



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

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

This Environmental Standard Review Plan has been prepared to establish guidance for the U.S. Nuclear Regulatory Commission staff responsible for environmental reviews for nuclear power plants. The Environmental Standard Review Plan is not a substitute for the NRC's regulations, and compliance with it is not required.

These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Individual sections of NUREG-1555 will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience. Comments and suggestions for improvement will be considered and should be sent to the U.S. Nuclear Regulatory Commission, Office of New Reactors, Washington, D.C. 20555-0001.

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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.

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

Capacity	Year			
	2000	2005	2010	--
Capacity Needed				
High				
25th Percentile				
Midrange				
75th Percentile				
Low				
Capacity Additions (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)				