U.S. NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL STANDARD REVIEW PLAN

8.1 DESCRIPTION OF POWER SYSTEM

REVIEW RESPONSIBILITIES

Primary— Organization responsible for the review of economic information

Secondary— None

I. AREAS OF REVIEW

The need for power is a critical component of an EIS as it establishes a framework for evaluation of project benefits and for the geographic boundaries over which benefits and costs are distributed. This ESRP discusses the proposed project in the context of the larger network of transmission and generation and the loads the system serves. ESRP 8.2 discusses demand and demand growth in the region, and ESRP 8.3 discusses power supply options.

The primary benefit of a new nuclear plant is the large quantity of baseload power it may provide. New power plants may be needed to meet growing loads and to replace plants that are retired. The need for new plants also has a geographic component, as power may be needed at specific locations on the interconnected power grid to ensure reliability of the entire power grid or of subsections of the grid. The geographic scope for the need for power may be defined in the application by a utility service area, but it also exists in a larger geographic context because power from the plant will flow outside a relevant utility service area boundary. This larger area is the relevant market area. The boundary of the relevant market area is primarily a function of the way the transmission system is planned and managed. This has both electrical and economic features, which requires further description to facilitate evaluation of an application and other materials staff may consult.

Wholesale power supply continues to be deregulated nationwide. Firms that do not serve retail customers may build and operate power plants. Power from any power plant may be sold to utilities and others using the regional transmission system. Management and operation of utility transmission is performed on a regional basis to support regional power exchanges through competitive power markets.

Some parts of the country have formed regional transmission operators (RTOs) or independent system operators (ISOs) to provide regional transmission planning and management and to operate wholesale power markets. Where these exist, they define the relevant market area for a proposed project. In addition to RTOs/ISOs, the United States is divided into unique regional electricity reliability councils by the North American Electric Reliability Corporation (NERC). Each regional council has responsibility for managing system reliability within their respective region by monitoring the balance between customer demand and generation. As a result, the local NERC region may be the relevant market area when RTOs/ISOs do not exist. It should also be noted that high voltage transmission interties enable power exchanges between NERC regions and RTOs/ISOs, although these exchanges are primarily governed by sales contracts.

The determination of the need for new generation requires evaluation of both utility supplies compared to projected demand, and demand in the relevant service and market areas. The applicant may provide or NRC staff obtain information from sources that encompass different geographic areas. Therefore NRC staff must be specific about what area they are referencing, such as utility service area, State, RTO/ISO area or regional market, NERC region, or other area if appropriate.

This ESRP directs the staff's description of the power system as it presently exists, including both service areas and regional relationships (e.g., regional wholesale power markets and institutions, power pool agreements, electrical transfer capabilities and congested transmission corridors, diversity interchange agreements, wheeling contracts, etc.).

The scope of the review directed by this plan should include a description of (1) the service and market area or areas, (2) the number and 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, including status of retail deregulation, operating regional transmission organizations and associated power markets and the role and capacity of interregional transmission interties. 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) after ensuring it is consistent with all available State or regional authorities' or RTO/ISO analyses, including appropriate regional NERC councils.

Reviewers of issues related to the need for power should identify any applicable NRC guidance before beginning their review.

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 in the relevant service and market areas that may affect energy and peakload demand forecasts (e.g., an extremely large

industrial customer or market conditions that may affect inter- and intra-regional power flows, such as low cost power from the Ohio Valley flowing east into markets in Pennsylvania and the Atlantic states or access to current or proposed inter-regional transmission interties).

- ESRP 8.3. Provide a list of factors that may affect power supply, such as diversity interchange agreements among adjacent regions, wheeling arrangements, chronic transmission congestion, 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 relevant service and market areas.

Data and Information Needs

Affected States and/or regions may prepare a need-for-power evaluation as part of a State or regional energy planning exercise. Similarly, State or regional agencies may require the applicant to document a need for power or plan for future plant construction. The applicant may choose to rely on those documents rather than prepare a description of the power system of its own. If so, NRC staff should review these documents to determine if they are (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Of particular concern are third-party plans or reports restricted to boundaries smaller than relevant service and market areas. Another concern is plans and studies that do not extend far enough into the future to provide an adequate basis for comparison. If NRC staff conclude these other documents are acceptable, no additional independent review by NRC staff may be needed and that analysis can be the basis for ESRPs 8.2 through 8.4.

If NRC staff determine these documents are not acceptable, it may request additional information from the applicant, or it may supplement the information provided with information from other sources, such as the Energy Information Administration, the Federal Energy Regulatory Commission (FERC), NERC and applicable member councils, and others to ensure adequate geographic coverage.

The following data or information should be included in the materials used by the reviewer to assess the need for power, including those submitted by the applicant. Staff should have access to these as well and may have to obtain them if they are not provided in order to review the applicant's need-for-power analysis:

- a map indicating the geographical and political boundaries of the relevant service and market areas. The map should indicate major electrical load centers and major intertie-transfer capabilities with neighboring utility systems and relevant markets. 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 its market. At a minimum, the reviewer should place the

proposed facility within a specific NERC subregion and reference the reliability needs of that region. If the proposed facility is expected to service customers in adjacent NERC subregions, the review should extend to those areas as well, and address potential intra- and inter-regional transmission adequacy to support projected power transfers.

- The current population and the number and types of customers in the relevant service and market areas, associated loads, and fractions of that load served by the applicant.

- identification of the power pool or regional transmission organization(s) (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.

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 weighing the costs and benefits of the proposed action and reasonable alternatives

- 10 CFR 51.75(b) and (c) with respect to applications for early site permits and combined licenses, respectively

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 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. It is also needed to characterize the benefits associated with the proposed project.

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 description of the power system 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 studies, forecasts and resource plans prepared by others.

(1) Obtain the required information for this analysis from:

- the applicant's environmental report
- the applicant's annual report
- data filed by the applicant with FERC, the applicable State public utility commission, and/or the applicable State facility siting authorities, and data and studies filed by the applicant with the relevant NERC reliability council and regional transmission operator

(2) Examine the geographical boundaries of the applicant's service area, the power pool or regional transmission organization (if applicable), and the NERC electric reliability region and wholesale power market of which the applicant is a part. Determine the probable competitors for the proposed facility using whatever reputable power market analysis is available, including NERC region reliability assessments and regional transmission organization plans and interconnection requests.

(a) Identify major electrical load centers on the map of the relevant service area and transmission paths and constraints to them from the proposed plant location.

(b) Examine the current population and the number and types of customers in the relevant service area and fraction with access to competitive retail power suppliers and rates of "choice" within them.

(3) Identify the appropriate NERC electric reliability council region.

(a) Examine any pertinent power pool and regional transmission operator agreements and reliability studies.

(b) Examine the applicant's major power purchases/sales with neighboring utility companies and retail power suppliers.

(c) Examine any wheeling or diversity interchange agreements and any current or proposed intertie 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 and market areas and relevant regional relationships.

(a) Identify any unusual features that affect subsequent evaluations of the need for power (e.g., large industrial customers or 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 and/or regional transmission organization(s) (if applicable), and the appropriate electric reliability and wholesale market region. The service-area map should indicate electrical transfer capabilities within the relevant service area (e.g., between the applicant and neighboring utilities and markets) and the major electrical load centers. The population to be served by the applicant should be stated along with the area of the system. 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, RTO/ISO, 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 or regional transmission organization, 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.

- 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 should be used by the staff in evaluating conformance with NRC requirements, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the requirements.

VI. REFERENCES

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

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

10 CFR 51.75, "Draft environmental impact statement—construction permit, early site permit, or combined license."

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

U.S. NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL STANDARD REVIEW PLAN

8.2.1 POWER AND ENERGY REQUIREMENTS

REVIEW RESPONSIBILITIES

Primary— Organization responsible for the review of need for power information

Secondary— None

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 growth in electricity consumption and peakload demand in the relevant utility service and market areas.

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (ER), and/or analysis performed by State or regional authorities, regional transmission operators (RTOs), or independent system operators (ISOs). The reviewer may also rely on relevant North American Electric Reliability Corporation (NERC) regional 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 need for power is a critical component of an EIS as it establishes a framework for evaluation of project benefits and for the geographic boundaries over which benefits and costs are distributed. This ESRP discusses demand and demand growth in the region and other factors affecting the need for new generating capacity. ESRP 8.2.2 discusses factors that underlay demand growth and how uncertainties in these factors were considered by the applicant.

The primary benefit of a new nuclear plant is the large quantity of baseload power it may provide. Consequently, analyses of need should focus primarily on energy, rather than peak demand requirements.

These requirements can be met by the proposed project, potential competing projects, and other alternatives. New power plants may be needed to meet growing loads and to replace plants that are retired. The need for new plants also has a geographic component, as power may be needed at specific locations on the interconnected power grid to ensure reliability of the entire power grid or of subsections of the grid. The geographic scope for the need for power may be defined in the application by a utility service area, but it also exists in a larger geographic context because power from outside a utility service area boundary may also serve the load. This larger boundary is primarily a function of the way the transmission system is planned and managed. This has both electrical and economic features, which requires further description to facilitate evaluation of materials submitted by the applicant and other materials staff may consult.

Wholesale power supply continues to be deregulated nationwide. Firms that do not serve retail customers may build and operate power plants. Power from any power plant may be sold to utilities and others using the regional transmission system. Management and operation of utility transmission is performed on a regional basis to support regional power exchanges through competitive power markets. Some parts of the country have formed RTOs or ISOs to provide regional transmission planning and management and to operate wholesale power markets. Where these exist, they define the relevant market area for a proposed project. In addition to RTOs/ISOs, the United States is divided into unique regional electricity reliability councils by NERC. Each regional council has responsibility for managing system reliability within their respective region by monitoring the balance between customer demand and generation. As a result, the local NERC region may be the relevant market area where RTOs/ISOs do not exist. It should also be noted that high voltage transmission interties enable power exchanges between NERC regions and RTOs/ISOs, although these exchanges are primarily governed by sales contracts.

The determination of the need for new generation requires evaluation of both utility supplies compared to projected demand, and demand in the relevant utility service and market areas. The applicant may provide or NRC staff may obtain information from sources that encompass different geographic areas. Therefore NRC staff must be specific about what area they are referencing, such as utility service area, State, RTO/ISO area or regional market, NERC region, or other area if appropriate.

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (ER) after ensuring it is consistent with all available State or regional authorities' or RTO/ISO analyses, including appropriate regional NERC councils.

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 each of the relevant service and market areas as referenced by the applicant or other sources consulted by the staff. Special attention should be given to the status of retail power deregulation, functions of wholesale power markets, regional transmission reliability requirements and transmission constraints, and anomalies, such as extremely

large industrial customers or market conditions that may affect inter- and intra-regional power flows as each affects energy load forecasts.

- ESRP 8.2.2. Obtain data on power and energy alternatives and provide the historic and projected growth data that are considered appropriate for the relevant service area(s) 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. For example, power production in excess of a traditional utility's needs can be readily sold to other utilities or retail power providers as a result of wholesale power market deregulation. Similarly, power from other projects can be purchased to satisfy the applicant's stated need. This makes the largest applicable regional power market a reasonable boundary for this study.

- 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, NERC reliability councils, and regional transmission organizations may prepare need-for-power evaluations for proposed generation and transmission facilities. The staff should review applicable evaluations and determine if each 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 that incorporate consumer response to power cost changes as new power plants are integrated into the power system. 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 area. If the proposed plant will serve loads beyond traditional utility boundaries, such as a competitive wholesale power market, then this market area will be the relevant area. If the need for power is based solely on needs within a utility service area (no surplus will be produced for export) and there are no alternative plants proposed by competitors, then analysis can be confined to the utility service area. Data should cover the 10 to 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 percent 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.

- evidence of wholesale power sales agreements for plant output for production that is expected to be surplus to traditional utility needs or projected competitive retail market sales. This power could offset projected energy and power requirements in the relevant area, or absent such requirements, indicate overbuilding of generating capacity.

- forecasts of all aggregate long-range consumption and system peakload demand made during the 10 to 15 years preceding the date of application with a description of the methodology used. This information will be used to evaluate the relative accuracy of previous energy and demand forecasts and/or demand variability.

- actual yearly increases 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 10 to 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 10 to 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, inter-ruptible 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.

Evaluation of these forecasts and other data may provide staff with an appropriate range of energy and power growth rates to assess alternative forecasts and to provide a context for growth projections beyond those available in alternative forecasts.

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(d) with respect to weighing the costs and benefits of the proposed action and reasonable alternatives.
- 10 CFR 51.75(b) and (c) with respect to applications for early site permits, combined licenses, construction permits, and operating licenses, respectively.

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 needed 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. In this context, industry best practice is defined by methods used by leading consultants in the field, the Energy Information Administration (EIA), federal power marketing administrations such as the Bonneville Power Administration and including the Tennessee Valley Authority, and leading state and regional power planning organizations, such as in California, New York, and Wisconsin and the Northwest Power and Conservation Council.

(1) Analyze the historical data and forecasts of demand factors for completeness and agreement with other forecasts, emphasizing the forecasted growth in kWh sales in the context of retail electricity prices. Growth rates during periods of flat or declining real retail power prices should be expected to be higher than during periods when prices are increasing.

(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 and elasticity of demand
- energy efficiency and energy substitution including on-site power production from renewables, combined heat and power, etc.
- price of alternative fuels
- income
- economic activity
- number of customers
- weather
- saturation levels of electricity using devices
- 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 federal (e.g., EIA), State, or regional sources. Compare the applicant's latest projections with those made earlier for the same or overlapping time periods. Consider the reasons forecasts for overlapping periods differ.

(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 using the stated review procedures. In this case, the staff should identify where problems in the review occurred and request additional information.

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 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 for the relevant service and market areas 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 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 concluded that the results are complete and adequate.

V. IMPLEMENTATION

The method described in this ESRP should be used by the staff in evaluating conformance with NRC requirements , except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the requirements.

VI. REFERENCES

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

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

10 CFR 51.75, "Draft environmental impact statement—construction permit, early site permit, or combined license."

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

U.S. NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL STANDARD REVIEW PLAN

8.2.2 FACTORS AFFECTING GROWTH OF DEMAND

REVIEW RESPONSIBILITIES

Primary— Organization responsible for the review of need for power information

Secondary— None

I. AREAS OF REVIEW

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

The need for power is a critical component of an EIS as it establishes a framework for evaluation of project benefits and for the geographic boundaries over which benefits and costs are distributed. ESRP 8.2.2 discusses factors that underlay demand growth, some of which may indicate the proposed plant is not needed as the applicant proposes. This review is critical as it provides assurance to the NRC and the public that issuing a license/permit for the plant is an appropriate action.

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (ER) and/or analysis performed by State or regional authorities, regional transmission operators (RTOs), or independent system operators (ISOs). The reviewer may also rely on relevant North American Electric Reliability Corporation (NERC) regional council 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 primary benefit of a new nuclear plant is the large quantity of baseload power it can provide. Consequently, analyses of need should focus primarily on energy, rather than peak demand requirements. These requirements can be met by the proposed project, potential competing projects, and other alternatives. New power plants may be needed to meet growing loads and to replace plants that are retired. The need for new plants also has a geographic component, as power may be needed at specific locations on the interconnected power grid to ensure reliability of the entire power grid or of subsections of the grid. The geographic scope for the need for power may be defined in the application by a utility service area, but it also exists in a larger geographic context because power from outside a utility service area boundary may also serve the load. This larger boundary is primarily a function of the way the transmission system is planned and managed. This has both electrical and economic features, which requires further description to facilitate evaluation of materials submitted by the applicant and other materials staff may consult.

Wholesale power supply continues to be deregulated nationwide. Firms that do not serve retail customers may build and operate power plants. Power from any power plant may be sold to utilities and others using the regional transmission system. Management and operation of utility transmission is performed on a regional basis to support regional power exchanges through competitive power markets. Some parts of the country have formed RTOs or ISOs to provide regional transmission planning and management and to operate wholesale power markets. Where these exist, they define the relevant market area for a proposed project. In addition to RTOs/ISOs, the United States is divided into unique regional electricity reliability councils by NERC. Each NERC regional council has responsibility for managing system reliability within their respective region by monitoring the balance between customer demand and generation. As a result, the local NERC region may be the relevant market area where RTOs/ISOs do not exist. It should also be noted that high voltage transmission interties enable power exchanges between NERC regions and RTOs/ISOs, although these exchanges are primarily governed by sales contracts.

The determination of the need for new generation requires evaluation of both utility supplies compared to projected demand, and demand in the relevant utility service and market areas. The applicant may provide or NRC staff may seek information from sources that encompass different geographic areas. Therefore NRC staff must be specific about what area they are referencing, such as utility service area, State, RTO/ISO area or regional market, NERC region, or other area if appropriate.

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (ER) after ensuring it is consistent with all available State or regional authorities' or RTO/ISO analyses, including appropriate regional NERC councils.

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. Obtain data on the power and energy requirements used to support the forecast analysis, including information on forecast methodology and assumptions. Provide data on power and energy alternatives and provide the historic and projected growth data that are considered

appropriate for the relevant area(s) 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. For example, power production in excess of a traditional utility's needs can be readily sold to other utilities or retail power providers as a result of wholesale power market deregulation. Similarly, power from other projects can be purchased to satisfy the applicant's stated need. This makes the largest applicable regional power market a reasonable boundary for this review.

- 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, NERC reliability councils, and regional transmission organizations may prepare need-for-power evaluations for proposed generation and transmission facilities. The NRC will review applicable evaluations and determine if each 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 that incorporate consumer response to power cost changes as new power plants are integrated into the power system. Projections of power need are expressions of "wants" rather than of necessity. Customers will find substitutes if the projected quantities are not available or are too expensive. Available projections should be evaluated based on the ability of the project methodology to capture these effects. As the area covered by the project increases, there is a greater likelihood underlying drivers for the growth in demand will vary across the area. Accordingly, larger area projections should be evaluated to determine if underlying assumptions are realistic for an entire region. Projections that incorporate ranges of forecasts allow evaluation of situations where regional growth is uneven and are better than projections that do not cover a range of growth rates. If State/regional or other independent third-party need-for-power evaluations are found to be acceptable, no additional independent review by NRC is needed, and the alternative analysis (analyses) can be the basis for the review in 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, data and information on the factors that affect demand growth should be obtained by NRC staff for review of the applicant's need-for-power analysis. Typically, demand growth is a function of population growth, increased wealth, fuel switching, industrial electricity use, and introduction of new or improved electricity using appliances, equipment, and other end uses. As a result, demand forecasts are very sensitive to assumptions about these factors. Accordingly, 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) and ROI of the following variables: population, employment by major industries, number of households, per capita income, consumer price index, manufacturing output, gross regional product, saturation of major appliance, trends in size of household, and prices of alternative fuels and competitiveness of

on-site generating technologies including renewables and combined heat and power. Data should cover the 15 years preceding the date of application through the 3rd year of commercial operation of all proposed units.

- historic and estimated growth of employment and wages by two digit standard industrial classification (SIC) code and personal income for the relevant utility and regional market areas for the preceding 15 years and projected through the 3rd year of commercial operation of the proposed plants.

- historical temperature adjusted energy and peakload data for the 10-year period preceding the application submittal date for the relevant service and market areas.

- to review fuel switching assumptions, data for the 5 years preceding the date of application including 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, trends in fuel switching, and promotion of fuel switching.

- 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 areas of the real price of electricity and substitute fuels by major customer class.

- historic and projected saturation rates of major electricity using equipment and appliances and average electricity use per each for the relevant utility and regional market areas for the preceding 15 years and projected through the 3rd year of commercial operation of the proposed plants.

- 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 and changes in underlying building, appliance, and equipment efficiency codes and standards.

- alternative assumptions used to conduct sensitivity studies, and associated results for each study. This should include variations on: employment and income growth rates, customer growth rates, and electricity using equipment and appliance saturation rates including customer installation of power generating equipment such as photovoltaic and wind generators.

If the proposed project will replace an existing generating plant, all of this information may not be needed, however sufficient data and information should be provided to verify the output of the plant being replaced. Staff should verify that the plant will, in fact, be retired through such means as plant retirement filings and announcements and evidence in filings of retirement plans to regional reliability

councils and regional transmission organizations showing zero output from the plant. Staff should also verify that demand will not decline below a level that requires the output from the proposed project using the data and information listed above. If the plant is being proposed to replace plants outside the scope (further in the future) of alternative forecasts and resource plans, staff should attempt to verify general growth trends for the appropriate period and compare these to planned power plants, operating power plants, and license expiration dates for plants that may need to be replaced. Applicants may be required to provide current information to state and local authorities later when construction is imminent.

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 and to weighing the costs and benefits of the proposed action and reasonable alternatives
- 10 CFR 51.75(b) and (c) with respect to applications for early site permits and combined licenses, respectively.

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 Part 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 8.2.2 will aid this

analysis by providing, as input to the reviewer of ESRP 9.2, 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 needed 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 of the utiliy industry. The reviewer should be aware of, and use, industry best practice where possible. In this context, industry best practice is defined by methods used by leading consultants in the field, the Energy Information Administration (EIA), federal power marketing administrations such as the Bonneville Power Administration and including the Tennessee Valley Authority, and leading state and regional power planning organizations, such as in California, New York, and Wisconsin and the Northwest Power and Conservation Council.

Economic and Demographic Trends

(1) Analyze the applicant's estimates of the effects of economic, employment, and demographic trends on the applicant's projected growth of electricity demand in the relevant service area. Growth in demand typically follows patterns of growth in population, employment, and income.

(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. In particular, consider trends in manufacturing employment, out-sourcing, and growth in service industries in relation to energy intensive manufacturing.

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]

(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). Consider power production from renewables by customers (including thermal uses such as the use of ground source heat pumps in place of conventional air conditioners, passive solar designs for heating and cooling, and building integrated solar and wind power) and combined heat and power.

(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. Consider historic and projected future electricity growth rates in conjunction with comparable trends and forecasts for retail electricity prices.

(2) Identify those elements that could have contributed to diminished growth during the historic period and in the forecast period. The list should include the following

- increases in energy efficiency including changes in building and appliance codes
- higher prices of electricity and tariffs that encourage conservation and demand reduction
- 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.

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

(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 versus 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 paying particular attention to building, appliance, and equipment energy efficiency codes and standards including voluntary programs such as Energy Star and Leadership in Energy and Environmental Design (LEED).

(b) the extent to which energy sources (e.g., synthetic natural gas, hydrogen) or energy conversion systems (e.g., renewable power systems and geothermal and solar space heating and cooling systems) currently under development may reasonably be expected to compete with or significantly reduce 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 if new electricity uses are introduced (e.g., increased availability of plug-in hybrid vehicles).

(d) similarly, the possibility that improvements in energy efficiency would result in offsetting electricity savings and thus, decreased use of electric power.

(e) the possibility of "double counting" energy savings (e.g., energy efficiency is an economic response and some conservation will be included in price factors, although specific conservation programs, including building codes and standards, will be additive).

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, marginal cost pricing, and flattened rates. Also consider rate and utility programs that promote use of renewable power, such as green power tariffs that either substitute power from renewable sources for conventional supplies or aggregate supplemental payments by consumers to invest in new renewable power resources.

(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) or valley filling from new electricity uses, such as off-peak charging of vehicle batteries.

(c) Estimate anticipated effects on annual electricity consumption and peakload demand.

(3) Determine to what extent economic, employment, 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 with particular emphasis in the aging of existing residents and in-migration of new ones

- the effect of energy efficiency improvements and substitution on projected kWh sales and peak demand, especially the impacts from building, appliance, and equipment energy efficiency codes and standards

- the effect of price competition with other fuels and on-site generating options 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, customer site generation via net metering, and substitution of renewable power for conventional generation.

(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, however the forecast demand is consistent with independent forecasts (see ESRP 8.2.1) that do include these factors, the reviewer can endorse the applicant's forecast.

IV. EVALUATION FINDINGS

If a need-for-power analysis prepared by or under the direction of affected States or other reputable, independent third-party is determined to be unavailable or unsatisfactory 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, business cycles, 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 paying particular attention to changes in building, appliance, and equipment energy efficiency codes and standards and economics of self-generation using renewables, use of ground source heat pumps and other renewable resources for thermal end uses such as for heating and cooling, and use of combined heat and power systems.

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 in this ESRP should be used by the staff in evaluating conformance with NRC requirements, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the requirements.

VI. REFERENCES

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

10 CFR 51.71, “Draft environmental impact statement—contents.”

10 CFR 51.75, “Draft environmental impact statement—construction permit, early site permit, or combined license.”

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

U.S. NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL STANDARD REVIEW PLAN

8.3 POWER SUPPLY

REVIEW RESPONSIBILITIES

Primary— Organization responsible for the review of need for power information

Secondary— None

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. The context for this review is described in ESRP 8.1, "Description of the Power System."

In performing this review, the reviewer may rely on the analysis in the applicant's environmental report (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. Of particular interest is an analysis of potential competitors to the proposed project, including other projects, market purchases, and customer-owned generation, including power from distributed renewable generation sources.

The analysis of purchases and sales should consider the fact that substantial amounts of electricity are now bought and sold in competitive wholesale markets by utilities, non-utility power producers, and power marketers and brokers within and between regions across the country and even between U.S. markets and markets in Canada and Mexico. As a result, the relevant area of analysis for this ESRP is likely to include the relevant utility service area, if the proposed project is expected to primarily serve the demand of a specific utility and service area, and a larger market area comprising trading partners of that

utility and others in the regional wholesale market area surrounding and/or abutting the utility or power plant site. This larger area may coincide with the area covered by a regional transmission organization (RTO), independent system operator (ISO), power pool, or North American Electric Reliability Corporation (NERC) regional reliability council, or multiples of these entities.

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. Obtain geographic and other descriptions of the wholesale power market in the region and a definition for the relevant market area for the proposed plant. Also, obtain planned and proposed generation additions, plant retirements, and transmission construction. Information obtained from the ESRP 8.1 reviewer should also include information on regional transmission operations, including mechanisms used by transmission operators to provide congestion and demand relief.

- 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 and/or regions, NERC reliability councils, and regional transmission organizations may prepare need-for-power evaluations for proposed generation and transmission facilities. The NRC will review applicable evaluations and determine if each is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the State, region, or other independent third-party such as an RTO or ISO or power pool or NERC region prepares a need-for-power evaluation that is found to be acceptable, no additional independent review by NRC is needed, and this analysis (or analyses) can be the basis for the review conducted under ESRPs 8.2 through 8.4.

As part of their analyses of the need for power, States and/or regional authorities may 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 data needed by the ESRP 8.3 reviewer. 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, NERC and its member regional reliability councils, 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. If the date of planned operation exceeds the time frame of alternative resource plans and other information sources, staff should explore commercial databases of generation additions, such as Platt's NewGen product, and regional news and industrial literature to identify planned and proposed resource additions for the applicable time period.

- 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.

Reviews of both applicant materials and others used to verify the applicant's submission need to address need for power in the context of both the utility service area, if the proposed plant is dedicated to utility demand, and the larger regional market where surplus power from the proposed plant could be sold or power from other sources purchased to displace the need for the proposed plant.

New central power plant additions are expected to compete in the future with distributed generation, which is defined as generation scaled to the needs of local areas and located in those areas. Central generation will also compete with customer-owned generation and potentially energy storage. Additions of these kinds of resources are being facilitated by state and federal incentives, especially for renewable generation, and net metering, which encourages retail customers to self-generate. Staff should evaluate local policies in these areas and trends in distributed and self-generation as part of this review.

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 and to weighing the costs and benefits of the proposed action and reasonable alternatives.
- 10 CFR 51.75(b) and (c) with respect to applications for early site permits and combined licenses, respectively.

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 the reviewer of ESRP 9.2 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 resource plans prepared by others. These procedures assume a traditional utility. Industry best practice may evolve as a result of deregulation of the utility industry. The reviewer should be aware of, and use, industry best practice where possible. In this context, industry best practice is defined by methods used by leading consultants in the field, the Energy Information Administration (EIA), federal power marketing administrations such as the Bonneville Power Administration and including the Tennessee Valley Authority, and leading state and regional power planning organizations, such as in California, New York, and Wisconsin and the Northwest Power and Conservation Council. Current best practice includes development of resource supply curves that rank from low to high prospective supply options (including energy efficiency as a supply option) on the basis of cost (typically net present value) with respective potential quantities of energy and power (see Northwest Power and Conservation Council power plans for a detailed description). Supply curves should facilitate staff comparison of supply options because some resources are inherently limited in terms of capacity and may, therefore, not be adequate substitutes for large central baseload generating plants.

Reviews of both applicant materials and materials from others used to verify the applicant's submission need to address need for power in the context of both the utility service area, if the proposed plant is dedicated to utility demand, and the larger regional market where surplus power from the proposed plant could be sold or power from other sources purchased to displace the need for the proposed plant. The following procedures should be applied in an analysis of each of these regions.

(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. Pay particular attention to "load islands" and other transmission constraints.

(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 and more efficient wholesale power market operations, such as locational pricing.

(g) Consider expected trends towards distributed and self-generation by consumers, such as from combined heat and power projects, building integrated renewable such as solar photovoltaic, small wind turbines, and low temperature geothermal generators. In particular, consider state and federal policies facilitating development of these resources including tax and other incentives, renewable portfolio requirements, net metering requirements, and utility programs to reduce peak demand, especially programs that encourage customers to operate customer owned generation during peak demand periods.

(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 or unsatisfactory, and an analysis is conducted by NRC staff, the ESRP 8.3 analysis will normally be divided into three subsections: existing and planned generating capacity, purchases and sales, and distributed and self-generation. These are discussed below.

Existing and Planned Generating Capacity

This discussion should summarize the relevant market area's present and planned generating capacity. The relevant market area's present capacity by type and any planned additions, upratings, deratings, and retirements (by unit) should be shown in a table. Each NERC regional reliability council issues a reliability assessment looking out 10 years every summer that lists current and projected plants, plant retirements, transmission additions, and remaining constraints and reliability reserve concerns. Commercial databases are also available. For example, Platt's NewGen product provides proposed and planned generation additions based on public announcements, permit filings, and so on. 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. Additional purchases and sales may be facilitated by planned and proposed transmission construction. This analysis should attempt to identify future transmission additions and how those may affect the need for new power plants.

Distributed- and Self-Generation

The staff discussion should also consider policies and trends that encourage growth in distributed- and self-generation that substitutes for power from central power plants. Typical policies include state and federal incentives for development of renewable resources, combined heat and power projects, and fuel cells, as well as renewable portfolio standards and net metering requirements. Regional and utility transmission operators may also have policies that encourage localized generation to relieve transmission congestion and/or to encourage generation expansion within "load islands."

If a need-for-power analysis prepared by or under the direction of affected States or regional authorities is available and satisfactory, input to the EIS from ESRP 8.3 may be divided into three 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 in this ESRP should be used by the staff in evaluating conformance with NRC requirements, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the requirements.

VI. REFERENCES

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

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

10 CFR 51.75, "Draft environmental impact statement—construction permit, early site permit, or combined license."

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

	Year			
Capacity	**2000**	**2005**	**2010**	**--**
Capacity Needed				
High 25th Percentile Midrange 75th Percentile Low				
Capacity Additions (Net of Distributed and Self-generation in Demand Forecast)				
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)				

U.S. NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL STANDARD REVIEW PLAN

8.4 ASSESSMENT OF NEED FOR POWER

REVIEW RESPONSIBILITIES

Primary— Organization responsible for the review of need for power information

Secondary— None

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. As such, it will draw on ESRPs 8.2 and 8.3.

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 reviewer of ESRP 8.4 should consider that substantial amounts of electricity are now bought and sold in competitive wholesale markets by utilities, non-utility power producers, and power marketers and brokers within and between regions across the country and even between U.S. markets and markets in Canada and Mexico. As a result, the relevant area of analysis for this ESRP is likely to include the relevant utility service area, if the proposed project is expected to primarily serve the demand of a specific utility and service area, and a larger market area comprising trading partners of that utility and others in the regional wholesale market area surrounding and/or abutting the utility or power plant site. This larger area may coincide with the area covered by a regional transmission organization (RTO),

independent system operator (ISO), power pool, or North American Electric Reliability Corporation (NERC) regional reliability council, or multiples of these. The reviewer should also consider the fact that distributed and self-generation by customers is increasing as power costs increase and the cost of distributed generating systems decrease. Finally, the reviewer should consider that dramatic improvements in electricity use have occurred recently and are projected to continue due to energy efficiency codes for equipment and appliances as well as buildings. As a result, new customers, on average, may have very different usage rates than previous generations of customers.

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 information and data on the power system context for the proposal.
- 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, NERC reliability councils, and regional transmission organizations may prepare need-for-power evaluations for proposed generation and transmission 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, States and/or regional authorities would normally collect data for the need for power. These data may be supplemented by information sources such as the Energy Information Administration, FERC, NERC and member reliability councils, and others.

If an analysis meeting the preceding criteria is not available or satisfactory, the following data or information should be obtained and/or prepared 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 for an example) and a table showing peakload responsibilities, accredited generating capacities, and resulting reserve margin (see Table 8.4-2 for an example). Reliability assessments prepared by each NERC reliability council should be used as a starting point.

- 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 including the requirements of the regional reliability council and regional transmission operator at a minimum.

- the applicant's calculated reserve margins extending from the present to the first 3 years after initial operation of all proposed units. Merchant plants may not have reserve requirements similar to those for regulated utilities, however, wholesale power suppliers are increasingly required to provide RTOs, ISOs, or reliability coordinators with assurances of reliability. (Merchant plants are not dedicated to a specific customer or load but sell solely to wholesale markets instead.)

- 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.) or other industry accepted measure.

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:

- 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 and to weighing the costs and benefits of the proposed action and reasonable alternatives

- 10 CFR 51.75(b) and (c) with respect to applications for early site permits and combined licenses, respectively.

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 or other independent third-party, 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 of the utility industry. The reviewer should be aware of, and use, industry best practice where possible. In this context, best practice is defined by methods used by leading consultants in the field, the Energy Information Administration (EIA), federal power marketing administrations such as the Bonneville Power Administration and including the Tennessee Valley Authority, and leading state and regional power planning organizations, such as California, New York, and Wisconsin and the Northwest Power and Conservation Council. Current best practice includes development of resource supply curves that rank from low to high prospective supply options (including energy efficiency as a supply option) on the basis of cost (typically net present value) with respective potential quantities of energy and power (see Northwest Power and Conservation Council power plans

for a detailed description). Supply curves should facilitate staff comparison of supply options because some resources are inherently limited in terms of capacity and may, therefore, not be adequate substitutes for large central baseload generating plants.

(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) encompasses 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 encompassed by 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, and 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) 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.

(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[(a)] 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:

- If the range of reasonable forecasts developed or adopted by the staff encompasses the applicant's forecast, the reviewer should perform the analysis using the developed or adopted forecast.

- If the range of forecasts falls below the applicant's forecast(s), the reviewer should use the staff forecasts.

(8) For each estimate of peakload responsibility[(b)] 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.

(a) 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.

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

(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. This source may be the most appropriate if the proposed plant is not planned to serve a traditional utility load or as a retail power supplier in a specific region, but is expected to provide power as a merchant plant to a regional wholesale power market. In this case, the analysis of the relevant market should include an assessment of competitors to the proposed plant.

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.

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 imported petroleum

- 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 for an example)

- a table showing peakload responsibilities, accredited generating capacities, and resulting reserve margin (see Table 8.4-2 for an example)

- 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 in this ESRP should be used by the staff in evaluating conformance with NRC requirements, except in those cases in which the applicant proposes an acceptable alternative for complying with specified portions of the requirements.

VI. REFERENCES

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

10 CFR 51.71, “Draft environmental impact statement—contents.”

10 CFR 51.75, “Draft environmental impact statement—construction permit, early site permit, or combined license.”

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

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

PAPERWORK REDUCTION ACT STATEMENT

The information collections contained in the Environmental Standard Review Plan are covered by the requirements of 10 CFR Part 51, and were approved by the Office of Management and Budget, approval number 3150-0021.

PUBLIC PROTECTION NOTIFICATION

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

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						