

## **ATTACHMENT 4**

## **SAFETY EVALUATION REPORT TEMPLATE FOR EARLY SITE PERMIT APPLICATIONS**

Suggested use: This document provides a basic organization for the NRC staff's safety evaluation report (SER) on an early site permit (ESP) application. Suggested sample language for some parts of the safety evaluation is also provided. In general, sample language for the specific technical sections of the SER can be found in the relevant guidance sections appended to Attachment 2 to RS-002 (or in those sections of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," shown as applicable in Attachment 2 to RS-002). These guidance sections also provide appropriate language for the evaluation findings in corresponding sections of the SER. Therefore, such language is not contained in this sample SER.

Text in the sample SER that appears outside brackets may be suitable as is for use in an SER for an ESP, unless site-specific considerations require that it be modified. Text inside brackets should be replaced with text appropriate for the ESP application under consideration.

Another good source of information on writing an SER for an ESP is the Early Site Review (performed using a similar process to that currently prescribed in 10 CFR Part 52, Appendix Q) for the Blue Hills site. While this document is dated (1977), and the scope of an ESP review differs somewhat from that performed for Blue Hills, the text of the Early Site Review is an example of previously approved text for topics similar to those that will need to be addressed in an SER for an ESP. The Blue Hills Early Site Review document can be found in ADAMS (ML022970348).

Recent SERs for license renewals have been used as partial examples for an ESP SER. These documents have been issued as NUREGs and are available on the NRC's Web site for reference. In addition, numerous recent SERs for power uprates and license amendments are available for reference in ADAMS.

NUREG-XXXX  
Month year

**U.S. Nuclear Regulatory Commission  
Safety Evaluation of Early Site Permit Application  
in the Matter of [Applicant and Site]  
Docket No. 52-XXX**

## TABLE OF CONTENTS

**Note: The structure identified below for the SER retains the NUREG-0800/Regulatory Guide 1.70 chapter and section numbering format to minimize confusion in cross-referencing among these documents and the guidance sections appended to Attachment 2 to the ESP Review Standard. Because many chapters and sections of those two documents are not applicable, there will be gaps (missing sections) in the SER. The New, Test and Research Reactors Program (RNRP) staff will insert placeholders and explanations into the SER for the missing chapters and sections, simply stating that they are not required for the SER to support the ESP.**

Abstract

Summary

- 1. Introduction and General Discussion
  - 1.1 Introduction
  - 1.2 General Description of Site
  - 1.3 Identification of Agents and Contractors
  - 1.4 Summary of Principal Review Matters
  - 1.5 Summary of Open and Confirmatory Items
  
- 2. Site Characteristics
  - 2.1 Site Location and Description
    - 2.1.1 Geography
    - 2.1.2 Exclusion Area Authority and Control
    - 2.1.3 Demography
    - 2.1.4 Conclusions
  
  - 2.2 Nearby Industrial, Transportation, and Military Facilities
    - 2.2.1 Identification of Potential Hazards in Vicinity of Site
    - 2.2.3 Evaluation of Potential Accidents
    - 2.2.4 Conclusions
  
  - 2.3 Meteorology
    - 2.3.1 Regional Climatology
    - 2.3.2 Local Meteorology
    - 2.3.3 Onsite Meteorological Measurements Program
    - 2.3.4 Short-Term (Accident) Dispersion Estimates
    - 2.3.5 Long-Term (Routine) Dispersion Estimates
    - 2.3.6 Conclusions

- 2.4 Hydrology
  - 2.4.1 Hydrologic Description
  - 2.4.2 Floods
  - 2.4.3 Probable Maximum Flood on Streams and Rivers
  - 2.4.4 Potential Dam Failures
  - 2.4.5 Probable Maximum Surge and Seiche Flooding
  - 2.4.6 Probable Maximum Tsunami Flooding
  - 2.4.7 Ice Effects
  - 2.4.9 Channel Diversions
  - 2.4.11 Low Water Considerations
  - 2.4.12 Groundwater
  - 2.4.13 Accidental Releases of Liquid Effluents
  - 2.4.14 Conclusions
- 2.5 Geology and Seismology
  - 2.5.1 Basic Geologic and Seismic Information
  - 2.5.2 Vibratory Ground Motion
  - 2.5.3 Surface Faulting
  - 2.5.4 Stability of Subsurface Materials and Foundations
  - 2.5.5 Stability of Slopes
  - 2.5.6 Conclusions
- 3.5.1.6 Aircraft Hazards
- 13.3 Emergency Planning
- 13.6 Physical Security
- 15.0 Accident Analyses
- 17.1.1 Quality Assurance
- 18. Review by the Advisory Committee on Reactor Safeguards
- 19. Overall Conclusions

## APPENDICES

Appendix A Chronology of Early Site Permit Application for [Site name]

Appendix B Bibliography for [Site name] Safety Evaluation Report

LIST OF FIGURES

LIST OF TABLES



## ABSTRACT

This safety evaluation report (SER) documents the technical review of the early site permit (ESP) application for the [site name] by the U.S. Nuclear Regulatory Commission (NRC) staff. By letter dated [month day, year], [applicant name] submitted the ESP application for [site name] in accordance with Part 52 of Title 10 of the Code of Federal Regulations.

The [site name] is located [briefly describe site location].

[Language for draft SER:] This SER presents the results of the staff's review of information submitted in conjunction with the ESP application.

[Language for final SER for the case in which no open items remain:] This SER presents the results of the staff's review of information submitted in conjunction with the ESP application. In an earlier version of this SER issued on [date], the staff identified a number of open and confirmatory items. All of those items have been resolved, as discussed in this SER.

On the basis of its evaluation of the application, the staff concludes that the [site name] is acceptable under the requirements of 10 CFR Parts 52 and 100 for an ESP. This conclusion is based on the site characteristics identified in this SER and on the number, type, and thermal power level of the nuclear power plant[s] specified in the application [or on the assumed PPE values specified in the application]. The staff's conclusion is subject to the conditions and limitations identified in this SER.

[Language for final SER for the case in which open items remain:] This SER presents the results of the staff's review of information submitted in conjunction with the ESP application. In an earlier version of this SER issued on [date], the staff identified a number of open and confirmatory items. All of those items have been resolved, as discussed in this SER, except [identify any items not closed that are the basis for denial of the application]. Based on [describe open items and regulations not satisfied, or describe undue risk], as described in detail in [identify sections] of this SER, the staff concludes that the [site name] is not acceptable under the requirements of 10 CFR Parts 52 and 100 for construction and operation of a nuclear power plant [specify type of power plant and size, if appropriate].

## SUMMARY

This report describes the results of a review by the U.S. Nuclear Regulatory Commission (NRC) staff of an application for an early site permit (ESP) at the [site name]. The requirements for an ESP are presented in Part 52 of Title 10 of the Code of Federal Regulations (10 CFR Part 52). When those requirements are satisfied, an ESP can be issued. Part 52 also contains requirements for an applicant to submit an environmental report pursuant to 10 CFR Part 51. The NRC reviews the environmental report as part of the agency's responsibilities under the National Environmental Policy Act (NEPA) of 1969, as amended. The results of that review are presented in an environmental impact statement (EIS), which is a separate report from this SER.

By letter dated [month day, year], [applicant name] submitted the ESP application for [site name]. [Provide a description of the site.]

In accordance with Part 52, [applicant name] submitted information in its ESP application that includes (1) a description of the site and nearby areas that could affect or be affected by a nuclear power plant [or plants] located at the site; (2) a safety assessment of the site on which the facility would be located, including an analysis and evaluation of the major structures, systems, and components of the facility that bear significantly on the acceptability of the site; and (3) [describe emergency planning information provided]. The application describes how the site complies with the requirements of 10 CFR Part 52 and the siting criteria of 10 CFR Part 100.

In this report, the staff documents the bases for its conclusion that [applicant name] has [or has not] demonstrated that the [site name] is acceptable under the requirements of 10 CFR Part 52 and 10 CFR Part 100 for siting of a nuclear power plant [or plants] of [describe type, number, and size of proposed nuclear power plants] [or is acceptable under the requirements of 10 CFR Part 52 and 10 CFR Part 100 for siting of a nuclear power plant whose design parameters fall within the plant parameter envelope specified for the ESP]. [Summarize here any notable application-specific aspects of the application or the safety evaluation, such as limitations on information provided that will require additional review at the COL stage.]

The conclusions in this report have been verified where appropriate by inspections conducted by the NRC. The scope of the inspections consisted of selected information in the ESP application and information in this report. Applicable inspection reports are identified as reference documents.

[Language for draft SER:] The bases for the conclusions in this report are also reviewed by the NRC's Advisory Committee on Reactor Safeguards. The Committee independently reviews the application and submits its recommendations directly to the Commission. The Committee's recommendations, and the NRC staff's responses to them, will be included in the final version of this report.

[Language for final SER:] The bases for the conclusions in this report were also reviewed by the NRC's Advisory Committee on Reactor Safeguards. The Committee independently reviewed the application and submitted their recommendations directly to the Commission. The Committee's recommendations, and the NRC staff's responses to them, are included in this report.

As required by 10 CFR 52.21, the review process for the ESP will include a public hearing. A notice of hearing was published in the Federal Register (FR \_\_\_\_\_). [Provide any other information regarding plans for a hearing available at time of completion of the SER.]

## 1. INTRODUCTION AND GENERAL DISCUSSION

### 1.1 Introduction

[The applicant] filed with the U.S. Nuclear Regulatory Commission (NRC) an application, docketed on [date], for an early site permit (ESP) for the [site name]. The proposed site is located in [county, State] at [description of location].

The staff has completed its review [add the following phrase for the draft SER:] to the extent possible at this time, in the areas of seismology, geology, meteorology, and hydrology; and in the area of hazards to a nuclear power plant that could result from man-made facilities and activities on or in the vicinity of the site. The staff has also evaluated risks of potential accidents at the site that could occur as a result of operation of a nuclear plant of [specify general design as applicable] at the site, and has evaluated whether the site would support provision of adequate physical security measures for a nuclear power plant or plants. The staff has evaluated the applicant's quality assurance measures to ensure appropriate quality controls have been applied to information supporting the application for an ESP. Finally, the staff has evaluated [specify extent to which emergency preparedness information has been provided by applicant and reviewed by NRC].

The information provided for the staff's review consisted of the ESP application, which included a description and a safety assessment of the site as required by 10 CFR 52.17, as well as [specify emergency planning information provided]. Copies of these documents are available for public inspection via the NRC's Agencywide Documents Access and Management System (ADAMS), Accession Nos. \_\_\_\_\_. The documents are also available for public inspection at the NRC's Public Document Room at One White Flint North, 11555 Rockville Pike, Rockville, MD, and at [location near site].

This report summarizes the results of the NRC staff's technical evaluation of the suitability of the proposed [site name] site for a nuclear power plant [or more than one, as applicable]. It delineates the scope of technical matters considered in evaluating the suitability of the site. Additional details on the scope and bases used by the NRC staff to evaluate the radiological safety aspects of a proposed nuclear power plant site are provided in NRC Review Standard RS-002, "Processing Applications for Early Site Permits." This document contains regulatory guidance based on the NRC's Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (hereinafter also referred to as the Standard Review Plan), NUREG-0800. The Standard Review Plan is the result of many years of experience of the NRC staff in establishing and promulgating guidance to enhance the safety of nuclear facilities and in evaluating safety assessments.

The applicant has filed an environmental report for the [site name] in which it evaluates those matters relating to the environmental impact assessment that can be reasonably reviewed at this time. The staff will report [or has reported] on the results of its evaluation of the environmental report for the [site name] in an environmental impact statement to be issued about [date] [or that was issued on (date)]. [If the applicant has submitted information to justify granting a limited work authorization:] The applicant has also provided a site redress plan in accordance with 10 CFR 52.25(a) for the purpose of seeking authorization for limited site activities allowed by 10 CFR 50.10(e)(1). The results of the staff's evaluation of that plan will be [or are] contained in the environmental impact statement.

[If the application is to be denied, the following paragraph does not apply and should be deleted.] The ESP and the findings contained therein can be referenced at some future date should the applicant decide to request the NRC staff to review an application for a combined license (COL) to construct and operate a nuclear power plant [or plants, as appropriate] at the [site name]. At that time, the applicant will identify any information in the safety assessment of the [site name] that has changed significantly since the publication of this report. [The following should be added if the ESP applicant provides a PPE.] In addition, the COL applicant will demonstrate that the design parameters for the plant design or designs for which a COL or COLs is sought fall within the plant parameter envelope submitted by the ESP applicant.

A chronology of the principal actions related to the staff's review of the ESP application for the [site name] is included as Appendix A to this report. The bibliography for this report is in Appendix B.

## 1.2 General Description of Site

[Provide here a brief summary of the site description provided in more detail in Section 2.1. Include a description of nearby roads, towns, state lines, etc., a figure showing the general location of the site, the Universal Transverse Mercator coordinates of the site location, site elevation, and description of locations of major nearby rivers and lakes. Make reference to the applicant's submittal for creeks and other small geographic features within five miles of the site. State the size of the site.]

[Describe site ownership, discuss the applicant's authority over and control of the exclusion area, and describe the location of the planned exclusion area within the site boundary.]

## 1.3 Identification of Agents and Contractors

[Applicant name(s)] was/were the applicant(s) for the ESP for [site name] and subsequently has/have been the only participant(s) in the review of [site name] suitability for a nuclear power plant. [Types of services] for the development of the ESP application were provided by [contractor names, if any].

[Describe contractor responsibilities related to development of the ESP application or the supporting information.]

Other consultants retained by the applicant to perform or verify studies for this review are identified in the applicant's safety assessment.

## 1.4 Summary of Principal Review Matters

This safety evaluation report summarizes the results of the technical evaluation of the [site name] performed by the NRC staff. The staff's evaluation included a technical review of the information and data submitted by the applicant with emphasis on the following principal matters:

- (1) The staff evaluated the population density and land use characteristics of the site environs and the physical characteristics of the site, including seismology, meteorology, geology, and hydrology. The purpose of the evaluation was to

determine whether these characteristics had been adequately described and were given appropriate consideration to identify the significant site-related design parameters and determine whether the site characteristics are in accordance with the Commission's siting criteria (10 CFR Part 100).

- (2) The staff evaluated the hazards to a nuclear power plant that could result from man-made facilities and activities; e.g., mishaps involving storage of hazardous materials (toxic chemicals, explosives) or transportation accidents (aircraft, marine traffic, railways, pipelines).
- (3) The staff evaluated the potential capability of the site to support the construction and operation of a nuclear power plant of the design specified by the ESP applicant [or of a nuclear power plant whose design parameters would fall within those specified in the applicant's plant parameter envelope] under the requirements of 10 CFR Parts 52 and 100.
- (4) The staff evaluated the suitability of the site for development of adequate physical security plans and measures for a nuclear power plant or plants.
- (5) The staff evaluated [describe emergency plan information evaluated. One of the following conclusions will be made:] After consultation with the Federal Emergency Management Agency, the staff has determined that there is no significant impediment [or, if applicable, that there are significant impediments] to development of emergency plans for the [site name]. [Or:] After consultation with the Federal Emergency Management Agency, the staff has determined that the major features of the emergency plans submitted by [applicant name] for [site name] are [or are not] acceptable. [Or:] After consultation with the Federal Emergency Management Agency, the staff has determined that the emergency plans submitted by [applicant name] for [site name] provide [or do not provide] reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.
- (6) The staff evaluated the applicant's quality assurance measures applied to the information submitted in support of its ESP application and safety assessment.
- (7) [Add other principal matters as applicable]

During the staff's review, several meetings (see Appendix A to this report) were held with representatives of the applicant and the applicant's contractors and consultants to discuss various technical matters related to the staff's review of the [site name]. The staff also visited the site to assess specific safety matters related to the staff's review of the site.

#### 1.5 Summary of Open and Confirmatory Items

[This section will exist only in the draft SER. The section will list the open items using a numbering system that identifies the sections of the SER in which discussion of each open item is provided. In preparing SE inputs, technical staff will identify open items to the Project Manager for inclusion in this section.]

**NOTE: For the remainder of the document, the format will follow the subsection format specified below. Guidance for the specific content of those sections, including wording for the Conclusions subsection, is found in the guidance sections appended to Attachment 2 to RS-002, or in sections of NUREG-0800 referenced in Attachment 2.**

**NOTE: The sample evaluation findings in each guidance section appended to Attachment 2 to RS-002, as well as those in NUREG-0800, use language appropriate for the case in which the applicant has met the acceptance criteria in the section. Should the staff make the determination for a given section that one or more of the acceptance criteria have not been met, the actual findings for that section will need to describe how each criterion has been met or not met.**

## 2.0 SITE CHARACTERISTICS

### 2.1 Site Location and Description

[In this brief introductory text, state that this section provides a description of the geographic and demographic characteristics of the site and its vicinity. Also note that a description of the applicant's authority over and control of the planned exclusion area is provided.]

#### 2.1.1 Geography

##### 2.1.1.1 Technical Information in the Application

[Describe the key technical points that were made in the application. It is not necessary to restate the application verbatim or to address all the details in the application.]

##### 2.1.1.2 Regulatory Evaluation

[Summarize, as applicable, any regulations and other regulatory references, including regulatory guides, generic letters, or NRC staff positions, that are applicable to this topic. These documents should be referenced in the applicant's safety analysis. If the staff agrees with the applicant's regulatory analysis, the staff may quote the applicant.]

[A statement similar to the following should be made.] The staff finds that the applicant in section \_\_\_ of its submittal identified the regulatory requirements applicable to geography. The regulatory requirements that the staff considered in the review of the application are the regulations at 10 CFR 52.17(a)(1), which require that the applicant for an ESP provide a description of the site. Section 2.1 of NUREG-0800 (as marked up and attached to the ESP Review Standard, RS-002) and Section 2.1 of Regulatory Guide 1.70 provide guidance on information appropriate for presentation on geography. [Cite other applicable regulations and documents. These may be some or all of the regulations the applicant identified.]

##### 2.1.1.3 Technical Evaluation

[Document the staff's evaluation of site geography against the relevant regulatory criteria. The evaluation should support the staff's conclusions as to whether the regulations are met. State what the staff did to evaluate the applicant's submittal. The staff's evaluation may include

verification that the applicant followed applicable regulatory guidance, performance of independent calculations, and validation that the appropriate assumptions were made. The staff may state that certain information provided by the applicant was not considered essential to the staff's review and was not reviewed by the staff. While the staff may summarize or quote the information offered by the applicant in support of its application, the staff should clearly articulate the bases for its conclusions.]

#### 2.1.1.4 Conclusions

[Summarize the staff's conclusions regarding geography, including words such as the following.] As set forth above in Sections 2.1.1.2 and 2.1.1.3 of this report, [provide specific bases for conclusions that follow]. Accordingly, the staff concludes that the site geography meets [or, if applicable, does not meet] the relevant requirements of 10 CFR Part 100 and is [or, if applicable, is not] acceptable for an ESP.

#### 2.1.2 Exclusion Area Authority and Control

##### 2.1.2.1 Technical Information in the Application

[Apply guidance for 2.1.1.1 above using wording specific to this topic.]

##### 2.1.2.2 Regulatory Evaluation

[Apply guidance for 2.1.1.2 above using wording specific to this topic.]

##### 2.1.2.3 Technical Evaluation

[Apply guidance for 2.1.1.3 above using wording specific to this topic.]

##### 2.1.2.4 Conclusions

[See guidance section 2.1.2 appended to Attachment 2 to RS-002 for sample wording.]

**NOTE: Remaining sections of the SER should use the same format as that provided above. Each section should contain a technical information section, regulatory evaluation, technical evaluation, and conclusions. The staff has the latitude to use subsections in addition to those listed above as needed to clearly present the information. The following sections are not addressed elsewhere in RS-002 nor in NUREG-0800, so guidance is provided for their content.**

**NOTE: If the application is to be denied, the SER should set forth the staff's determination on every matter within the scope of the ESP, acceptable or not, and the basis for each determination.**

## 18.0 REVIEW BY THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

[For draft SER:] The application for an early site permit at [site name], as well as this SER, are expected to be reviewed by the Advisory Committee on Reactor Safeguards. The staff intends



to issue a final SER [after resolution of open items regarding this SER, if any] and after receipt of the Committee's report to the Commission relative to its review. This final SER will append a copy of the Committee's report and will address each of the comments made by the Committee. It will also describe any steps taken by the staff to resolve any issues raised as a result of the Committee's review.

[For final SER:] The Advisory Committee on Reactor Safeguards (ACRS) completed its review of the request of the [applicant name] for an early site permit for the [site name] at its [meeting number] meeting on [dates], in [location], and of the staff's SER for this application. [Describe any other Committee activities, such as site visits or subcommittee meetings related to the ESP application.] The ACRS report for the [site name] early site permit review is included in this report as Appendix \_\_. The report contains comments and recommendations to the Commission regarding the [site name] early site permit review. The report concludes that [summarize conclusions]. The staff has transmitted the ACRS report to [applicant name] for its consideration in the use of the [site name] for a nuclear power plant.

The actions the staff has taken and additional actions the staff plans to take in response to the comments and recommendations identified by the ACRS in its report of [date] are described in the paragraphs below.

[For each ACRS item, describe or quote the comment and discuss the staff's actions in response.]

## 19.0 CONCLUSIONS

[Language for case in which the ESP is to be issued:] Based on the staff's analysis of the proposed [site name], the staff has reached the following conclusions, subject to the conditions discussed in this report, for the site-related issues covered by the [site name] safety assessment:

- (1) [Applicant name] has described, analyzed, and evaluated the proposed [site name] to establish the acceptability of the site for an ESP based on the site characteristics identified in this SER and on the number, type, and thermal power level of nuclear power plants specified in the application [or on the assumed PPE values specified in the application]. This description and the staff's evaluation include a definition of site-related parameters that the staff would evaluate in determining the acceptability of a nuclear power plant [or plants] to be constructed at the [site name].
- (2) On the basis of the foregoing, the staff concludes that the ESP for the [site name] is acceptable under 10 CFR Parts 52 and 100 for referencing in a COL application, subject to [state any conditions or limitations on this conclusion]. In accordance with 10 CFR 52.39, matters resolved in this SER will be treated as resolved in a future COL application unless a contention is admitted that the proposed reactor does not fit within one or more of the site parameters evaluated in this SER, or a petition is filed which alleges that either the site is not in compliance with the terms of the ESP or that the terms of the ESP should be modified.

[Language for case in which the ESP is to be denied:] Based on the staff's analysis of the proposed [site name], the staff has reached the following conclusions for the site-related issues covered by the [site name] safety assessment:

- (1) [Applicant name] has described, analyzed, and evaluated the proposed [site name] to establish the acceptability of the site for construction and operation of a nuclear power plant of [specify type, number, etc. as appropriate]. However, the staff has determined that the site is not acceptable for the proposed purpose because [identify all matters resulting in denial].
- (2) On the basis of the foregoing, the staff concludes that the [site name] is not acceptable under 10 CFR Parts 52 and 100 for reference in a COL application. Accordingly, the staff has determined that the application should be denied.