



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL
STANDARD
REVIEW PLAN**
OFFICE OF NUCLEAR REACTOR REGULATION

8.0 NEED FOR POWER

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes evaluation of the need for power. The scope of the paragraph covered by this plan introduces the material from the reviews conducted under ESRPs 8.1 through 8.4.

Review Interfaces

None.

Data and Information Needs

The reviewer for this ESRP should obtain the proposed organizational structure of the EIS from the Environmental Project Manager.

II. ACCEPTANCE CRITERIA

The reviewer should ensure that the introductory paragraph prepared under this ESRP is consistent with the intent of the following regulation:

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USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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Published environmental standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555-0001.

- 10 CFR 51.70(b) with respect to preparation of an EIS that is concise, clear, analytic, and written in plain language.

Regulatory positions and specific criteria necessary to meet the Commission's regulations identified above are as follows:

- There are no regulatory positions specific to this ESRP.

Technical Rationale

Introductory paragraphs that orient the reader with respect to the relevance of the material to the overall organization and goals of the EIS add clarity to the presentation.

III. REVIEW PROCEDURES

The material to be prepared is informational in nature, and no specific analysis of data is required.

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 8.1 through 8.4. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

The method described herein will be used by the staff in evaluating conformance with the Commission's regulations, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the regulations.

VI. REFERENCE

10 CFR 51.70, "Draft environmental impact statement—general."



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8.1 DESCRIPTION OF POWER SYSTEM

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the power system as it presently exists, including both service areas and regional relationships (e.g., power pool agreements, electrical transfer capabilities, diversity interchange agreements, wheeling contracts, etc.).

The scope of the review directed by this plan should include a description of (1) the service area or areas, (2) the types of customers and major electrical load centers to be served by the proposed project, and (3) system factors that are unique to the power system. This review will provide input to the reviews conducted under ESRPs 8.2, 8.3, and 8.4.

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (ER) and/or State or regional authorities' or Independent System Operators' (ISOs') analyses concerning the need for power and energy supply alternatives after ensuring that the analysis of the need for power and alternatives is reasonable and meets high quality standards.

The guidance in this ESRP is limited because changes in the regulatory structure are occurring as the guidance is being revised. Reviewers of issues related to the need for power should identify current NRC policy before beginning their review. Deregulation in the electricity market will have a significant impact on the analysis of the need for power. Applicants may be power generators rather than utilities; therefore, analysis of the need for power must be sufficiently flexible to accommodate the applicant type. Because of deregulation in bulk sales markets for electricity, the advent of independent power producers,

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Published environmental standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555-0001.

and the increased use of purchases and exchanges of electricity among utilities to meet demand, the demand for electricity by ultimate customers within a utility's traditional service area increasingly is not met by the utility's own generating resources. Trading of electricity will be further facilitated by the Federal Energy Regulatory Commission's (FERC's) final rule (61 FR 21540) requiring all public utilities that own, control, or operate facilities used for transmitting electric energy in interstate commerce to have on file open access nondiscriminatory transmission tariffs that contain minimum terms and conditions on nondiscriminatory service. The term "relevant service area" is used here to indicate any region to be served by the proposed facility, whether or not it corresponds to a traditional utility service area. "Relevant service area" is a situation-specific concept and must be defined on a case-by-case basis.

As an example of changes, the relevant service area could be interpreted as a power marketing area encompassing all of the United States east of the Rocky Mountains. The concept of "relevant region" is also introduced here to mean an area for which electricity demand forecasts are performed, such as the Northeast Power Coordinating Council region, which might or might not include the relevant service area.

Review Interfaces

The reviewer for this ESRP should obtain input from or provide input to the reviewers for the following ESRPs, as indicated:

- ESRPs 8.2.1 and 8.2.2. Identify and provide information on any anomalies of the relevant service area that may affect energy and peakload demand forecasts (e.g., an extremely large industrial customer).
- ESRP 8.3. Provide a list of factors that may affect power supply, such as diversity interchange agreements, wheeling arrangements, etc.
- ESRP 8.4. Provide a list of power pooling agreements as they might impact reserve margin criteria.
- ESRP 9.1. Provide a list of factors that might encourage or impede the possibility of purchasing electrical power rather than installing new generating capacity.
- ESRP 9.3. Identify and provide information on the geographical boundaries of the applicant's service area(s).

Data and Information Needs

Affected States and/or regions are expected to prepare a need-for-power evaluation. NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need for power evaluation is found acceptable, no additional independent review by NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

As part of their analyses of the need for power, States and/or regional authorities are expected to describe and assess the regional power system. The reviewer should evaluate the description and determine if it is comprehensive and subject to confirmation. If it is found acceptable, no additional data collection by NRC should usually be needed. These data may be supplemented by information sources such as the Energy Information Administration, FERC, the North American Electric Reliability Council, and others.

If an analysis meeting the preceding criteria is not available, the following data or information should be obtained by NRC staff for review of the applicant's need-for-power analysis:

- a map indicating the geographical and political boundaries of the relevant service area. The map should indicate major electrical load centers and major intertie-transfer capabilities with neighboring utility systems. If there are no specific system boundaries, the staff should obtain the best possible description of typical competitors and satisfy themselves that the proposed facility will be competitive in that market.
- the current population and the number and types of customers in the relevant service area
- the percentage of electricity (in terms of total electrical energy) that the applicant supplies to each State in the relevant service area. Include percentages for residential, commercial, and industrial customers.
- identification of the power pool (if applicable) or alternative mutual assistance arrangements in which the applicant may be a participant, and the commitments of its members in terms of reserve margin requirements, planning, and joint ownership of generating capacity
- the planning and coordinating functions of the appropriate electric reliability council
- a map of the power pool (if applicable) and the electric reliability council region that identifies geographical boundaries and FERC's power supply areas.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the power system are based on the relevant requirements of the following regulations:

- 10 CFR 51, Appendix A(4), with respect to discussion of the no-action alternative in NRC EISs
- 10 CFR 51.71(d) with respect to analysis of alternatives
- 10 CFR 51.71(e) with respect to weighing the costs and benefits of the proposed action and reasonable alternatives

Regulatory positions and specific criteria necessary to meet the regulations identified above are as follows:

- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains a description of the existing power system.

Technical Rationale

The technical rationale for evaluating the applicant's description of the power system is discussed in the following paragraphs:

An understanding of the existing regional power system is needed to perform an independent evaluation of the need for power, to evaluate the no-action alternative and the proposed action, and to compare the proposed action with other alternatives.

The description of the power system should be adequate to permit an independent analysis of the need for power and alternatives when considered with other factors covered in ESRPs 8.2.1, 8.2.2, and 8.3.

III. REVIEW PROCEDURES

If an independent review of the need for power is to be conducted by NRC staff in lieu of using a review prepared by affected States and/or regions or ISO, the procedures discussed below should be followed. These procedures also may be used by the reviewer as an aid in evaluating forecasts prepared by others.

(1) Obtain the required information for this analysis from

- Section 1 of the applicant's environmental report
- bond rating services
- the applicant's annual report
- data filed by the applicant with FERC and the applicable State public utility commission.

(2) Examine the geographical boundaries of the applicant's service area, the power pool (if applicable), and the electric reliability region of which the applicant is a part. If no such boundaries are relevant, determine the probable competitors for the proposed facility using whatever reputable power market analysis is available.

(a) Identify major electrical load centers on the map of the relevant service area.

(b) Examine the current population and the number and types of customers in the relevant service area.

(c) Identify the major types of industry and commerce existing in the service area (if applicable).

- (3) Identify the appropriate electric reliability council region.
 - (a) Examine any pertinent power pool agreements.
 - (b) Examine the applicant's major power purchases/sales with neighboring utility companies.
 - (c) Examine any wheeling or diversity interchange agreements.
- (4) Ensure that the information and data derived from the analysis are adequate to serve as a basis for characterizing the applicant's service area and its regional relationships.
 - (a) Identify any unusual features that affect subsequent evaluations of the need for power (e.g., large industrial customers, a noncontiguous service area).
 - (b) Ensure that these features are accounted for and have been explained.

IV. EVALUATION FINDINGS

The information and data obtained from this analysis should be organized into subsections as follows:

- A brief introductory paragraph that contains the name(s) of the applicant(s), the percentage share of the proposed plant that each applicant will own, the station name, the number of generating units proposed, the net electrical rating of each proposed unit, and the applicant's proposed month and year of initial commercial operation of each unit.
- A section that contains maps indicating the geographical and political boundaries of the relevant service area, the power pool (if applicable), and the appropriate electric reliability region. The service-area map should indicate electrical transfer capabilities between the applicant and neighboring utilities and also the major electrical load centers. The population to be served by the applicant should be stated along with the area of the system (in square kilometers). Major types of customers should be identified as well as any atypical situations (e.g., an extremely large industrial customer). The primary types of industry and commerce for the region should also be identified.
- A section that contains a brief description of any relevant power pool and appropriate electric-reliability council(s). A brief discussion of any major existing or proposed power sales/purchases or diversity interchange agreements within the region should be included. If the applicant is a member of a power pool, a brief discussion should be presented regarding the legal commitments of the power pool members in terms of reserve margin requirements, planning, and sharing generating capacity.
- Alternatively, describe the probable competitors for the proposed facility, based on any reputable analysis, and discuss the marketability of power from the proposed facility together with any significant market competitors and risks.

V. IMPLEMENTATION

The method described herein will be used by the staff in evaluating conformance with the Commission's regulations, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the regulations.

VI. REFERENCES

10 CFR 51, Appendix A(4), "Purpose and need for action."

10 CFR 51.71, "Draft environmental impact statement—contents."

Federal Energy Regulation Commission. 1996. "Promoting Wholesale Competition Through Open-Access Nondiscriminatory Transmission Services by Public Utilities," 61 *Federal Register* 21540.

U.S. Nuclear Regulatory Commission (NRC). 1976. *Preparation of Environmental Reports for Nuclear Power Stations*. Regulatory Guide 4.2, Rev. 2, Washington, D.C.



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8.2 POWER DEMAND

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the demand for electricity. The scope of the paragraph covered by this plan introduces the material from the reviews conducted under ESRPs 8.2.1 and 8.2.2.

Review Interfaces

None.

Data and Information Needs

The reviewer for this ESRP should obtain the proposed organizational structure of the EIS from the Environmental Project Manager.

II. ACCEPTANCE CRITERIA

The reviewer should ensure that the introductory paragraph prepared under this ESRP is consistent with the intent of the following regulation:

- 10 CFR 51.70(b) with respect to preparation of an EIS that is concise, clear, analytic, and written in plain language.

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Published environmental standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555-0001.

Regulatory positions and specific criteria necessary to meet the regulations identified above are as follows:

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's power demand is discussed in the following paragraph:

Introductory paragraphs that orient the reader with respect to the relevance of the material to the overall organization and goals of the EIS add clarity to the presentation.

III. REVIEW PROCEDURES

The material to be prepared for ESRP 8.2 is informational in nature, and no specific analysis of data is required.

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 8.2.1 and 8.2.2. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

The method described herein will be used by the staff in evaluating conformance with the Commission's regulations, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the regulations.

VI. REFERENCE

10 CFR 51.70, "Draft environmental impact statement—general."



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8.2.1 POWER AND ENERGY REQUIREMENTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's analysis and evaluation of the historic and projected electricity consumption and peakload demands in the relevant service area or market. The scope of the review directed by this plan should include a detailed analysis and evaluation of the applicant's treatment of these projections and, where needed, an independent assessment of forecasts of the service area growth in electricity consumption and peakload demand.

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (ER) and/or State or regional authorities' or Independent System Operators' (ISOs') analyses concerning the need for power and energy supply alternatives after ensuring that the analysis of the need for power and alternatives is reasonable and meets high quality standards.

The guidance in this ESRP is limited because changes in the regulatory structure are occurring as the guidance is being revised. Reviewers of issues related to the need for power should identify current NRC policy before beginning their review. Deregulation of utilities will have a significant impact on the analysis of the need for power. Applicants may be power generators rather than utilities; therefore, analysis of the need for power must be sufficiently flexible to accommodate the applicant type. Because of deregulation in bulk-sales markets for electricity, the advent of independent power producers, and the increased use of purchases and exchanges of electricity among utilities to meet demand, the demand for electricity by ultimate customers within a utility's traditional service area increasingly is not met by the utility's own generating resources. Trading of electricity will be further facilitated by the Federal Energy

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Published environmental standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555-0001.

Regulatory Commission's (FERC's) final rule (61 FR 21540) requiring all public utilities that own, control, or operate facilities used for transmitting electric energy in interstate commerce to have on file open-access nondiscriminatory transmission tariffs that contain minimum terms and conditions on nondiscriminatory service. The term "relevant service area" is used here to indicate any region to be served by the proposed facility, whether or not it corresponds to a traditional utility service area. Relevant service area is a situation-specific concept and must be defined on a case-by-case basis.

As an example of changes, the relevant service area could be interpreted as a power marketing area encompassing all of the United States east of the Rocky Mountains. The concept of "relevant region" is also introduced here to mean an area for which electricity demand forecasts are prepared, such as the Northeast Power Coordinating Council region, which might (or might not) include the relevant service area.

Review Interfaces

The reviewer for this ESRP should obtain input from and provide input to the reviewers for the following ESRPs, as indicated:

- ESRP 8.1. Obtain a description of the power system in the relevant service area. Special attention should be given to anomalies, such as extremely large industrial customers, that may affect energy and peak load forecasts.
- ESRP 8.2.2. Obtain data on power and energy requirements and provide the historic and projected growth data that are considered appropriate for the relevant service area to support the forecast analysis. This may or may not be the applicant's historical service area, even if the applicant is a traditional electric utility.
- ESRP 8.4. Provide the range of forecasts developed from this plan for assessing the need for baseload generating units of the proposed capacity.
- ESRPs 9.1 and 9.2.1. Provide the power and energy requirements as determined through this analysis.

Data and Information Needs

Affected States and/or regions continue to prepare need-for-power evaluations for proposed energy facilities. The NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Forecasts should include demand scenarios for midrange, high, low, 75th percentile, and 25th percentile conditions. If the need-for-power evaluation is found acceptable, no additional independent review by the NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

If an analysis meeting the preceding criteria is not available, the following data or information should be obtained by NRC staff for review of the applicant's need-for-power analysis:

- historical and projected electrical energy use by major categories in the relevant service area. Data should cover the 15 years preceding the date of application through the 3rd year of commercial operation of all proposed units. Major categories are those that account for 5% or more of the relevant service area consumption, including residential, commercial, industrial, agricultural, large special loads (such as Federal installations or highly electricity intensive industries), street lighting, municipal systems and co-ops, other utilities, and rapid transit systems.
- forecasts of all aggregate long-range consumption and system peakload demand made during the 15 years preceding the date of application
- the yearly increase in total kilowatt-hour (kWh) sales for the 15 years preceding the date of application and an average annual compound growth rate for this period
- a normalized kWh sales growth rate that accounts for unusual changes (e.g., weather and fluctuations in major loads not representative of system growth), a list of the changes considered, and the method of normalization
- a description of the methodologies used in forecasting (e.g., econometric, extrapolation, judgment, and surveys) showing all major factors considered in arriving at the forecast, how these factors were introduced to the forecast, and an estimate of their likely effect on the growth of kWh sales and peakload demand in the service area
- the historic and projected relevant service area season of peakload demand (summer-winter) for the 15 years preceding the date of application through the 3rd year of commercial operation of all proposed units
- the historic and projected relevant service area load factor (average load/peakload) for the 15 years preceding the date of application through the 3rd year of commercial operation of all proposed units; where shifts in load factor or load factor trends are evident, identification of the principal factors contributing to these shifts or trends
- the yearly increase in regional system peakload demand for the 15 years preceding the date of application and an average annual compound growth rate for this period
- a normalized regional system peakload rate that accounts for unusual changes (e.g., weather, interruptible contracts, and fluctuations in major loads not representative of system growth), a list of the changes considered, and the method of normalization
- load duration curves for the current year and for the 1st year of commercial operation of the first proposed unit

- the minimum hourly load for the current year and for the 1st year of commercial operation of the first proposed unit.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the power and energy requirements are based on the relevant requirements of the following:

- 10 CFR 51, Appendix A(4), with respect to discussion of the no-action alternative in NRC environmental impact statements (EISs).
- 10 CFR 51.71(e) with respect to weighing the costs and benefits of the proposed action and reasonable alternatives.

Regulatory positions and specific criteria necessary to meet the regulations identified above are as follows:

- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), with respect to electrical demand and projections.

Technical Rationale

The technical rationale for evaluating the applicant's power and energy requirements is discussed in the following paragraphs:

Section 4 of Appendix A to 10 CFR 51 specifically requires that the no-action alternative be discussed in an NRC EIS. ESRP 8.2.1 will aid this analysis by providing information to enable an analysis to be made in ESRP 8.4 of the need for power from the proposed power plant.

10 CFR 51.71(e) states that a draft EIS is to contain a preliminary recommendation respecting the proposed action "reached after weighing the costs and benefits of the proposed action and considering reasonable alternatives." ESRP 8.2.1 will aid this determination by providing input that can be used to evaluate the need for power and the potential benefits of the proposed action and the alternatives.

III. REVIEW PROCEDURES

If an independent review of power and energy requirements is to be conducted by NRC staff in lieu of using a review prepared by affected States and/or regions, the procedures discussed below should be followed. These procedures also may be used by the reviewer as an aid in evaluating forecasts prepared by others. These procedures assume that the applicant is a traditional utility. Industry best practice may evolve as a result of deregulation. The reviewer should be aware of, and use, industry best practice where possible.

- (1) Analyze the historical data and forecasts of demand factors for completeness and agreement with other forecasts, emphasizing the forecasted growth in kWh sales.
- (2) Analyze the forecasting methodologies employed to the extent needed to reach conclusions regarding their acceptability. Relevant factors to consider include the following:
 - price of electricity
 - energy efficiency and substitution
 - price of alternative fuels
 - income
 - economic activity
 - number of customers
 - weather
 - saturation levels
 - treatment of uncertainty.
- (3) Consider how the demand influencing factors are taken into account. If scientific methodologies are employed, determine if they pass standard tests of acceptability (e.g., statistical tests of significance).
- (4) Analyze any parameter estimates (e.g., price and income elasticities) obtained by the applicant's methodologies to determine the degree to which they agree with other estimates that are generally available for the relevant region from State or regional sources. Compare the applicant's latest projections with those made earlier for the same or overlapping time periods.
- (5) Evaluate the applicant's forecasts and the data and methodology used to make these forecasts and reach one of the following conclusions:
 - (a) The applicant's forecast and all data and methodologies are verified by the staff analyses, and the reviewer concludes that the methodology, underlying assumptions, and results are similar to those that would have been used and obtained by the staff.
 - (b) The applicant's forecasts, methodologies, and data used cannot be verified by the staff. In this case, the staff should perform an independent assessment using independent forecasting models and underlying assumptions.
- (6) Use the following approach for conducting independent assessments of forecasts of service area growth in electricity consumption and peakload demand:
 - (a) Consider independent forecasting methods to obtain from each a growth rate forecast that is viewed as reasonable by the staff.
 - (b) Determine if other methods (e.g., for the service area or specifically for the region) are available and consider their use for this assessment.

(c) In applying the selected methods, conduct a parametric analysis, based on a range of plausible growth rates, against which the applicant's projected growth rate is compared to determine reasonableness.

- The selection of additional methods should be based partially on geographic compatibility and partially on the method sophistication.
- Wherever possible, all methods used should be adjusted to reflect important service area trends and characteristics.

(d) Use the results of these methods to prepare comparable peakload forecasts.

IV. EVALUATION FINDINGS

Input from analysis of this ESRP should be designed to accomplish the following objectives: (1) public disclosure of the applicant's forecasts of peakload and electrical energy demand and (2) presentation of the staff's evaluation regarding the completeness and adequacy of these forecasts.

When the reviewer has determined that a forecast made by or for one or more State or regional agencies is complete and adequate, the following information should be included in the environmental impact statement (EIS):

- the forecast methodology used by the State or regional agency
- summaries of the data used
- forecasts made by the State or regional agency and the basis for the staff's determination of the adequacy of these forecasts.

If the reviewer determines that the State or regional forecast is complete and adequate, the reviewer should provide input to the EIS similar to the following:

The staff reviewed the information provided by the State or regional body, verified the forecast of electricity consumption and peak-load demands, and concluded that the results are complete and adequate.

When the need for power analysis has been prepared by the applicant and the reviewer has determined that the applicant's forecasts are complete and adequate, the following information should be included in this section of the EIS:

- the forecast methodology used by the applicant
- summaries of the data used, together with the staff's evaluation of the data
- forecasts made by the applicant and the basis for the staff's evaluation of the adequacy of these forecasts.

In this case, the staff would provide input to the EIS similar to the following:

The staff reviewed the information provided by the applicant, verified the applicant's forecast of electricity consumption and peak load demands, and concluded that the results are complete and adequate.

When the reviewer has performed an independent analysis, the following information may be included in this section of the EIS:

- for each method, a description of the method, the explanatory variables used, the parameter estimates generated, and the assumed growth rates for each of the explanatory variables
- a description and justification of any changes made in the method by the reviewer. (These will typically be with respect to assumed growth rates in explanatory variables and in some cases adjustments to elasticity estimates.)
- a description of the assumptions and techniques used to convert the energy growth forecasts to peakload growth forecasts
- the ranges for energy growth and peakload growth that have been determined to be reasonable.

For this case, the staff would provide input to the EIS similar to the following:

The staff performed an independent assessment using independent forecasting methods and underlying assumptions. The results of these methods were used to prepare peakload forecasts. The staff concludes that these forecasts are adequate and in appropriate detail for further analyses.

V. IMPLEMENTATION

The method described herein will be used by the staff in evaluating conformance with the Commission's regulations, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the regulations.

VI. REFERENCES

10 CFR 51, Appendix A(4), "Purpose and need for action."

10 CFR 51.71, "Draft environmental impact statement—contents."

Federal Energy Regulation Commission. 1996. "Promoting Wholesale Competition Through Open-Access Nondiscriminating Transmission Services by Public Utilities," 61 *Federal Register* 21540.

U.S. Nuclear Regulatory Commission (NRC). 1976. *Preparation of Environmental Reports for Nuclear Power Stations*. Regulatory Guide 4.2, Rev. 2, Washington, D.C.



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8.2.2 FACTORS AFFECTING GROWTH OF DEMAND

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification, analysis, and evaluation of factors contributing to the rate of growth of electricity demand in the applicant's service area.

The scope of the review directed by this plan should include economic and demographic trends, conservation, substitution, and price and rate structure as these factors may affect the rate of growth of electricity demand.

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (ER) and/or State or regional authorities' or Independent System Operators' (ISOs') analyses concerning the need for power and energy supply alternatives after ensuring that the analysis of the need for power and alternatives is reasonable and meets high-quality standards.

The guidance provided in this ESRP is limited because changes in the regulatory structure are occurring as the guidance is being revised. Reviewers of issues related to the need for power should identify current NRC policy before beginning their review. Economic deregulation of utilities will have a significant impact on the analysis of the need for power. Applicants may be power generators rather than utilities; therefore, analysis of the need for power must be sufficiently flexible to accommodate the applicant type. Because of deregulation in bulk sales markets for electricity, the advent of independent power producers and the increased use of purchases and exchanges of electricity among utilities to meet demand, the demand for electricity by ultimate customers within a utility's traditional service area

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Environmental standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for environmental reviews for nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Environmental standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The environmental standard review plans are keyed to Preparation of Environmental Reports for Nuclear Power Stations.

Published environmental standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555-0001.

increasingly is not met by the utility's own generating resources. Trading of electricity will be further facilitated by the Federal Energy Regulatory Commission's (FERC's) final rule (61 FR 21540) requiring all public utilities that own, control, or operate facilities used for transmitting electric energy in interstate commerce to have on file open-access nondiscriminatory transmission tariffs that contain minimum terms and conditions on nondiscriminatory service. The term "relevant service area" is used here to indicate any region to be served by the proposed facility, whether or not it corresponds to a traditional utility service area. Relevant service area is a situation-specific concept and must be defined on a case-by-case basis.

As an example of changes, the relevant service area could be interpreted as a power-marketing area for independent power generators. The concept of "relevant region" is also introduced here to mean an area for which electricity demand forecasts are done, such as the Northeast Power Coordinating Council region, which would include the relevant service area.

Review Interfaces

The reviewer for this ESRP should obtain input from or provide input to the reviewers for the following ESRPs, as indicated:

- ESRP 8.2.1. Provide data on the power and energy requirements to support the forecast analysis.
- ESRP 8.4. Provide information pertaining to baseload capacity planning to support the evaluation of the need for the plant.
- ESRPs 9.1, 9.2.1 and 9.2.2. Provide information pertaining to those factors affecting growth of electricity demand that could affect the need for or choice of alternative energy sources and systems.

Data and Information Needs

Affected States and/or regions continue to prepare a need-for-power evaluation for proposed energy facilities. The NRC will review the evaluation for the proposed facility, if available, and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the State/regional need-for-power evaluation is found to be acceptable, no additional independent review by NRC is needed, and the State or regional analysis can be the basis for ESRPs 8.2 through 8.4.

If an analysis prepared by or under the direction of one or more State or regional agencies meeting the preceding criteria is not available, the following data or information should be obtained by NRC staff for review of the applicant's need-for-power analysis:

- historical and estimated growth for the relevant service area (or close geographic approximation) of the following variables: population, number of households, per capita income, consumer price index, manufacturing output, gross regional product, saturation by major appliance, trends in size of household, and prices of alternative fuels. Data should cover the 15 years preceding the date of application through the 3rd year of commercial operation of all proposed units.
- historical temperature adjusted peakload data for the 10-year period preceding the application submittal date

- for the 5 years preceding the date of application, the percentage of residences in the relevant service area relying on oil and the percentage relying on gas for space conditioning, water heating, and operating major appliances; similarly, for industries in the relevant service area, the percentages of total energy requirements being met by oil and gas over this same time period
- from the date of application to 3 years after initial commercial operation of the first proposed unit, the generally known availability of oil and gas to ultimate customers in the relevant service area (e.g., gas curtailments and status of gas hookups to new customers)
- for the 15 years preceding the date of application through the 3rd year of commercial operation of all proposed units, the historic and projected growth for the relevant service area of the real price of electricity by major customer class
- the current and projected rate structures (at time of first-unit startup) for major customer classes
- the relevant region's efforts to conserve and promote customer conservation of electrical energy.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the factors affecting growth of demand are based on the relevant requirements of the following:

- 10 CFR 51, Appendix A(4), with respect to discussion of the no-action alternative in NRC environmental impact statements (EISs)
- 10 CFR 51.71(d) with respect to analysis of alternatives
- 10 CFR 51.71(e) with respect to weighing the costs and benefits of the proposed action and reasonable alternatives.

Regulatory positions and specific criteria necessary to meet the regulations identified above are as follows:

- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), with respect to electrical demand and projections.

Technical Rationale

The technical rationale for application of these acceptance criteria is discussed in the following paragraphs:

NRC's regulations implementing the National Environmental Policy Act (NEPA) in 10 CFR 51, Appendix A, contain the format for presentation of material in EISs. Section 4 of Appendix A specifically requires that the no-action alternative be discussed in an NRC EIS. ESRP 8.2.2 will aid this analysis by providing information to enable an analysis to be made of the need for power from the proposed power plant.

NRC's regulations implementing NEPA also include 10 CFR 51.71, which specifies the content requirements for draft EISs. It is stated in 10 CFR 51.71(d) that a draft EIS is to include "a preliminary analysis that considers and balances the environmental and other effects of the proposed

action and the alternatives available for reducing or avoiding adverse environmental and other effects.” In addition to providing input for analysis of the no-action alternative, the review under ESRP 8.2.1 will aid this analysis by providing, as input to ESRP 9.1.1, information pertaining to those factors affecting the growth of electricity demand that could affect the choice of alternative energy sources and systems.

It is stated in 10 CFR 51.71(e) that a draft EIS is to include a preliminary recommendation respecting the proposed action “reached after weighing the costs and benefits of the proposed action and considering reasonable alternatives.” The review conducted under ESRP 8.2.2 will aid this determination by providing input that can be used to evaluate the need for power and the potential benefits of the proposed action and the alternatives.

III. REVIEW PROCEDURES

If an independent review of need for power is to be conducted by NRC staff in lieu of using a review prepared by affected States and/or regions, the procedures discussed below should be followed. These procedures also may be used by the reviewer as an aid in evaluating forecasts prepared by others. The procedures assume a traditional utility. Industry best practice may evolve as a result of deregulation. The reviewer should be aware of, and use, industry best practice where possible.

Economic and Demographic Trends

- (1) Analyze the applicant’s estimates of the effects of economic and demographic trends on the applicant’s projected growth of electricity demand in the relevant service area.
- (2) Obtain or prepare independent forecasts for the economic and demographic variables identified by the applicant as affecting the rate of growth of electricity demand within the relevant service area.
- (3) Consider additional variables when it appears that they could affect electricity demand growth.

Forecasts prepared for service areas other than those to be served by the applicant may be used when in the reviewer’s judgment they are sufficiently similar to provide a meaningful comparison.

- (4) For each variable used by the applicant,
 - (a) Compare the applicant’s projected growth rates with growth rates developed or obtained by the reviewer.
 - (b) Identify differences.
 - (c) Analyze significant differentials as they contribute either positive or negative effects to the applicant’s forecasted growth rate of electricity demand.
- (5) Compare the historic growth of these variables with the forecasted growth rates, and identify differences as positive or negative influences on projected electricity demand growth.

Energy Efficiency and Substitution^(a)

-
- (a) For this ESRP, substitution is defined as the substitution of electricity for other fuels.

- (1) Estimate the importance of energy efficiency and substitution in the relevant service area by preparing an estimate of the effect of these factors on projected kilowatt-hour (kWh) sales and peak demand in the relevant service area for the proposed initial year of plant operation (first unit).
 - (a) Contrast this estimate with that of the applicant.
 - (b) Note any significant differences between the two estimates.
 - (c) Calculate the annual compound growth rate in kWh sales and peakload for the last 15 years and compute the increase or decrease in growth rates during the period.
- (2) Identify those elements that could have contributed to diminished growth. The list should include the following
 - increases in energy efficiency
 - higher prices of electricity
 - economic recession
 - milder than usual weather.
- (3) Estimate the relative effects of energy efficiency, price, recession, and weather on diminished growth using the following analyses:
 - (a) Compare the real rate of change in the average price of a kWh of electricity in the service area in the last 15 years and contrast with the real rate of change nationally.
 - (b) Compute the real rate of change in the gross regional product for the relevant service area (or geographic approximation) in the last 15 years with the real rate of increase in gross national product.
 - (c) Review peakload growth in the last 15 years (adjusted for temperature) and discuss positive or negative effects on observed growth rate.
- (4) Consider the effect of substitution on growth using the following analyses:
 - (a) Review the importance of oil and gas in the relevant service area relative to their availability. Consider any curtailments or denials to new customers (residential, industrial, and commercial) if they exist. Determine the relevant service area's dependence on fossil fuels and the ratio between demand and available supply.
 - (b) Identify trends in new homes (all-electric versus other), purchases of new appliances (electric vs. other), and shifts in industrial energy and commercial energy requirements. Determine if electricity is capturing or losing an increasing share of the new and replacement market, and the reasons for the increasing or decreasing share.
- (5) Determine the extent to which the future substitution between electrical energy and fuels such as oil and natural gas may tend to increase or decrease the demand for electric power and thus offset or reinforce the impacts of energy efficiency measures.

- (6) Consider any estimates developed by the applicant with respect to the impact of substitution on realized growth rate and determine any adjustments to growth forecasts that may have been made to reflect the substitution.
- (7) Consider the following factors as they contribute to electricity demand growth:
 - (a) the extent to which technological breakthroughs, government legislation and subsidies, and large energy efficiency investments may provide greater energy efficiency savings than have been experienced in the past
 - (b) the extent to which energy sources (e.g., synthetic natural gas) or energy conversion systems (e.g., solar space heating) currently under development may reasonably be expected to compete with the use of electricity. Consult with the reviewer of ESRP 9.2 to complete this portion of the review.
 - (c) the possibility that long-term savings may not be particularly significant
 - (d) the possibility that improvements in energy efficiency would result in decreased use of electric power
 - (e) the possibility of “double counting” energy savings (e.g., energy efficiency is an economic response).

Price and Rate Structure

- (1) Determine how and to what extent the applicant has considered price response in demand forecasts.
 - (a) Where the applicant has developed and/or used an econometric model, identify the applicant’s price elasticities, forecasted growth rates for the price of electricity, and treatment of price competition.
 - (b) Obtain independent forecasts of growth in the real price of electricity.
 - (c) Compare these forecasts with the treatment of price in the applicant’s analysis.
- (2) Consider the effects of price competition and alternative rate structures that would moderate load growth or reshape load curves.
 - (a) Consider alternative rate structures such as peakload pricing, inverted rates, and flattened rates.
 - (b) Analyze the relevant region’s present attempts and future plans to improve the system load factor via rate restructuring (e.g., higher tail rate during peak periods and demand charges that are based on maximum demand).
 - (c) Estimate anticipated effects on annual electricity consumption and peakload demand.
- (3) Determine to what extent economic and demographic trends, energy efficiency and substitution, open competition, and price and rate structure are likely to affect the rate of growth of electrical demand. This determination should be based on the following information:

- the effect of economic and demographic variables on the expected growth of electricity demand
 - the effect of energy efficiency improvements and substitution on projected kWh sales and peak demand
 - the effect of price competition and the growth in the real price of electricity on the expected growth of electricity demand
 - the capability of present and proposed rate structures to promote load management.
- (4) Ensure that the data and analyses submitted by the applicant are accurate and in sufficient detail to allow one to conclude that the forecast submitted by the applicant properly reflects the factors listed above.
- (a) If the reviewer concludes that the applicant has taken reasonable account of these factors in its forecast, the reviewer can endorse the applicant's forecast.
- (b) If the reviewer determines by analysis that adequate consideration has not been given to the factors listed above, see ESRP 8.2.1 to develop an independent range of electricity-demand growth to determine if the differences in the treatment of these factors affect the reasonableness of the applicant's ultimate growth rate.

IV. EVALUATION FINDINGS

If a need-for-power analysis prepared by or under the direction of affected States is determined and an analysis is conducted by NRC staff, the ESRP 8.2.2 analysis will normally be divided into three subsections consisting of a discussion of the applicant's treatment of economic and demographic trends, energy efficiency improvements and substitution, and price and rate structure. The following information should be included in each of these subsections.

Economic and Demographic Trends

This section should include a comparison of the applicant's estimates of the effect of economic and demographic trends on electricity-demand growth with independent analyses of those effects by State and regional authorities or NRC staff. Any significant differences should be noted, and the reviewer should indicate what appears to be the most appropriate estimate.

The reviewer should provide a concluding statement in the EIS similar to the following:

The staff reviewed the data and analyses submitted by the applicant and determined that they are reasonable and in sufficient detail to conclude that the forecast submitted by the applicant properly reflects the effect of economic and demographic variables on the expected growth of electricity demand.

Energy Efficiency and Substitution

The reviewer should provide a qualitative assessment as to the effectiveness of energy efficiency improvements in the last several years given industry restructuring, price changes, recession, and weather. Successful efforts undertaken within the relevant region to promote energy efficiency on the

part of customers and with respect to internal use of power transmission and distribution efficiency and demand side management should be included.

The reviewer should present any other significant factors that could affect the growth of electricity demand in the service area.

The reviewer should provide a concluding statement in the EIS similar to the following:

The staff reviewed the data and analyses submitted by the applicant and other data and determined that they are reasonable and in sufficient detail to conclude that the forecast submitted by the applicant properly reflects the effect of energy efficiency and substitution on projected kWh sales and peak demand.

Price and Rate Structure

The reviewer should describe present and proposed price and rate structures and discuss how price competition and utility price and rate structure may affect the growth of electricity demand.

The reviewer should provide a concluding statement in the EIS similar to the following:

The staff reviewed the data and analyses submitted by the applicant and determined that they are reasonable and in sufficient detail to conclude that the forecast submitted by the applicant properly reflects the effect of the growth in the real price of electricity on the expected growth of electricity demand, and the capability of present and proposed rate structures to promote load management.

If a need-for-power analysis prepared by or under the direction of affected States or regions is available, the ESRP 8.2.2 analysis may be divided into three subsections as above, or it may consist of a single section summarizing the relevant aspects of the region's need for power.

V. IMPLEMENTATION

The method described herein will be used by the staff in evaluating conformance with the Commission's regulations, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the regulations.

VI. REFERENCES

10 CFR 51, Appendix A(4), "Purpose and need for action."

10 CFR 51.71, "Draft environmental impact statement—contents."

Federal Energy Regulation Commission. 1996. "Promoting Wholesale Competition Through Open-Access Nondiscriminating Transmission Services by Public Utilities," 61 *Federal Register* 21540.

U.S. Nuclear Regulatory Commission (NRC). 1976. *Preparation of Environmental Reports for Nuclear Power Stations*. Regulatory Guide 4.2, Rev. 2, Washington, D.C.



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8.3 POWER SUPPLY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review and evaluation of the present and planned generating capability and the present and planned purchases and sales of power and energy. The scope of the review directed by this plan will include consideration of the type (e.g., coal-fired) and function (e.g., baseload) of the relevant region's plants, the nature of purchases and sales (firm and nonfirm) of power and energy, and any proposed additions, retirements, redesignations, deratings, or upratings of the relevant region's plants.

In performing this review, the reviewer may rely on the analysis in the applicant's ER and/or State or regional authorities' analyses concerning the need for power and energy supply alternatives. The reviewer should ensure that the analysis of the need for power and alternatives is reasonable and meets high-quality standards.

The analysis of purchases and sales should consider the fact that substantial amounts of electricity are now bought and sold between regions in the country and between utilities in the same region. Such trading of electricity will be further facilitated by the Federal Energy Regulatory Commission's final rule (61 FR 21540) requiring all public utilities that own, control, or operate facilities used for transmitting electric energy in interstate commerce to have on file open-access nondiscriminatory transmission tariffs that contain minimum terms and conditions on nondiscriminatory service.

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USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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Published environmental standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555-0001.

The guidance provided in this ESRP is limited because changes in the regulatory structure are occurring as the guidance is being revised. Reviewers of issues related to the need for power should identify current NRC policy before beginning their review. Deregulation of utilities will have a significant impact on the analysis of the need for power. Applicants may be power generators rather than utilities; therefore, analysis of the need for power must be sufficiently flexible to accommodate the applicant type. Because of deregulation in bulk sales markets for electricity, the advent of independent power producers, and the increased use of purchases and exchanges of electricity among utilities to meet demand, the demand for electricity by ultimate customers within a utility's traditional service area increasingly is not met by the utility's own generating resources. Trading of electricity will be further facilitated by the Federal Energy Regulatory Commission's (FERC's) final rule (61 FR 21540) requiring all public utilities that own, control, or operate facilities used for transmitting electric energy in interstate commerce to have on file open-access nondiscriminatory transmission tariffs that contain minimum terms and conditions on nondiscriminatory service. The term "relevant service area" is used here to indicate any region to be served by the proposed facility, whether or not it corresponds to a traditional utility service area. Relevant service area is a situation-specific concept and must be defined on a case-by-case basis.

As an example of changes, the relevant service area could be interpreted as a power marketing area encompassing the entire United States east of the Rocky Mountains. The concept of "relevant region" is also introduced here to mean an area for which electricity-demand forecasts are performed, such as the Northeast Power Coordinating Council region, which might or might not include the relevant service area.

Review Interfaces

The reviewer for this ESRP should obtain input from or provide input to the reviewers for the following ESRPs, as indicated.

- ESRP 8.1. Obtain input on factors that may affect power supply, such as diversity interchange agreements, wheeling arrangements, etc.
- ESRP 8.4. Provide assurance that descriptions of the region's existing and planned sources of power and energy satisfy the requirements of the reviewer of ESRP 8.4.
- ESRP 9.2.2. Provide any data concerning restrictions on the use of energy sources available to the region.

Data and Information Needs

Affected States or regions continue to prepare need-for-power evaluations for proposed energy facilities. The NRC will review the evaluation for the proposed facility and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the State's or region's need-for-power evaluation is found acceptable, no additional independent review by NRC is needed, and the State's analysis can be the basis for ESRPs 8.2 through 8.4.

As part of their analyses of the need for power, States and/or regional authorities are expected to provide a description and assessment of the regional power system. The reviewer should evaluate the description and determine if it is comprehensive, subject to confirmation, and includes the following data. If it is found acceptable, no additional data collection by NRC should usually be needed. These data may be supplemented by information from sources such as the Energy Information Administration, the Federal Energy Regulatory Commission, North American Electric Reliability Council, and others.

If an analysis prepared by or under the direction of one or more State agencies or regional authorities meeting the preceding criteria is not available, the following data or information should be obtained by NRC staff for review of the applicant's need-for-power analysis:

- planned generating capability at the expected peakload period of each year, beginning with the year of application (current year) and continuing through the 3rd year of commercial operation of the proposed project
- a listing of each generator with a capacity of 100 MWe or more in operation at the time of application; planned and proposed capability additions thereafter, including scheduled date of operation, retirements or deratings, redesignation (e.g., baseload to intermediate); and upratings for 3 years after operation of the proposed project. Each generator should be categorized as to type (e.g., hydroelectric, coal, oil, gas, nuclear, or pumped storage) and function (i.e., baseload, intermediate, or peaking). Estimates of projected capacity factor ranges and average variable costs for each unit tabulated should be provided. Small peaking units may be lumped into a single category for simplicity.
- definitions of the terms baseload, intermediate, peaking, firm, and nonfirm sales and purchases as applicable to the relevant regional system
- the ratio of baseload capacity to total capacity for the 15 years preceding the date of the application, and for each year through the 3rd year of commercial operation of the proposed project
- the energy to be generated by function and type of all facilities for the 1st year of commercial operation of the proposed project
- factors that affect or may affect power plant availability (e.g., plant reliability, environmental regulations, and scarcity of fuels)
- annual net firm and nonfirm power sales and purchases or interchange agreements for the year of application and for each subsequent year through the 3rd year of commercial operation of the proposed project.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the relevant region's power supply are based on the relevant requirements of the following:

- 10 CFR 51, Appendix A(4), with respect to discussion of the no-action alternative in NRC environmental impact statements (EISs)
- 10 CFR 51.71(d) with respect to analysis of alternatives
- 10 CFR 51.71(e) with respect to weighing the costs and benefits of the proposed action and reasonable alternatives.

Regulatory positions and specific criteria necessary to meet the regulations identified above are as follows:

- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), with respect to descriptions of the power system additions, retirements, etc.

Technical Rationale

The technical rationale for evaluating the applicant's power supply is discussed in the following paragraphs:

The NRC's regulations implementing the National Environmental Policy Act (NEPA) at 10 CFR 51 include Appendix A, containing the format for presentation of material in EISs. Section 4 of Appendix A specifically requires that the no-action alternative be discussed in an NRC EIS. The review conducted under ESRP 8.3 will aid this analysis by providing information to enable an analysis to be made under ESRP 8.4 of the need for power from the proposed power plant.

NRC's regulations implementing NEPA also include 10 CFR 51.71, which specifies the content requirements for draft EISs. It is stated in 10 CFR 51.71(d) that a draft EIS is to include "a preliminary analysis which considers and balances the environmental and other effects of the proposed action and the alternatives available for reducing or avoiding adverse environmental and other effects." In addition to providing input for analysis of the no-action alternative, the review conducted under ESRP 8.3 will aid this analysis by providing as input to ESRP 9.1 data concerning restrictions on the use of energy sources that are applicable to the applicant.

It is stated in 10 CFR 51.71(e) that a draft EIS is to include a preliminary recommendation respecting the proposed action "reached after weighing the costs and benefits of the proposed action and considering reasonable alternatives." The review conducted under ESRP 8.3 will aid this determination by providing input, which can be used to evaluate the need for power and the potential benefits of the proposed action and the alternatives.

III. REVIEW PROCEDURES

If an independent review of the need for power is to be conducted by NRC staff in lieu of using a review prepared by affected States and/or regions, the procedures discussed below should be followed. These procedures also may be used by the reviewer as an aid in evaluating forecasts prepared by others. The procedures assume a traditional utility. Industry best practice may evolve as a result of deregulation. The reviewer should be aware of, and use, industry best practice where possible.

- (1) Segregate the regional plants by fuel type and consider the present and future availability of the indicated fuel.
 - (a) Identify any factors (e.g., air quality regulations or forced outages of long duration) that have affected past plant availability or capacity factor.
 - (b) Consider how these factors may affect planned availability or capacity factor.
- (2) Relate the applicant's definitions of baseload, intermediate, and peaking plants to other accepted uses of these terms. Where the applicant's designations do not conform to accepted uses, determine the reason for the differences.
- (3) Analyze the region's present and planned generation mix in light of the region's present and planned purchases and sales (firm and nonfirm) of power and energy.
 - (a) Include nonfirm purchases and sales of power when considering the capability of the relevant region's power system.
 - (b) Include firm sales and purchases of power when considering the applicant's peakload responsibility.
 - (c) Consider the relevant region's and applicant's role as either a net purchaser or net seller.
 - (d) Quantify shifts in the relevant region's and applicant's position over time, i.e., whether the region and applicant are becoming more dependent or less dependent on purchasing power from or selling power to other systems.
 - (e) Identify and determine the reasons for any unusual purchases or sales that have occurred.
 - (f) Consider the possibility of a reduction in overall capacity requirements for the region that could be accomplished by the wheeling and pooling of power.
- (4) Where the relevant region plans deratings, redesignations, or retirements (whose total is 200 MW or more) within approximately 2 years before or after the proposed date of commercial operation of the proposed project, determine the reasons for such a change.

- (a) Determine the reasons for all 100-MW or larger unit redesignations or retirements.
- (b) Analyze the historical, present, and projected ratio of baseload capacity to total capacity and determine reasons for any large variations in this ratio over time.

(5) Determine whether

- the description of present and planned capacity correctly identifies baseload, intermediate, and peaking units and that planned additions are reasonable
- the description of present and planned purchases and sales of power and energy correctly identifies the applicant's capabilities to sell or need to purchase
- plans for redesignation or re-rating of generating capacity have been explained and are reasonable
- the proposed baseload fraction of the applicant's total capacity is appropriate.

IV. EVALUATION FINDINGS

If a need-for-power analysis prepared by or under the direction of affected States or regions is unavailable, and an analysis is conducted by NRC staff, the 8.3 analysis will normally be divided into two subsections: existing and planned generating capacity and purchases and sales. These are discussed below.

Existing and Planned Generating Capacity

This discussion should summarize the relevant region's present and planned generating capacity. The relevant region's present capacity by type and any planned additions, upratings, deratings, and retirements (by unit) should be shown in a table. The capacity in the relevant power pool and reliability council should also be summarized and supported by a table (or tables) when appropriate, such as Table 8.3-1.

Purchases and Sales

This discussion should summarize the effect of purchases and sales on relevant regional load and capability. The reviewer should distinguish between (1) energy and power sales (or purchases), (2) firm and nonfirm sales (or purchases), and (3) on-peak and off-peak sales (or purchases). A table such as Table 8.3-1 may support the discussion.

If a need-for-power analysis prepared by or under the direction of affected States or regional authorities is available, input to the EIS from ESRP 8.3 may be divided into two subsections as above or it may consist of a single section summarizing the relevant aspects of the State's need-for-power analysis.

V. IMPLEMENTATION

The method described herein will be used by the staff in evaluating conformance with the Commission's regulations, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the regulations.

VI. REFERENCES

10 CFR 51, Appendix A(4), "Purpose and need for action."

10 CFR 51.71, "Draft environmental impact statement—contents."

Regulatory Guide 4.2, Rev. 2. 1976. *Preparation of Environmental Reports for Nuclear Power Stations*.

Federal Energy Regulation Commission. 1996. "Promoting Wholesale Competition Through Open-Access Nondiscriminating Transmission Services by Public Utilities," 61 *Federal Register* 21540.

Table 8.3-1. Example of Table Summarizing Present and Planned Generating Capacity and Purchases and Sales of Electricity in Context of Electricity Load Forecasts

Capacity	Year			
	2000	2005	2010	--
Capacity Needed				
High				
25th Percentile				
Midrange				
75th Percentile				
Low				
Capacity Additions				
Additions, Upratings, Deratings, and Retirements				
Unit 1				
Unit 2				
Unit 3...				
Net Energy and Power Sales (Purchases)				
Firm				
Non-firm				
On-Peak				
Off-Peak				
Net Capacity Needed				
(By scenario)				



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8.4 ASSESSMENT OF NEED FOR POWER

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review and assessment of the need for new baseload generating capacity. This review should include an assessment of the timing of the need for the additional capacity.

The scope of the review directed by this plan should include a comparison of baseload capacity with baseload demand, a reserve margin assessment, projected cost of power, a comparison of total capacity in relation to peakload demand, a schedule evaluation, and an ultimate conclusion regarding the need for the electrical-production capability of the proposed facility.

In performing this review, the reviewer may rely on the analysis in the applicant's ER and/or State or regional authorities' or Independent System Operators' (ISOs') analyses concerning the need for power and energy supply alternatives after ensuring that the analysis of the need for power and alternatives is reasonable and meets high quality standards.

Any need for power analysis should also take account of the fact that substantial amounts of electricity are now bought and sold between regions in the country and between utilities in the same region. Such trading of electricity will be further facilitated by the Federal Energy Regulatory Commission's (FERC's) final rule (61 FR 21540) requiring all public utilities that own, control, or operate facilities used for transmitting electric energy in interstate commerce to have on file open access nondiscriminatory transmission tariffs that contain minimum terms and conditions on nondiscriminatory service.

October 1999

8.4-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

Environmental standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for environmental reviews for nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Environmental standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The environmental standard review plans are keyed to Preparation of Environmental Reports for Nuclear Power Stations.

Published environmental standard review plans will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience.

Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Washington, D.C. 20555-0001.

Review Interfaces

The reviewer for this ESRP should obtain input from or provide input to the reviewers for the following ESRPs, as indicated:

- ESRPs 8.2.1 and 8.2.2. Obtain data on power and energy requirements and factors affecting growth of demand.
- ESRP 8.3. Obtain data on power supply.
- ESRPs 9.2.1 and 9.2.2. Provide information to assist in the consideration of alternative sources of energy that might provide the baseload generating capacity.
- ESRPs 10.4.1 and 10.4.2. Provide a summary of the benefit-cost balancing dealing with the consequences of not having sufficient baseload capacity or of adding this capacity too soon.

Data and Information Needs

Affected States and/or regions continue to prepare need-for-power evaluations of proposed energy facilities. The NRC will review the evaluation of the proposed facility and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need-for-power evaluation is found acceptable, no additional independent review by NRC is needed and the analysis can be the basis for ESRPs 8.2 through 8.4.

As part of their analyses of the need for power, States and/or regional authorities normally describe and assess the need for power. These data may be supplemented by information sources such as the Energy Information Administration, FERC, North American Electric Reliability Council, and others.

If an analysis meeting the preceding criteria is not available, the following data or information should be obtained by NRC staff for review of the applicant's need-for-power analysis:

- projected baseload demand from the present to 3 years after initial commercial operation of all proposed units. Prepare a table showing baseload demands, baseload capacities, and resulting deficit or surplus (see Table 8.4-1) and a table showing peakload responsibilities, accredited generating capacities, and resulting reserve margin (see Table 8.4-2).
- reserve margin criteria for the service area. Briefly describe the reserve margin deemed desirable by the staff based on its evaluation of the applicant's analysis and supplementary sources of information.
- the applicant's calculated reserve margins extending from the present to the first 3 years after initial operation of all proposed units

- historical data on installed and actual reserve margins at the time of summer and winter peak hourly demand for the 15 years preceding the date of application
- the relationship between reserve margin (expressed as percent) and system reliability level (expressed as 1 day's outage in 10 years, 5 years, etc.).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the staff's assessment of the need for power are based on the relevant requirements of the following:

- Section 103(b)(1) of the Atomic Energy Act specifies that NRC can only issue licenses for utilization or production facilities whose proposed activities will serve a useful purpose proportionate to the quantities of special nuclear material or source material to be utilized
- 10 CFR 51, Appendix A(4), with respect to discussion of the no-action alternative in NRC environmental impact statements (EISs)
- 10 CFR 51.71(d) with respect to analysis of alternatives
- 10 CFR 51.71(e) with respect to weighing the costs and benefits of the proposed action and reasonable alternatives.

Regulatory positions and specific criteria necessary to meet the regulations identified above are as follows:

- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), with respect to the need for new capacity.

Technical Rationale

The technical rationale for evaluating the applicant's assessment of the need for power is discussed in the following paragraphs:

The Atomic Energy Act states that licenses for a nuclear power plant can only be issued when the plant will serve a useful purpose proportional to the quantities of special nuclear material or source material to be utilized. A demonstration of the need for electricity from the proposed plant is necessary to satisfy the "useful purpose" requirement.

NRC's regulations implementing the National Environmental Policy Act (NEPA) in 10 CFR 51 include Appendix A, containing the format for presentation of material in EISs. Section 4 of Appendix A specifically requires that the no-action alternative be discussed in an NRC EIS. ESRP 8.4 will assist in this analysis.

NRC's regulations implementing NEPA also include 10 CFR 51.71, which specifies the content requirements for draft EISs. It is stated in 10 CFR 51.71(d) that a draft EIS is to include "a preliminary analysis which considers and balances the environmental and other effects of the proposed action and the alternatives available for reducing or avoiding adverse environmental and other effects." In addition to providing input for analysis of the no-action alternative, the review conducted under ESRP 8.4 will aid this analysis by providing as input to ESRP 9.1 information to assist in the consideration of alternative sources of electric energy.

It is stated in 10 CFR 51.71(e) that a draft EIS is to include a preliminary recommendation respecting the proposed action "reached after weighing the costs and benefits of the proposed action and considering reasonable alternatives." The review conducted under ESRP 8.4 will aid this determination by evaluating the need for power and the potential benefits of the proposed action and the alternatives.

III. REVIEW PROCEDURES

If an independent review of need for power is to be conducted by NRC staff in lieu of using a review prepared by affected States and/or regions, the procedures discussed below should be followed. These procedures also may be used by the reviewer as an aid in evaluating forecasts prepared by others. The procedures assume a traditional utility. Industry best practice may evolve in response to deregulation. The reviewer should be aware of, and use, industry best practice where possible.

- (1) Calculate baseload demand as that portion of forecasted kilowatt-hour (kWh) sales occurring at loads equal to or less than average load.
 - (a) Forecasted growth in the relevant region(s) as a range:
 - The forecasted growth rates of kWh sales in this analysis should include at least the applicant's mid-range, high, low, 75th percentile, and 25th percentile forecasts, and the forecast ranges developed by the affected State and/or region or NRC staff (ESRP 8.2.1).
 - If the range of reasonable forecasts developed or adopted by the staff (the 25th percentile to 75th percentile range) includes the applicant's forecasts of the 25th to 75th percentile range, perform the analysis using the NRC range.
 - If the range of relevant regional forecasts developed or adopted by the NRC staff is included in the applicant's 25th percentile to 75th percentile range, perform the analysis using the applicant's range.
 - If the two ranges partially overlap or one is lower, use the lower of the two ranges.
 - (b) In any case, analyze

- reasons for differences between the applicant's forecast and the forecast developed or adopted by the staff
 - the implications for baseload demand of the extreme value forecasts.
- (2) Analyze the power supply data (e.g., capacity factors, variable costs, redesignations) and estimate the baseload capacity of the system using the evaluation of ESRP 8.3.
 - (3) Compare the supply of baseload capacity with the demand for baseload capacity for the first 3 years of commercial operation of all proposed units.
 - (4) Identify the reserve margin^(a) requirements currently in acceptance for the service area and identify the organization responsible for establishing this requirement.
 - (a) Determine if the reserve margin requirements at the time the proposed units are scheduled to begin operation are different from the current reserve margin requirements.
 - (b) Contact the appropriate regional reliability council, other regional bodies, power pools, and FERC to compare this reserve margin requirement with requirements recommended by these organizations.
 - (5) Calculate the region's accredited generating capacity (i.e., total installed capacity plus nonfirm purchases and less nonfirm sales) for the period extending from 1 year preceding commercial operation of the proposed first unit to the 3rd year of commercial operation of the proposed last unit.
 - (6) Calculate peakload^(b) responsibility based on the growth rates for peakload demand calculated for ESRP 8.2.1.
 - (7) For reviews requiring additional staff analysis, calculate peakload responsibility based on forecasted growth rates for peakload demand.
 - (a) Determine these by contrasting the applicant's projected range of growth rates for system peakload with the range of growth rates developed or adopted by the staff for the system peak.

The same rules for comparison apply as for annual kWh sales:

-
- (a) Reserves are defined in this ESRP as the difference between accredited net generating capacity and peakload responsibility; the reserve margin is this difference divided by the peakload responsibility.
 - (b) For each growth rate used, calculate system peakload for the relevant years and adjust for firm purchases and sales and interruptible contracts to obtain peakload responsibility.

- If the range of reasonable forecasts developed or adopted by the staff includes the applicant's forecast, the reviewer should perform the analysis using the developed or adopted forecast.
- If the range of forecasts falls totally below the applicant's forecast, the reviewer should use the staff forecasts.

- (8) For each estimate of peakload responsibility^(a) and for each year under consideration, calculate reserve margin as

$$\text{Reserve Margin} = \frac{\text{Accredited Generating Capacity} - \text{Peakload Responsibility}}{\text{Peakload Responsibility}}$$

Based on the reserve margins and the projections for baseload demand, determine the timespan representing the probable dates when plant capacity will initially be needed.

- (9) Prepare an analysis of the costs and benefits of not having sufficient and timely capacity additions and also the costs and benefits of adding capacity too soon.
- (a) For these purposes, assume the applicant's proposed date of commercial operation of all proposed units and consider the effects of the load materializing 3 years earlier than this date and 3 years later than this date.
- (b) The 6-year timespan may be shifted if conditions specific to the service area suggest this to be appropriate.

Treatment of this subject should include, at a minimum, participation by the socioeconomic and benefit-cost reviewers.

- (10) If a need-for-power analysis conducted by or for one or more relevant regions affected by the proposed plant concludes there is a need for new generating capacity, that finding should be given great weight provided that the analysis was systematic, comprehensive, subject to confirmation, and responsive to forecast uncertainty.

If no such analysis is available, determine whether the projected peakload responsibility plus the reserve requirement exceeds the total accredited generating capacity and, absent special circumstances, these findings justify the conclusion that new capacity is warranted.

(a) Peakload responsibility is defined as system load plus firm sales and less firm purchases.

Although this criterion does not show a need for baseload capacity, it does demonstrate a need for new capacity that is independent of type. This criterion, coupled with an affirmative indication that there is a need for baseload capacity, justifies a baseload addition within the timespan determined by the reviewer's forecast analysis.

(11) If these criteria cannot be met, it may still be possible that the proposed facility will be needed on some other basis. The analysis should be summarized in a table similar to Table 8.4-3. Additional considerations include the following:

- the relevant region's need to diversify sources of energy (e.g., using a mix of nuclear fuel and coal for baseload generation)
- the potential to reduce the average cost of electricity to consumers
- the nationwide need to reduce reliance on fossil fuels generally, and imported petroleum in particular
- the case of a significant benefit-cost advantage being associated with plant operation before system demand for the plant capacity develops. (This will require the reviewer's benefit-cost evaluation of the consequences of not having sufficient baseload capacity or of adding this capacity too soon.)

If none of the above criteria can be satisfied, it may be concluded that there is no need for additional baseload generating capability on the scale represented by the applicant's proposal during the timespan considered.

IV. EVALUATION FINDINGS

This section of the environmental impact statement should be planned to document the following:

(1) public disclosure of the applicant's forecast of need for the proposed project, (2) a presentation of the staff's analysis of the applicant's forecast, and (3) a presentation of the staff's conclusion of whether additional capacity is needed within the timespan developed by the staff.

The following information should be included in the EIS:

- a table showing baseload demands, baseload capacities, and resulting deficit or surplus (see Table 8.4-1)
- a table showing peakload responsibilities, accredited generating capacities, and resulting reserve margin (see Table 8.4-2)
- a brief description of the reserve margin deemed desirable by the staff based on its evaluation of the applicant's analysis and supplementary sources of information

- the staff's conclusion as to whether additional capacity (represented by the proposed plant) is needed within the timespan developed by the staff
- a tabulation of costs and benefits associated with bringing the proposed plant online as scheduled, but not having the electrical demand materialize as projected.

V. IMPLEMENTATION

The method described herein will be used by the staff in evaluating conformance with the Commission's regulations, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the regulations.

VI. REFERENCES

10 CFR 51, Appendix A(4), "Purpose and need for action."

10 CFR 51.71, "Draft environmental impact statement—contents."

Atomic Energy Act of 1954, as amended, 42 USC 2011 et seq.

Federal Energy Regulation Commission. 1996. "Promoting Wholesale Competition Through Open-Access Nondiscriminating Transmission Services by Public Utilities." *Federal Register* 21540.

U.S. Nuclear Regulatory Commission (NRC). 1976. *Preparation of Environmental Reports for Nuclear Power Stations*. Regulatory Guide 4.2, Rev. 2, Washington, D.C.

Table 8.4-1. Baseload Demand, Capacity, and Capacity Surplus (Deficit)

	Year			
	2000	2005	2010	--
Baseload Demand by Scenario				
High				
25th Percentile				
Midrange				
75th Percentile				
Low				
Baseload Capacity				
Surplus (Deficit)				
High				
25th Percentile				
Midrange				
75th Percentile				
Low				

Table 8.4-2. Peakload Responsibilities, Generating Capacities, and Reserve Margin

Year	Accredited Generating Capacity (MW)	System Peakload Responsibility (MW)			Reserve Margin (% of Peakload Responsibility)		
		25th Percentile Forecast	Midrange Forecast	75th Percentile Forecast	25th Percentile Forecast	Midrange Forecast	75th Percentile Forecast
2000							
2005 ^(a)							
2010							
2015							
...							
(a) year unit is expected to come online.							

Table 8.4-3. Example of Summary Page of Staff Assessment of Need for Power

Forecast Demand Year =	Net Needed Baseline Capacity	Net Capacity Needed for Peak Power	Net Capacity Needed for Source Diversity	Reduction in Average Cost of Power	Amount and Type of Fossil Fuel Displaced	Net Benefit of Early Availability
High						
25th Percentile						
Midrange						
75th Percentile						
Low						
Net Benefit If 3 Years Earlier						
Net Benefit If 3 Years Later						