U.S. NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL STANDARD REVIEW PLAN

9.2.2 ALTERNATIVES REQUIRING NEW GENERATING CAPACITY

REVIEW RESPONSIBILITIES

Primary— Organization responsible for the review of energy alternative information

Secondary—None

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification and review of alternative sources of energy that could reasonably be expected to meet the demand from both a load and economic standpoint for additional generating capacity determined for the proposed project. Energy sources selected by this review will be compared with the proposed project by the reviewer for ESRP 9.2.3. The scope of the review directed by this plan will be governed by consideration of national policy, by site- and region-specific factors, and by the extent to which the energy sources may be considered as commercially exploitable. Within this scope, the reviewer should determine the current and projected status of (1) alternatives not yet commercially available, (2) fossil fuels, taking into account national policy regarding their use as fuels, and (3) alternatives uniquely available within the region (e.g., hydropower and geothermal).

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. The reviewer should ensure that the analysis of the need for power and alternatives is reasonable and meets high quality standards.

The term "relevant service area" is used in this ESRP to indicate any region to be served by the proposed facility, whether or not it corresponds to a traditional utility service area. Relevant service area is a situation-specific concept, and it must be defined on a case-by-case basis. Applicants may be power generators rather than a utility; therefore, analysis of existing and projected capacity and alternatives must be sufficiently flexible to accommodate differences in the applicant types and regulatory environments. The concept of "relevant region" is also introduced here to mean an area for which

electricity-demand forecasts are done, such as the Northeast Power Coordinating Council region, that would usually include the relevant service area.

Review Interfaces

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

- ESRP 8.1 - 8.4. Obtain a description of the power system, factors associated with the power demand and supply, and an assessment of the need for power. An assessment of the need for power is not required for early site permit (ESP) applications unless the applicant elects to cover need for power in its application.

- ESRP 9.2.3. For each alternative established as competitive, provide the ESRP 9.2.3 reviewer with a description of the energy source/plant combination. This should include the basis for the ESRP 9.2.2 reviewer's findings and sufficient design/performance data to permit the subsequent comparison of the alternative with the proposed project.

Data and Information Needs

The kinds of data and information needed will be affected by site and regional factors as they concern availability of the alternative energy sources, and the degree of detail should be modified according to the technological status of the alternatives or combinations of alternatives. If a need for power and alternatives analysis that is reasonable and meets high quality standards is not available, the following data or information should be obtained:

- For alternatives that have not yet achieved commercial acceptance, U.S. Department of Energy (DOE) research, development, and demonstration/commercialization schedules and projected capability as a source of central station power. Information on many of these technologies is available from DOE's Internet site, currently listed as http://www.doe.gov/.

- For nonrenewable fuels (e.g., coal, natural gas, and petroleum fuels), the fuel quality, availability to the applicant, rate of consumption estimates, potential environmental restrictions and impacts, amount of land that would be needed, and U.S. national policy, if any, with respect to new uses of these fuels.

- For renewable fuels (e.g., wind, geothermal, hydroelectric, wood and municipal solid waste, energy crops, and solar), availability to the applicant, quantities needed, potential environmental restrictions and impacts, amount of land that would be needed, amount of the fuel available, and U.S. national policy, if any, with respect to new uses of these fuels.

  For these alternatives, the reviewer should obtain information on the extent of the resource, environmental restrictions and impacts, licensing or permitting constraints, status of

commercialization, and engineering problems associated with each source (from the ER and consultation with local and national resource agencies). NRC's Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437), as updated and modified, can be used as a source of information.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of alternatives requiring new generating capacity are based on the relevant requirements of the following:

- 10 CFR 51.71(d) and 10 CFR 51, Appendix A to Subpart A, with respect to the need to discuss alternatives to the proposed action in the EIS.

Regulatory positions and specific criteria necessary to meet the regulations as 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 analysis of alternatives requiring new generating capacity.

Technical Rationale

The technical rationale for evaluating the applicant's alternatives requiring new generating capacity is discussed in the following paragraph:

The consideration of alternatives is the heart of an NRC EIS (10 CFR 51, Appendix A). The review conducted under this ESRP contributes to the consideration of alternatives by addressing alternatives that involve the addition of power generation capacity. The results of this review are considered in the assessment of alternative energy sources and systems conducted under ESRP 9.2.3.

III. REVIEW PROCEDURES

The reviewer should review the alternative energy sources and combinations of sources available to the applicant, and categorize them as either competitive or noncompetitive with the proposed project. A competitive alternative is one that is feasible and compares favorably with the proposed project in terms of environmental and health impacts. If the proposed project is intended to supply baseload power, a competitive alternative would also need to be capable of supplying baseload power. A competitive alternative could be composed of combinations of individual alternatives.

(1) For competitive alternatives, the reviewer should ensure that the energy source or system meets the following criteria:

- The energy conversion technology should be developed, proven, and available in the relevant region.[(a)]

- The alternative energy source should provide generating capacity substantially equivalent to the capacity need established by the reviewer of ESRP 8.4.

- The capacity should be available within the timeframe determined for the proposed project.

- Use of the energy source is in accord with national policy goals for energy use.

- Federal, State, or local regulations do not prohibit or restrict the use of the energy source.

- There are no unusual environmental impacts or exceptional costs associated with the energy source that would make it impractical.

- The reviewer should ensure that the following energy sources have been considered by the applicant:

  - wind
  - geothermal
  - natural gas
  - hydropower
  - municipal solid wastes
  - biomass
  - coal
  - photovoltaic cells
  - solar thermal power
  - wood waste
  - energy crops
  - other advanced systems (e.g. fuel cells, synthetic fuels, etc.).

- The reviewer should ensure that all alternative energy sources available have been evaluated using the criteria listed above to determine if the alternatives can be considered competitive with the proposed project.

(2) For noncompetitive alternatives, the reviewer should ensure that the statements dismissing these alternatives are appropriately referenced, applied to the relevant regional system, and that the reasons for rejecting these alternatives have been provided.

(a) Current reports on specific technologies may be identified from the DOE's program offices' web sites (http://www.doe.gov).

(3) For alternative energy sources, the reviewer should evaluate the applicant's or regional authority's analysis of each energy source to determine that it describes the source plant combination in sufficient detail to enable the reviewer of ESRP 9.2.3 to compare the environmental and social costs of this alternative with the proposed project. Specific analytical procedures should depend on the alternative. The reviewer should evaluate the analysis procedure in consultation with the reviewers of ESRP 9.2.3 (for analysis requirements) and ESRP Chapter 2.0 (for environmental descriptions and socioeconomic data).

(4) For the alternatives considered competitive, the reviewer should ensure that there are suitable sites for an alternative plant and should determine the general characteristics of such a site-plant combination. The results of this analysis should be used by the reviewer of ESRP 9.2.3 in determining the impacts and costs (environmental, health, capital and operating costs, etc.) of the alternative and comparing them with the impacts and costs of the proposed project. Based on an appropriate site (this may include the proposed nuclear plant site) and the energy sources identified, the reviewer should consider the following:

- distance from the fuel sources to the plant, probable transportation means, and mileages for each transportation means

- average daily fuel requirements based on the installed capacity need determined by the reviewer for ESRP 8.4 and the heat content

- need for fuel pretreatment (e.g., washing), if any, including the volumes of materials (water) required, the quantities of wastes produced, and means of waste disposal. Also include estimated effects of fuel source preparation on fuel characteristics, quantities of water required, and quantities of wastes produced.

- in the case of coal or other solids as the preferred alternative to the proposed project, need for combustion-product solid waste disposal, including the quantities of wastes produced and disposal methods and locations for deposition of solid waste

- need for flue-gas desulfurization, the process to be used, and (on an average daily basis), the raw material inputs and byproduct and/or waste product outputs and means of waste disposal

- average daily atmospheric releases of carbon dioxide (CO_2) and pollutants of concern regulated under the Clean Air Act (including total suspended particulates [TSP], sulfur oxides [SO_x], and nitrogen oxides [NO_x].

(5) For alternatives that have been determined to be competitive, the reviewer should ensure that sufficient data are available to permit the reviewer of ESRP 9.2.3 to compare the environmental impacts and costs of these alternatives with costs of the proposed project.

(6) For each alternative established as noncompetitive, a brief statement should be prepared describing or identifying the alternative and the basis for the staff's conclusion that it was noncompetitive.

IV. EVALUATION FINDINGS

Input to the environmental impact statement (EIS) review should be directed toward accomplishing the following objectives: (1) public disclosure of the alternative energy sources considered, (2) presentation of the basis for the staff analysis, and (3) presentation of staff conclusions for each alternative energy source considered.

The depth and extent of the input to the EIS should be governed by the alternatives or combination of alternatives that are found to be non-competitive with the proposed project. The characteristics of the alternatives should be described in sufficient detail that a decision can be reached regarding environmental impacts. The NRC staff evaluation should support concluding statements of the following type to be included in the EIS:

> The staff reviewed the available information and concluded that the issues have been covered in sufficient detail for staff analysis of alternatives requiring new generating capacity.

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, "Format for Presentation of Material in Environmental Impact Statements."

10 CFR 51.45, "Environmental report."

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

Clean Air Act Amendments of 1977, as amended, 41 USC 7401 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.

U.S. Nuclear Regulatory Commission (NRC). 1996. Generic Environmental Impact Statement for License Renewal of Nuclear Plants. NUREG-1437, 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.