicable

(2)(ii) agencies are committed, to development, field tests

(2)(iii) agencies are committed to executing their

responsibilities in an emergency

- if certifications are not obtained applicant must contain information including utility plan
- providing reasonable assurance protective measures

→Part 50

NUREG-0654 Rev. 1
Supp. 1

→44 CFR 352

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**10 CFR 50.47
Emergency Plans**

- (a)(1) NRC finding reasonable assurance adequate protective measures can and will be taken in the event of an emergency
- (2) NRC finding based on review of FEMA findings and on NRC assessment of onsite plans
- (b) The onsite, and except for paragraph (d), offsite plans must meet the following standards:
- (1) Primary responsibilities for emergency response
 - licensee, State & local
 - supporting organizations
 - Principal response organization has staff to respond, and augment on a continuous basis

→ NUREG-0654 Section II. A Assignment of Responsibility

→ FEMA - GM-IT-5 Agreements Among Governmental Agencies & Private Parties
 - (2) On-shift emergency response are unambiguously defined. Key initial accident response is maintained at all times, augmentation is available, offsite support & response specified

→ NUREG-0654 Section II B. Onsite Emergency Organization Table B-1
 - (3) Arrangements for requesting & effectively using assistance resources have been made. EOF will accommodate State & local staff and augmenting organizations identified

→ NUREG-0654 Section II C. Emergency Response Support & Resources

→ NUREG-0696 Functional Criteria for Emergency Response Facilities
 - (4) A standard emergency classification & action level scheme & bases is used by licensee, State/local to determine minimum initial offsite measures

→ NUREG-0654 Section II D. Emergency Classification System & Appendix 1

→ RG 1.101 Emergency Planning and Preparedness for Nuclear Power Reactors (alternative approach)
 - (5) - procedures have been established for
 - notification by licensee of State/ local emergency organization
 - initial & followup messages
 - means to provide early notification and clear instruction to the populace within EPZ

→ NUREG-0654 Section II E. Notification Methods & Procedures & Appendix 1 & Appendix 3

→ FEMA REP-10 Guide for the Evaluation of Alert and Notification Systems for nuclear power plants

→ FEMA AN-1, FEMA Action to Qualify Alert & Notification Systems Against NUREG-0654 & FEMA - REP-10

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50.47(b) (continued)

(6) Provisions for prompt communications among principal response organizations to emergency personnel & public.	→ NUREG-0654
Section II F. Emergency Communications & App. 3	→ FEMA - REP-10
- FEMA - AN-1	
(7) Information is made available to public, on initial actions, points of contact with news media, dissemination of information to the public.	→ NUREG-0654
Section II. G. Public Education and Information	→ FEMA - REP-11, A Guide to Preparing Emergency Public Information materials	→ FEMA - GM IT-20
Foreign Language Translation of Public Education Brochures & Safety Messages
(8) Adequate emergency facilities & equipment to support emergency response is provided & maintained.	→ NUREG-0654
Section II. H. Emergency Facilities, & Equipment Appendix 2	→ NUREG-0696 Rev.1
Functional Criteria for Emergency Response Facilities	→ NUREG-0737
TNI Action Plan Requirements
↓
NUREG-0737
Supp. 1
↓
R. G. 1.97 Rev.2
Accident Instrumentation
(9) Adequate methods & systems and equipment for assessing & monitoring actual or potential offsite consequences are in use.	→ NUREG-0654
Section II. I. Accident Assessment & Appendix 1, Appendix 2	→ NUREG-0578
MRC letter 10/30/79	
(10) A range of protective actions for emergency workers & public.	→ NUREG-0654
Section II. J. Protective Response & Appendix 1, & Appendix 4 | → EPA - 520/1-75-001
43 FR 58798 12/15/78
EPA - 520/1-78-001B
- SAND 77-1725
- SAND 78-0454 | → FEMA - IT-21
Acceptance Criteria for Evacuation Plans

- FEMA - IN-1
The Ingestion Exposure Pathway |
| (11) Means for controlling radiological exposures for emergency workers | → NUREG-0654
Section II. K. Radiological Exposure Control | → 10 CFR 20
- EPA 520/1-75-001
- ANSI 13.12 | |
| (12) Arrangements for medical services for contaminated injured individuals | → NUREG-0654
Section II. L. Medical and Public Health Support | → FEMA - MS-1
Medical Services | Note: (11) refers to "EPA Emergency & Lifesaving Activity Protective Action Guides" |
| (13) General recovery and re-entry plans | → NUREG-0654
Section II. M. Recovery & Re-Entry Planning and Post Accident Operations | → AIF Study
"Nuclear Power Plant Emergency Response Plan" 10/11/79 | |

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50.47(b) (continued)

- (14) - Periodic exercises will be conducted to evaluate major portions of response capabilities.
- Periodic drills will be conducted to develop & maintain key skills and correct deficiencies.

→ NUREG-0654
Section II. N. Exercise & Drills

→ FEM REP-14
REP Exercise Manual
- FEM REP-15
REP Exercise Methodology
- FEM - IT-5
Agreements Among
Governmental Agencies and
Private Parties

- (15) Radiological response training is provided.

→ NUREG-0654
Section II. O. Radiological
Emergency Response Training

- (16) Responsibilities for plan development, review & distribution is established. Planners are properly trained.

→ NUREG-0654
Section II. P. Responsibility
for Planning Effort:
Development Periodic Review
and Distribution of Emergency
Plans

50.47(c)(1) Failure to meet §(b) NRC can decline to issue operating license.
If State & local decline participation of §(b) an operating license may be issued if applicant demonstrates.

- (i) Applicants inability to comply with §(b) is a result of nonparticipation of State and/or local government.

- (ii) Applicant has made a sustained good faith effort to obtain participation of State and/or local government.

- (iii) Applicant's emergency plan provides reasonable assurance that health & safety of public is not endangered by the operation of the facility.
A utility plan will be evaluated against the same planning standards applicable to §(b) see: (A), (B)

→ NUREG-0654 Rev. 1
Supp. 1 9/88

- (2) Generally

- plume exposure EPZ 10 mile radius
- ingesting pathway EPZ 50 mile radius
- size of EPZ case by case for gas cooled & for reactors less than 250 MWT

→ NUREG-0654
Section I. D.
- NUREG-0396
- EPA 520/1-78-016
44 FR 61123 (10/23/79)

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50.47(d)(1)

- notwithstanding §(a) & (b)
- no offsite emergency determination need be made by NRC or FEMA prior to issuing an operating license for fuel loading or low power testing
- NRC finding onsite prior to fuel loading & 5% of rated power
- NRC base its finding of the onsite plans in paragraph (b) and Appendix E
- review of applicant plan includes the offsite standards:

→ NUREG-0654
Part 50 Appendix E

(1)	Arrangements for onsite assistance
Accommodate State/local at EOF, and
Identification of augmenting organization	→ NUREG-0654
Section II. C. Emergency
Response & Support Resources	→ FEMA GN 11-5
Agreements Among
Governmental Agencies
& Private Parties
(2)	Procedures for license communication with
State & local organization	→ NUREG-0654
Section II. E. Notification
Methods & Procedures	→ FEMA - REP-10, Guide for Alert & Notification Systems
- FEMA - AN-1, Action Quality Alert and Notification
Systems
(3)	Provisions for prompt communications	→ NUREG-0654
Section II. F. Emergency
Communications	→ FEMA - REP-10, Guide for Alert & Notification Systems
- FEMA - AN-1, Action Quality Alert and Notification
Systems
(4)	Adequate onsite emergency facilities &
equipment are provided & maintained. | → NUREG-0654
Section II. H. Emergency
Facilities & Equipment | → NUREG-0696
Criteria for
Emergency Response
Facilities

→ NUREG-0737,
Supp.1
TNI Action Plan
Requirements

→ FEMA REP-2/Rev. 2
Guidance on Offsite
Radiation Measurements

FEMA REP-13
Guidance on Offsite
Radiation Measurements
Phase 2 |
| (5) | Adequate methods, systems & equipment for
assessing & monitoring actual or potential
offsite radiological consequences. | → NUREG-0654
Section II. I. Accident
Assessment

→ NUREG-0654
Section II. J. Protective
Response | → NUREG-0578
NRC letter 10/30/79

→ EPA 520/1-75-001
EPA 520/1-78-001B |
| (6) | Medical service arrangements for
contaminated injured onsite individuals. | → NUREG-0654
Section II. L. Medical
& Public Health Support | → FEMA NS-1
Medical Services |
| (7) | Radiological emergency response training
of available to those offsite
support onsite emergencies. | → NUREG-0654
Section II. O. Emergency
Response Training | |

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10 CFR 50.47
Emergency Plans

50.47(d)(1)

Part 50
Appendix E. Emergency Planning
& Preparedness for Production
and Utilization Facilities

50.34(a)
CP PSAR General EP Plans

50.34(b)
OL FSAR Submitted EP Plans

Part 50, Appendix E(1)
Preliminary Safety
Analysis Report

Proposed Emergency Plans
Onsite & EPZ

Meet Standards
of 50.47(b)

- EPZ Size
Local EP Needs & Capabilities
Demography
Topography
Land Characteristics
Access Routes
Jurisdictional Boundaries

- Generally
Plume Exposure Pathway - 10 Miles
Ingestion Pathway - 50 Miles

NUREG-0396
EPA 520/1-78-016

Minimum PSAR Description

- II. A. - on and offsite emergency response organization
 - means for notification of persons assigned
- B. - Contacts, identification & arrangements made and documented with government, local, & State agencies coping with emergencies
- C. - protective measures to be taken onsite within each EPZ to protect health & safety;
 - procedures as to how to be carried out, e.g.:
 - (- who authorizes evacuation
 - how is the public notified & instructed
 - how evacuation carried out)
 - expected response of offsite agencies
- D. - Facility features to be provided onsite emergency first aid & decontamination & transportation of onsite individuals to offsite treatment facilities
- E. - Provisions to be made for emergency treatment at offsite facilities for individuals injured onsite
- F. - Provision for a training program for those assigned:
 - specific authority & responsibility
 - other persons not employees of licensee but may be of assistance
- G. - Preliminary analysis projecting time & means to be employed in notifying State/local & public
- Preliminary analysis of evacuation time estimates in various EPZ sectors including transient & permanent population noting major impediments to evacuation or taking protective actions

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Part 50, Appendix E. II. PSAR (cont'd)

- II. H. - Preliminary analysis reflecting the need for facilities, systems, & methods of determining degree of seriousness of emergency situations within and outside site boundaries, capabilities for dose projection, using real time meteorological information, field monitoring teams within EPZ.
- Preliminary analysis reflecting role TSC, EOF, in assessing information, recommending protective actions and disseminating information to the public.

Part 50, Appendix E. III. FSAR

FSAR shall contain plans

- overall concept of operations
- elements of advanced planning
- response roles for on & offsite
- coordinating activities
- assurance that protective measures can be taken

IV. Content of Plan

- compliance with 50.47(b)
- provide analysis time required to evacuate within the EPZ sectors for transient & permanent population

A. Organization	→50.47(b)(1)(2)(3)	→NUREG-0654	Section II. A, B, C
B. Assessment Actions	→50.47(b)(4)(5)(10)	→NUREG-0654	Section II. D, E, J
C. Activation of Emergency Organization	→50.47(b)(6)	→NUREG-0654	Section II. F
D. Notification Procedures	→50.54(s)(2) 50.47(b)(6)(7)	→NUREG-0654	Section II. F, G
E. Emergency Facilities & Equipment	→50.47(b)(8)(9)	→NUREG-0654	Section II. H, I
	50.47(b)(14)(15)	→NUREG-0654	Section II. H, O
F. Training			
1. full participation exercise, within two years of OL	→Part 2, Rules of Practice for Domestic Licensing Proceedings		
2. test annually			
3. offsite biennially full participation			
4. Remedial exercises will be required if emergency plan is not satisfactory			
NRC in consultation with FEMA			
5. formal critiques			
6. identify State & locals refusing to participate	→50.47(c)(1)		
G. Maintaining Emergency Preparedness			
H. Recovery			

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Part 50, Appendix E. V.

Implementing Procedures

- No less than 180 days prior to OL
licensee must submit detailed
implementing procedures

10 CFR 50.4

- Submit to NRC any changes to emergency
plan or procedures within in 30 days,
of the change

10 CFR 50.4

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III. LICENSING AND TECHNICAL REVIEW RESULTS

A. SUMMARY OF RESULTS

The results of the licensing and technical reviews revealed several significant points. The body of NRC regulations, guidance, and acceptance criteria represent a thorough and logical mechanism for meeting Federal requirements for siting a nuclear power generating facility. Environmental requirements in Federal legislation (e.g., the National Environmental Policy Act (NEPA), the Clean Water Act, the National Historic Preservation Act, and the Endangered Species Act) are comprehensively addressed by 10CFR52, Regulatory Guide 4.2, and NUREG-0555. Nuclear safety requirements are addressed in a comprehensive manner by 10CFR50, 10CFR100, Regulatory Guide 1.70, NUREG-0800, and other regulations and guidance documents. Where some revision or updating is necessary, the NRC is aware of and plans to address most of these needed changes [as described in its Early Site Permit Program Plan (ESP³), dated July 26, 1991]. The results as presented herein suggest that many activities are already underway. Other findings presented indicate that they should be addressed as part of ongoing industry and NRC activities or through refinement of current plans.

B. DISCUSSION

Review results were based on knowledge of current requirements, regulatory guidance, and acceptance criteria and on publicly-available information regarding in-process and proposed changes to those documents. The review results presented in this section are organized into three categories:

1. Siting Application Requirements^a
2. Environmental Report (ER)
3. Emergency Planning/Preparedness

The remainder of this section presents information on the review results for each of these categories. Discussion papers are divided into four areas: Background, Statement of Issue, Status, and Required/Planned Actions. These discussions represent, to the best of the Program's knowledge, up-to-date information on each issue. Ongoing and proposed NRC and industry interactions are addressed in the

^aAlthough the reviews for this category encompass the entire range of application requirements, both Environmental Report and Emergency Planning/Preparedness are presented as separate categories.

discussions, as appropriate. For easy reference, outstanding issues identified by the reviews are also summarized in Table III-1.

TABLE III-1. SUMMARY OF RESULTS OF LICENSING AND TECHNICAL REVIEWS

AREA	ISSUE	REF. NRC's ESP ³ JULY 26, 1991
SITING APPLICATION REQUIREMENTS		
Demography	<ul style="list-style-type: none"> • Codification of population density limits • Resolution of PIRG, et al., petition 	P-04 P-10
ALWR Accident Source Terms	<ul style="list-style-type: none"> • Decoupling offsite dose calculations from siting • Acceptance of ALWR source term and codification into 10CFR50 	P-04, P-05
Seismic and Geologic Siting Requirements	<ul style="list-style-type: none"> • Update of 10CFR100 seismic and geologic siting criteria and methodology • Decoupling siting from plant design and operational requirements 	P-06 P-06
Site/Plant-Specific Design Information Needed for ESP/COL Siting Applications	<ul style="list-style-type: none"> • Characterization of site and assessment of site acceptability • Acceptance of generic site and plant information 	

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TABLE III-1. CONTINUED.

AREA	ISSUE	REF. NRC's ESP ³ JULY 26, 1991
ENVIRONMENTAL REPORT		
Alternatives	<ul style="list-style-type: none"> • Alternative system design assessments • Alternative site reviews 	P-03
Benefits Assessment	<ul style="list-style-type: none"> • Clarification of "benefits assessment" exclusion 	
Fuel Cycle and Transportation	<ul style="list-style-type: none"> • Update of 10CFR51, Tables S-3 and S-4 	P-09
Updates to Regulatory Documents	<ul style="list-style-type: none"> • Incorporation of 10CFR52 language (e.g., in Regulatory Guide 4.2 and NUREG-0555) 	T-04, T-06
Severe Accident Mitigation Design Alternatives	<ul style="list-style-type: none"> • Consideration of SAMDAs in ALWR siting 	P-05
Transmission Facilities	<ul style="list-style-type: none"> • Clarification of ownership of transmission facility rights-of-way at ESP stage 	

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TABLE III-1. CONCLUDED.

AREA	ISSUE	REF. NRC's ESP ³ JULY 26, 1991
EMERGENCY PLANNING/PREPAREDNESS		
ALWR Emergency Planning/Preparedness	<ul style="list-style-type: none"> • 180-day requirement for implementing procedures prior to "operating license" • Two-year requirement for full participation exercise prior to "operating license" • ALWR emergency planning • Clarification of 10CFR52.17(b)(1-3) requirements regarding significant impediments and major features • Role of FEMA in site licensing 	<p>P-08</p> <p>P-08</p> <p>P-07</p> <p>T-05</p>

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SITING APPLICATION REQUIREMENTS

Siting application requirements were reviewed in order to ascertain their current applicability to ESP and COL. During the review, several recent and/or ongoing NRC activities were noted:

1. The NRC has added a new part to its regulations: 10CFR52, *Early Site Permits; Standard Design Certifications and Combined Operating Licenses for Nuclear Power Plants*. This regulation provides for issuance of ESPs. An ESP is a permit issued by the NRC to an applicant for a site where an unspecified nuclear plant(s) will be built within the terms and conditions of the ESP. ESPs are expected to make possible the resolution of site-related issues prior to COL applications. Site approval can also be requested as part of COL licensing. The Atomic Energy Act of 1954, as amended, and Title II of the Energy Reorganization Act of 1974 set forth the authority of NRC to issue permits and licenses associated with nuclear sites and facilities and to regulate the commercial nuclear power industry.
2. The NRC has begun to update and separate siting from plant design issues contained within its regulations. This action is based on the Commission's Staff Requirements Memorandum (SRM) to SECY-91-041, *Early Site Permit Review Readiness*. The SRM instructed the staff to commence the regulatory change effort and not wait until an application for an ESP is received. The NRC developed its Early Site Permit Program Plan (ESP³)^a which details the action plans and associated schedules for each identified siting regulation issue. To resolve these issues, revisions to Parts 100, 50, and 51 of Title 10 of the Code of Federal Regulations; to the Standard Review Plans (SRPs); and to regulatory guidance documents are needed. Development of new guidance is also needed to provide approaches where none exist.
3. The NRC has undertaken the revision of 10CFR100, *Reactor Siting Criteria*. The purpose of this revision is to separate plant design and siting issues and to update seismic and geologic siting criteria. These revisions will make Part 100 strictly a siting regulation. Specific information relevant to these revisions was presented to the ACRS by the NRC in December 1991 and January 1992 and forms the basis for the review results presented herein. The NRC issued a proposed rule for public comment on October 20, 1992 (57 FR 47802-47821).

Review results indicated that for the most part current requirements, regulatory guidance, acceptance criteria, and the needed changes that have been identified by the NRC in ESP³ should generate the necessary environment to provide for a stable standardized approach to nuclear

^aAt the time of this revision, ESP³ had not been updated since the July 26, 1991 version. The ESPDP understanding is that NRC is moving ahead with regulatory initiatives but is awaiting the announcement of an applicant prior to making decisions about staff resources and priorities.

power plant siting. Further, the review results confirmed the appropriateness of NRC-proposed plans to resolve many issues and identified additional issues that should be addressed.

A discussion of each of the following issues is presented as part of the Siting Application Requirements category:

- Demography
- ALWR Accident Source Terms
- Seismic and Geologic Siting Requirements
- Site/Plant-Specific Information Needed for ESP/COL Siting Applications.

DEMOGRAPHY

BACKGROUND

The proposed revision to 10CFR100 codifies the guidance contained in Regulatory Guide 4.7 related to population density adjacent to nuclear power plants. Regulatory Guide 4.7 presents the following criteria:

If "the population density, including weighted transient population, projected at the time of initial operation of a nuclear power station exceeds 500 persons per square mile averaged over any radial distance out to 30 miles (cumulative population at a distance divided by the area at the distance), or the projected population density over the lifetime of the facility exceeds 1,000 persons per square mile averaged over any radial distance out to 30 miles, special attention should be given to the consideration of alternative sites with lower population densities."

This codification of demographic criteria is intended to strengthen the NRC policy of discouraging metropolitan siting of nuclear power plants and to resolve the PIRG, et al., petition dated June 1, 1976, on the subject of requiring population density criteria in the vicinity of nuclear power plants.

There is insufficient improvement to protection of the public health and safety to necessitate limiting population density adjacent to nuclear power plant sites.

STATEMENT OF ISSUE

Codification of Regulatory Guide 4.7 criteria would impose restrictive criteria without technical basis and would not allow alternative approaches when such requirements are offered as guidance only.

STATUS

1. The nuclear industry, through NUMARC, has submitted comments to the NRC on this subject.^a
2. The NRC issued the proposed revisions to 10CFR100 for public comment on October 20, 1992 (57 FR 47802-47821).
3. The nuclear industry, through NUMARC, is preparing a response to the proposed revisions to 10CFR100.

^a Letter: Byron Lee, Jr. to the Honorable Ivan Selin, Chairman of NRC, July 8, 1992.

4. The proposed revision to RegGuide 4.7 was issued for public comment on November 25, 1992 (57 FR 55, 601-55, 602).
5. The ESPDP has conducted an evaluation of population distribution relative to meeting the quantitative health objectives of the NRC safety goal policy for offsite risk associated with nuclear power plants.

REQUIRED/PLANNED ACTIONS

1. The nuclear industry, through NUMARC, will file comments on the proposed revision to 10 CFR Parts 50, 52, and 100 during the public comment period, due March 24, 1993.
2. The ESPDP will continue to monitor this item and identify further actions as necessary.

ADVANCED LIGHT WATER REACTOR (ALWR) ACCIDENT SOURCE TERMS

BACKGROUND

Technical Information Document (TID) 14844, dated March 23, 1962, specifies the source term used to determine site conformance to the offsite dose limits in 10CFR100.^a Projected offsite doses from postulated credible accidents must meet these criteria before the site is acceptable for a nuclear power plant. The ALWR Utility Requirements Document (URD) specifies the source term for ALWRs.

STATEMENT OF ISSUE

There is a strong technical bases for establishing the ALWR source term.

STATUS

1. The NRC is currently working on establishing the ALWR source term. The ALWR source term requirements (in the URD) differ from those published for comment by NRC in draft NUREG-1465 issued on July 28, 1992. The public comment period ended on October 26, 1992. NUMARC offered comments and endorsed the comments of the ALWR Program.
2. The NRC is in the process of resolving public comments on the draft NUREG-1465. It should be noted that NRC issued an October 19, 1992 letter to ABB-Combustion Engineering allowing them to use the updated source term in evaluations of their system 80+ ALWR design.

REQUIRED/PLANNED ACTIONS

1. The ALWR Program will continue interactions with NRC to resolve technical differences and will provide comments on the NRC staff contractor reports dealing with natural and engineered fission product deposition and removal mechanisms.
2. The nuclear industry, through NUMARC, will file comments during the public comment period on the proposed changes to 10CFR50 regarding source terms (expected to be issued in the latter half of 1993).

^aIt is recognized that the proposed revision to 10CFR100 will move the offsite dose calculation requirements and proposed analytical methods into the interim revision of 10CFR50.

SEISMIC AND GEOLOGIC SITING REQUIREMENTS

BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) is reviewing and modifying the regulation associated with seismic and geologic siting criteria. The proposed changes would result in the placement of seismic and geologic criteria related to new licenses in a new Appendix B to 10CFR100, and seismic criteria related to plant design and operation in a new Appendix S to 10CFR50. Terms or phrases used at present to define regions for site seismic and geologic investigation (e.g., capable fault and tectonic province) are to be eliminated and replaced with terms more consistent with the source of the seismic input (e.g., seismic source, seismogenic source, and capable tectonic source). The new Appendix B, as currently drafted, requires both deterministic and probabilistic evaluations to establish the proper selection of the safe shutdown earthquake (SSE). In addition to these two appendices, NRC is developing four new draft regulatory guides and updates to the Standard Review Plans to support regulation revisions:

1. DG-1015, *Identification and Characterization of Seismic Sources, Expected Maximum Earthquakes and Ground Motion*
2. DG-1016, *Revision 2 to Regulatory Guide 1.12 Nuclear Power Plant Instrumentation for Earthquakes*
3. DG-1017, *Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Post-Earthquake Actions*
4. DG-1018, *Restart of a Nuclear Power Plant Shutdown by a Seismic Event*

The ALWR preliminary designs being developed by nuclear steam supply system (NSSS) vendors consider a range of foundation support conditions from rock to soils with varying depths to bedrock. To account for the effect of seismic soil-structure interaction for the range of sites, the designs have included various assumptions such as soil layering and variation of shear wave velocity with soil depth. This results in enveloping design response spectra at the base of the category 1 building structures and at each floor level which will be used in the design process.

NRC will require verification that the SSE response spectra derived for the actual siting foundation conditions and including embedment of the structures is enveloped by the building response spectra used to design the standard plants. This verification may be done by comparing the design spectra at the bottom of the building foundation. If the site response at the building foundation were found to exceed the design spectra, it would require a very costly reanalysis of the plant to demonstrate that allowable responses for structures, piping, and equipment are not exceeded.

STATEMENT OF ISSUE

As a result of this revision, two areas might affect the schedule for obtaining an ESP: (1) areas of site investigations resulting from new terminology and (2) definition of the appropriate methodology for establishing the SSE.

STATUS

1. As a result of a December 1991 ACRS recommendation, the proposed regulation changes and regulatory guidance were made publicly available for information.
2. The nuclear industry, though NUMARC, has submitted comments to the NRC based on the publicly available information noted above^a.
3. The NRC issued the proposed revisions to 10CFR100 for public comment on October 20, 1992 (57 FR 47802-47821).
4. The nuclear industry, through NUMARC, is preparing a response to the proposed revisions to 10CFR100. (Comments due March 24, 1993.)
5. The proposed revision to RegGuide 4.7, draft RegGuide (DG)-1015, -1016, -1017, and -1018 and portions of NUREG 0800 (Standard Review Plan on this subject) were issued for public comment as of November 25, 1992 (57 FR 55, 601-55, 602). (Comments due March 24, 1993.)
6. EPRI, in support of the ESPDP, is conducting research and development to provide updated guidelines for determining design basis ground motions.
7. EPRI/DOE/NRC agreed to a project to resolve the controversy of diverging probabilistic methodologies (i.e., EPRI vs. Lawrence Livermore National Laboratories) for determining SSE.

^aLetters: W. H. Rasin to E. S. Beckjord, May 8, 1992, and Byron Lee, Jr. to the Honorable Ivan Selin, Chairman, of NRC, June 22, 1992.

REQUIRED/PLANNED ACTIONS

1. The nuclear industry, through NUMARC, will file comments on the proposed revision to 10 CFR Parts 50, 52, and 100 during the public comment period, due March 24, 1993.
2. The ESPDP will develop a strategy for acceptance of the approach used in the seismic guidelines under development by EPRI by March 1993 with Phase III applicant participation.

SITE/PLANT-SPECIFIC INFORMATION NEEDED FOR ESP/COL SITING APPLICATIONS

BACKGROUND

The U.S. commercial nuclear industry [through nuclear industry groups, in cooperation with utilities and nuclear steam supply system (NSSS) vendors] has created a Utility Requirements Document (URD) containing design requirements for advanced light water reactors (ALWRs). Additional information is needed for ALWR permit, license, and other approval applications that could be generic to all sites, but that is beyond the URD scope. Because the various applications must include much site/plant-specific information that might not (normally) be available at the ESP stage, creation of a generic document would minimize *ad hoc* approaches, reduce costs to individual utilities, ensure consistency, and facilitate regulatory agency reviews.

Use of the generic enveloping approach would also be beneficial when extended to the COL phase. NRC requires COL applicants to submit information and analysis results that demonstrate that the plant design falls within the site characterization parameters specified in the ESP application [10CFR52.17(1)(1)]. Because there is no additional guidance as to what NRC requires for this demonstration, compliance could be difficult at the time of COL application unless generic analyses can be referenced. Addressing as many requirements as possible using generic enveloping criteria would add stability to the site licensing process.

STATEMENT OF ISSUE

Early confirmation is needed from the NRC that the generic plant parameter envelope (PPE) approach is acceptable. The level of detail required to demonstrate compliance with 10CFR52.17(1)(1) also needs to be better defined.

STATUS

1. The ESPDP has developed a document, *Early Site Permit Demonstration Program Plant Parameters Envelope*, revision 2, March 1993.
2. Through meetings and discussions with NRC, the ESPDP has received informal acceptance of the concept of using enveloping parameters for site characterization and environmental studies.

REQUIRED/PLANNED ACTIONS

The ESPDP will pursue formal acceptance of the concept of using enveloping parameters.

ENVIRONMENTAL REPORT

A discussion of each of the following issues is presented as part of the Environmental Report (ER) category:

- **Alternatives**
- **Benefits Assessment**
- **Fuel Cycle and Transportation**
- **Updates to Regulatory Documents**
- **Severe Accident Mitigation Design Alternatives**
- **Transmission Facilities**

ALTERNATIVES

BACKGROUND

The NRC ESP regulations require an applicant to submit an environmental report that includes an evaluation of alternative sites [10CFR52.17(a)(2)]. NRC guidance on preparing environmental reports specifies the following types of evaluations:

- Station design alternatives (Regulatory Guide 4.2, Chapter 10)
- Alternative sites (Regulatory Guide 4.2, Chapter 9)

1. Station Design Alternatives

The National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ), and the NRC regulations implementing NEPA require the evaluation of alternatives to the major Federal action under consideration but do not specify what alternatives, or range of alternatives, that must be considered. The guidance to consider station design alternatives regarding the design of some plant systems that significantly affect the plant's relationship with the environment, as stated in Chapter 10 of Regulatory Guide 4.2, revision 2, July 1976, represent the decision of the NRC staff as to how an alternative to one aspect of a nuclear plant design needs to be evaluated to comply with NEPA and the NRC regulations (i.e., 10CFR51). Because the performance of a station design alternative evaluation is not specifically a statutory or regulatory requirement, the NRC has discretion in determining the rigor with which the evaluation should be conducted and whether alternative approaches that are advocated are consistent with the fundamental principles of NEPA. From the regulatory guidance the following considerations:

- A. Range of alternatives
- B. Normalization of cost comparison
- C. Effect of capacity factor
- D. Monetized costs
- E. Environmental costs
- F. Support details
- G. Presentation of alternative designs

must be applied to the following items:

- A. Circulating system (excluding intake and discharge)
- B. Intake system

2 of 2

ALTERNATIVES

BACKGROUND

The NRC ESP regulations require an applicant to submit an environmental report that includes an evaluation of alternative sites [10CFR52.17(a)(2)]. NRC guidance on preparing environmental reports specifies the following types of evaluations:

- Station design alternatives (Regulatory Guide 4.2, Chapter 10)
- Alternative sites (Regulatory Guide 4.2, Chapter 9)

1. Station Design Alternatives

The National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ), and the NRC regulations implementing NEPA require the evaluation of alternatives to the major Federal action under consideration but do not specify what alternatives, or range of alternatives, that must be considered. The guidance to consider station design alternatives regarding the design of some plant systems that significantly affect the plant's relationship with the environment, as stated in Chapter 10 of Regulatory Guide 4.2, revision 2, July 1976, represent the decision of the NRC staff as to how an alternative to one aspect of a nuclear plant design needs to be evaluated to comply with NEPA and the NRC regulations (i.e., 10CFR51). Because the performance of a station design alternative evaluation is not specifically a statutory or regulatory requirement, the NRC has discretion in determining the rigor with which the evaluation should be conducted and whether alternative approaches that are advocated are consistent with the fundamental principles of NEPA. From the regulatory guidance the following considerations:

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- B. Normalization of cost comparison
- C. Effect of capacity factor
- D. Monetized costs
- E. Environmental costs
- F. Support details
- G. Presentation of alternative designs

must be applied to the following items:

- A. Circulating system (excluding intake and discharge)
- B. Intake system

- C. Discharge system
- D. Chemical waste treatment
- E. Biocide treatment
- F. Sanitary waste systems
- G. Liquid radwaste systems
- H. Gaseous radwaste systems
- I. Transmission facilities
- J. Other systems.

2. Alternative sites

Evaluation of alternative sites has been a standard part of the power plant siting process (Regulatory Guide 4.2, Chapter 9). At the ESP stage, the applicant will be required to submit information to this regard. NRC guidance to staff reviewers includes assessing the applicant's information on alternatives (NUREG-0555, Chapter 9). In addition, the NRC is considering the initiation of rulemaking (e.g., 10 CFR 51) to address alternative site reviews (ESP³).

STATEMENT OF ISSUE

1. Station-specific selection of systems and available alternatives may not be available at the time of ER preparation for an ESP; therefore, innovative means of performing alternative systems analysis may be necessary.
2. A consistent and objective approach for the performance of alternative site reviews is required.

STATUS

1. (a) The ESPDP has issued a report, *Station Design Alternatives*, that defines means of performing alternative systems analysis at the ESP stage.

(b) A position paper was developed and submitted to NRC for agreement in January 1993.
2. (a) The ESPDP has developed an industry approach for site selection (*Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application*).

(b) A position paper was developed and submitted to NRC for agreement in January 1993.

REQUIRED/PLANNED ACTIONS

1. The ESPDP will pursue formal acceptance of the approach for performing alternative systems analysis at the ESP stage.
2. (a) The ESPDP will pursue formal acceptance of the approach for performing alternative site reviews at the ESP stage.

(b) Revision 1 of *Siting Guide: Site Selection and Evaluation for an Early Site Permit Application* will provide guidance for complying with the regulatory requirements of alternative site reviews (to be issued in early 1993).

BENEFITS ASSESSMENT

Background

The U.S. Nuclear Regulatory Commission (NRC) early site permit regulations allow an applicant to submit an environmental report that does not assess the benefits (e.g., need for power) of the proposed action [10CFR52.17(a)(2)]. Regulatory Guide 4.2 and NUREG-0555 specifically discuss these subjects.

Regulatory Guide 4.2

<u>Section</u>	<u>Topic</u>
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A.5	Cost-Benefit Analysis
B.1.1	System Demand and Reliability
B.1.3	Consequences of Delay
B.8.1	Benefits
B.8.2	Costs
B.11	Summary Cost-Benefit Analysis

NUREG-0555

<u>Section</u>	<u>Topic</u>
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4.4.2	Social and Economic Impacts
5.8.2	Social and Economic Impacts
8	Need for the Plant
10.4	Benefit-Cost Balance

Statement of Issue

NRC guidance and clarification is needed. One way to accomplish this is by specifically deferring consideration of the topics listed above until the utility has applied for a COL.

Status

A letter has been written from NUMARC to the NRC^a requesting clarification of this issue.

REQUIRED/PLANNED ACTIONS

The ESPDP will obtain detailed clarification from the NRC regarding benefits exclusions.

^aLetter: John P. Ronafalvy to Barry Zalzman, June 15, 1992.

FUEL CYCLE AND TRANSPORTATION

BACKGROUND

Tables S-3 and S-4 from 10CFR51.51 and 51.52 generically address the potential environmental impacts from the uranium fuel cycle and transportation of nuclear fuel and waste.

STATEMENT OF ISSUE

The adequacy of assumptions used in creating the tables should be verified for application to ALWR passive and evolutionary designs as well as adding current emission information regarding Radon-222 and Technetium-99.

STATUS

The NRC has included the update of 10CFR51, Tables S-3 and S-4, for action in its Early Site Permit Program Plan (P-09).

REQUIRED/PLANNED ACTIONS

The nuclear industry, through NUMARC, will file comments during the public comment period for the proposed NRC updates.

UPDATES TO REGULATORY DOCUMENTS

BACKGROUND

Many new environmental statutes and amendments to existing statutes have been enacted since 1979 [last revision date for NUREG-0555 Environmental Standard Review Plan (SRP)]. 10CFR52 processes are not reflected in SRPs, regulations, and regulatory guidance documents (e.g., NUREG-0800).

STATEMENT OF ISSUE

As a result of these new environmental statutes and amendments, the impact to requirements and standards provided in SRPs and other regulatory documents are not well-defined.

STATUS

The NRC has contracted Pacific Northwest Laboratories to update and convert into electronic retention its standard review plans. NUREG-0555 and NUREG-0800 are the first SRPs to undergo conversion and update. The NRC has developed a plan for performing this work, detailed in NUREG-1447, *SRP Update and Development Program, Implementing Procedures Document*.

REQUIRED/PLANNED ACTIONS

The ESPDP will provide information relevant to the SRP updates to NRC (e.g., Regulatory Criteria Evaluation Report and Plant Parameters Envelope document) that may be of use to NRC.

The nuclear industry, through NUMARC, will file comments as SRP sections are made available for public comment by NRC.

SEVERE ACCIDENT MITIGATION DESIGN ALTERNATIVES (SAMDA)

BACKGROUND

The National Environmental Policy Act (NEPA) severe accident mitigation design alternatives (SAMDA) requirements resolution for ALWRs are detailed in the NRC Staff Requirements Memorandum (SRM) to SECY-91-229. Resolution is to be accomplished with each standardized design at the design certification rulemaking proceeding.

STATEMENT OF ISSUE

ESP siting applications may precede the resolution of this issue within the design certifications.

STATUS

1. The ESPDP completed a plant parameters envelope task activity developing the parameters that may be used as the basis for addressing this issue in the interim between the first ESP applications and the design certification rulemaking proceedings.
2. A position paper was developed and submitted to NRC for agreement in January 1993.

REQUIRED/PLANNED ACTIONS

The ESPDP will pursue formal acceptance of the proposed approach for addressing this issue between the first ESP applications and the design certification rulemaking proceedings.

TRANSMISSION FACILITIES

BACKGROUND

10CFR52.17(2) requires early site permit (ESP) applicants to submit an Environmental Report (ER). Regulatory Guide 4.2, Section 3.9, directs applicants to include transmission facility information in the ER. NUREG-0555, Section 3.7, directs NRC staff to review corridor or right-of-way descriptions and maps.

At the ESP stage, a utility's need for power may be too far in the future to support the power of eminent domain (in which case the utility may not be assured of control over all the proposed rights-of-way). However, the utility could still meet the ESP environmental report requirements if NRC would accept corridor information. The applicant may not be able to comply if the NRC required specific rights-of-way information and ownership of the rights-of-way.

STATEMENT OF ISSUE

Clarification is needed on whether ownership of the proposed transmission line route is necessary to obtain an ESP.

STATUS

A position paper was developed and submitted to NRC for agreement in January 1993.

REQUIRED/PLANNED ACTIONS

The ESPDP will pursue formal NRC agreement that providing a range of transmission line routes or corridors based on a parameters envelope of facility designs and commonly accepted operations and maintenance practices is sufficient for ER analysis at the ESP stage.

EMERGENCY PLANNING/PREPAREDNESS

A discussion of ALWR emergency planning/preparedness issues is presented in this category.

EMERGENCY PLANNING/PREPAREDNESS

BACKGROUND

1. The robust advanced light water reactor (ALWR) passive plant design features will provide the opportunity to modify the current conventional emergency planning elements (criteria). These design features should allow revised approaches to offsite planning while enhancing public protection and safety. The approach for accomplishing regulatory change for ALWR emergency planning criteria is based on U.S. Nuclear Regulatory Commission (NRC) approval of ALWR design features, physically-based source terms, containment design features, dose evaluation criteria, and other technical criteria in its Safety Evaluation Report (SER) on the ALWR Utility Requirements Document (URD) Volume III (for passive plants). The ALWR program is requesting NRC acceptance of the criteria, methodology, and elements of ALWR emergency planning in the URD in order to provide a technical basis for eventual regulatory treatment (i.e., Generic Rulemaking).
2. Existing 10CFR50 language specifies time-dependent milestones referenced to the operating license (OL). These milestones (e.g., full participation exercise within 2 years of OL) cannot be performed at COL (equivalent of OL).
3. The role of the Federal Emergency Management Agency (FEMA) in licensing nuclear power plant sites is not well-defined.
4. ESP applications require, as a minimum, the identification of significant impediments and major features of an emergency plan and inclusion of a description of contacts and arrangements made with local, state, and Federal agencies having emergency planning responsibilities.

STATEMENTS OF ISSUES

1. The robust ALWR design features, as specified in Volume III of the URD, allow for the modification of current offsite planning criteria that will enhance the protection of public health and safety.
2. Decouple emergency planning exercise and programmatic requirements from OL (COL).
3. The role of FEMA in site licensing needs clarification.

4. Submittal requirements to identify "significant impediments" and "major features" of emergency plans are not well-defined and need clarification.

STATUS

1. At the March 27, 1992 meeting, NRC indicated that the "staff is prepared to react" to an ALWR Program Initiative on emergency planning, and that an action plan should be prepared and discussed with the staff. Accordingly, the ALWR Program has developed and will be submitting in the near future an action plan for discussion with NRC.
- 2,3,4. (a) The NRC is currently working to resolve these issues (ESP³, Third Quarter 1991 update, Process Issues P-07 and P-08).
- (b) A meeting between ESPDP and NRC was held on June 30, 1992, to discuss issues associated with emergency planning at the ESP stage. NRC guidance was provided as a result of the meeting.^a

REQUIRED/PLANNED ACTIONS

1. The ALWR Program will interact with NRC to communicate its ALWR Emergency Planning/Preparedness action plans for future tasks.
- 2,3,4. The nuclear industry, through NUMARC, will file comments as proposed regulatory changes are made available for public comment by NRC.

^a Meeting Summary: NRC Memorandum, Barry Zalman to Distribution, July 13, 1992.

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END