PRELIMINARY*
ENVIRONMENTAL STANDARD REVIEW PLAN

FOR ES SECTION 9.2 ALTERNATIVE SITES

REVIEW INPUTS

Environmental Report Sections

9.2 Alternatives Requiring the Creation of New Generating Capacity
9.3 Cost-Effectiveness Analysis of Candidate Site-Plant Alternatives

Environmental Reviews

2 Environmental Descriptions
4 Environmental Impacts of Construction
5 Environmental Impacts of Station Operation
8.1 Description of the Power System

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Regulatory Guide 4.7, "General Site Suitability Criteria for Nuclear Power Stations"
U.S. Department of Interior, "Threatened and Endangered Species List"
State rare and endangered species lists
Advisory Committee on Historic Preservation, "National Register of Historic Places"
Federal, State, and local Acts, ordinances, requirements, and standards for land use, water use, water quality, and air quality
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Other

Responses to requests for additional information
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REVIEW OUTPUTS

Environmental Statement Sections

9.2 Alternative Sites

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10.4.3 Benefit-Cost Balance: Summary

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*This issue of alternative site analysis and evaluation is as of this date (February 1979) under consideration by the Commission.

I. PURPOSE AND SCOPE

The purpose of this Environmental Standard Review Plan (ESRP) is to direct the staff's analysis and evaluation of alternatives to the applicant's proposed site for the construction and operation of a nuclear power plant. The scope of the review directed by this plan will include the analysis and evaluation of the region of interest, candidate areas, potential sites, candidate sites and proposed alternatives sites* identified by the applicant; and the methodology used by the applicant in these identifications. The review will also include the staff's independent comparison of alternative sites with the applicant's proposed site to determine if there are any alternative sites that are environmentally preferable to the proposed site. When one or more environmentally preferable alternative sites are identified, the scope of this review will be extended, using benefit-cost techniques and other procedures to determine if any environmentally preferable site can be shown to be obviously superior to the applicant's proposed site.

The review will be directed to identification of sites suitable for the size and type of nuclear power plant proposed by the applicant. Plant design modifications (e.g., cooling-system design) may be considered on a site-specific basis. The review will be limited to those procedures and sites selected by the applicant.

II. REQUIRED DATA AND INFORMATION

The following data and information will usually be required:

A. A description of the site-selection process, including the following items:

1. Objectives of the site-selection process (from the ER)

2. Basic constraints and limitations, e.g., rules, regulations, laws, giving the basis and rationale for their choice and applicability (from ER)

*See Appendix A for a definition of region of interest, candidate areas, potential sites, candidate sites and proposed alternative sites.

3. Selection procedures for the region of interest, candidate areas, potential sites, candidate sites, and proposed site (from the ER)

4. Basis for establishing the geographical scope of the region of interest (from the ER).

5. Factors considered at each level of the selection process, parameters by which these factors were measured, and criteria used to define levels of quality, e.g., numerical limits or decision standards (from the ER)*

6. Criteria used to screen potential sites (from the ER)

7. Methodologies used in the candidate-site comparison process, including (when used) factors such as (a) importance factors, (b) preference functions, (c) utility functions, (d) weighting factors, (e) ranking scales, (f) scoring schemes, (g) rating systems, and (h) sensitivity analyses (from the ER).

B. A description of the geographic area considered by the applicant, including the following items (from the ER):

1. Major centers of population

2. Areas predicted to be deficient in power

3. Water bodies available for cooling

4. Railroads, highways, and waterways (existing and planned)

5. Topographic features

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*See Appendix B to this ESRP for a checklist of selection-process factors.

6. Major land-use classifications (e.g., residential, agricultural) and land-use areas set aside for specific uses

7. Location and description of existing and planned primary electrical generating stations

8. Existing and planned transmission network

9. Transmission interconnections with other utilities

10. Natural and man-made features (e.g., zones of seismic activity, unusual geologic features, military installations) constituting potential hazards to construction or operation of a nuclear power plant.

The above data and information should be supplied as (or supported by) maps of adequate scale and detail.

C. Descriptions of the following (from the ER):

1. Region of interest

2. Candidate areas

3. Potential sites (including all sites within the region of interest with an operating nuclear power plant or a construction permit for a nuclear power plant)

4. Candidate sites.

D. Descriptions of how the process described in Item A above was used to identify and select Items C.1 through C.4 above (from the ER).

E Data sources used in the site-selection process, including results of site-specific field investigations (from the ER).

III. ANALYSIS PROCEDURE

The staff analysis of alternative sites is a critical element of the environmental review inasmuch as a staff conclusion that an alternative site is obviously superior to the applicant's proposed site must be translated as a recommendation that the application be denied.

Under the general guidance and direction of the project manger, the reviewer* will analyze the sites and procedures selected by the applicant. The reviewer will not develop nor pursue a self-developed site selection program. Therefore, the objectives of this analysis procedure are to accomplish the following:

A. Understand the applicant's site-selection methodology so that an eventual evaluation can be made of the reasonableness and capability of this process to identify candidate sites that are among the best that could reasonably have been found.

B. Analyze the reconnaissance-level information used throughout the site selection process so that an eventual evaluation of completeness and a staff determination of whether the information was adequate for the level of screening for which it was used can be made.

C. Analyze the candidate-site evaluation procedure in the detail needed to be able to make an eventual evaluation that no site within the appropriate study area could be judged (by this or by any other acceptable and accurate procedure based on reconnaissance-level data) to be obviously superior to the applicant's proposed site.

D. Review and analyze the region of interest selected by the applicant so that an eventual evaluation of the appropriateness (e.g., in terms of geographical,

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*The environmental review of alternative sites will include all major aspects of environmental impacts of construction and operation, economic costs, and safety considerations. Accordingly, the activities and inputs of reviewers for all of the above technical disciplines will be required in the conduct of this review and "reviewer" as used in this ESRP refers to any such discipline as may be affected.

demographic, legal, regulatory, and institutional restrictions) of the selected region can be made.

E. Review and analyze the candidate areas selected by the applicant so that an eventual evaluation of the appropriateness (e.g., in terms of safety considerations, prohibited areas, geographic or engineering restrictions, and environmental restrictions) of the selected candidate areas can be made.

F. Review the potential sites identified by the applicant so that an eventual evaluation can be made with respect to (1) adequacy of the site identification process and (2) consistency with the applicant's criteria for site selection.

G. Analyze the candidate sites proposed by the applicant to the level needed to conclude that they are or are not potentially licensable sites and to identify the potential environmental impacts (adverse and beneficial) attributable to each site that would be used (1) by the applicant to select the proposed site and (2) by the reviewer to determine the possible existence of an obviously superior site.

H. Recognize that there will be special cases where the proposed site will not have been selected on the basis of a systematic site selection process. Examples include plants proposed to be constructed on the site of an existing nuclear power plant previously found acceptable on the basis of a NEPA review and/or demonstrated to be environmentally satisfactory on the basis of operating experience, and sites assigned or allocated to an applicant by a State government from a list of State-approved power plant sites. For such cases the reviewer will analyze the applicant's site selection process only as it applies to candidate sites other than the proposed site, and the site comparison process may be restricted to a site-by-site comparison of these candidates with the proposed site. As a corollary, all nuclear power plant sites within the identified region of interest, having an operating nuclear power plant or a construction permit issued by the NRC, will be compared with the applicant's proposed site.

The following analysis procedure will be used:

A. Site-Selection Methodology

The reviewer will analyze the applicant's detailed plan or program used in the site-selection process, and from this analysis will identify (for further consideration) the following minimum of any such plan:

1. Objectives and Procedures

2. Region-of-Interest Selection Criteria

3. Candidate-Area Selection Criteria

4. Potential-Site Identification Process

5. Screening Process

6. Candidate-Site Evaluation Parameters

7. Candidate-Site Evaluation and Final Selection Process.

When an applicant's plan does not appear to address one or more of the above elements, the reviewer will consult with the applicant to determine the reasons for any such omissions.

B. Site-Selection Process

The following analysis procedure is based on the minimum site selection methodology elements described above. Modifications to this procedure may be made when the reviewer determines (1) that additional elements have been provided by the applicant, (2) that one or more elements have been properly omitted, or (3) that substitute elements have been provided. The reviewer must ensure that sufficient information is available to permit an adequate review.

1. Objectives and Procedures

The reviewer will consider the objectives and procedures in the light of a process that is (a) to identify potentially licensable sites that are among the best that could reasonably have been found within the region of interest and (b) to select from these candidate sites the proposed site. In addition, the reviewer will analyze the applicant's stated objectives and procedures to identify the following:

a. A statement of objectives and a selection procedure that outlines a clear flow path describing the overall selection process

b. Incorporation of quality-assurance procedures that provide for checks and balances and seek to prevent omissions of available data

c. Provisions for adequate documentation of selection procedures

d. The degree of objectivity of the process, i.e., assurance that the process is not directed to a predetermined result

e. The specific environmental parameters (e.g., aquatic ecology, seismicity, socioeconomics) incorporated in the selection process

f. The degree to which weighting (importance) factors, if used, will affect the final selection process. If weighting factors are not used, the reviewer will assume that all siting parameters used by the applicant were assigned equal weight.

2. Region of Interest

The reviewer will consult with the reviewers for ES Section 8.1 in analyzing region of interest (ROI) selection criteria and the selected region. The reviewer will conduct the analysis according to the following procedure:

a. Identify the applicant-selected ROI and compare it with the geographic area considered

b. Compare the ROI with the applicable electric reliability council region

c. Compare the ROI with the power pool region (if any) with which the applicant is associated

d. Compare the ROI with the applicant's service area

e. Compare the ROI with the major load centers within the applicant's service area

f. Identify deficient power areas in any of the above described areas

g. Identify any constraints (e.g., legal, institutional, political, economic) on the applicant's siting options.

3. Candidate Areas

The reviewer will consult with those ES Section 2 reviewers responsible for land use, water use, ecology, socioeconomics, geology, hydrology, and meteorology; and with appropriate reviewers for safety-related issues (e.g., seismicity). The reviewer will use inputs and assistance from these reviewers in analyzing candidate-area selection criteria and the selected candidate areas. The reviewers will include, at a minimum, the following in their considerations:

a. Areas Requiring Special Consideration
   (1) Federally-owned properties (e.g., National forests)
   (2) State-owned properties (e.g., State parks)
   (3) Unusual ecosystems or social institutions
   (4) Legally excluded areas

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b. Geographical Considerations
   (1) Engineering constraints (e.g., topography, water availability)
   (2) Transportation of construction materials
   (3) Transmission corridors
   (4) Proximity of other generating stations

c. Environmental Loading
   (1) Land use
   (2) Water use
   (3) Socioeconomics

d. Safety
   (1) Earthquake Hazard
   (2) Geologic Hazard
   (3) Man-made Hazard
   (4) Hydrology
   (5) Demography

4. Potential Sites

The reviewer will consult with the appropriate environmental and safety reviewers to analyze the site-selection process and the sites selected by this process. The reviewers will consider the following factors:

a. Land availability and accessability
b. Water availability and accessability.

The above factors will include economic costs in the determination of land and water availability. The reviewer may recognize other parameters in the site-selection process. However, the objective of this phase of the process is to identify those factors that will allow siting of a nuclear generating station. The next phase of the process will be concerned with those factors that would prevent such siting.

5. Screening Process

The reviewer will analyze the criteria used by the applicant to screen potential sites and the process by which these criteria were used to accomplish the screening. As a general rule, land use, water use, terrestrial and aquatic ecology, meteorology, and safety-related issues will be considered. The reviewer should expect that the screening criteria will be general in nature and based on a level of information that, except for rare instances, need not require onsite investigation.

This phase of the applicant's site selection process leads to identification of candidate sites that are potentially licensable; thus the reviewer's analysis will consider only those environmental parameters that would prevent issuance of a license. The identification and analysis of potential impacts that might require commitment for mitigation prior to issuance of a license, or of institutional factors that might prevent ultimate licensing, should be considered in the candidate site evaluation phase of the site selection process. The reviewer will consider at a minimum the following factors in screening potential sites:

a. Land use
b. Water use
c. Transmission corridor feasibility
d. Terrestrial ecology
e. Aquatic ecology
f. Meteorology
g. Safety-related (e.g., site-specific geologic, seismic, demographic) issues.

Additional factors will be considered when, on a regional basis, they are of importance in establishing potential licensability. In analyzing the process by which the above factors were used, the reviewer should apply these factors to several of the potential sites, and determine if the process (a) is objective and (b) identifies sites that appear to be potentially licensable. The reviewer must be familiar with the contents of Regulatory Guide 4.7, and will use this guidance in analyzing the potential site-screening process.

6. Candidate-Site Evaluation

The reviewer will analyze the criteria used by the applicant to compare candidate sites and the process by which these criteria were used to select the proposed site. As a general rule, these criteria should be associated with predicted impacts of site preparation, plant construction and operation, and with the overall economic costs associated with the applicant's site acquisition, environmental review, site preparation, and construction activities. Impacts and economic costs associated with transmission of electricity will also be considered. To accomplish this review, the reviewer will consult with the ES Section 4 and 5 reviewers for land-use impacts, hydrological and water-use impacts, terrestrial and aquatic ecosystem impacts, and socioeconomic impacts. The reviewer will also consult with the appropriate benefit-cost reviewers to analyze economic costs of the candidate sites. With the assistance of the above reviewers, the reviewer will analyze impact criteria for the following:

a. Land use
b. Hydrology and water use
c. Terrestrial ecology
d. Aquatic ecology
e. Socioeconomics
f. Safety-related issues.

Criteria should be developed for both construction and operational impacts, and should consider both the site and vicinity and any needed transmission corridors. The reviewer will analyze the applicant's selection criteria from the viewpoint of their applicability to a wide variety of candidate sites, their value in permitting comparisons of potential impacts, and the practicality of obtaining the required data.

In analyzing the site-selection process, the reviewer will consider how the impact data were obtained, how they were applied to each candidate site, and how the comparisons between sites were made. As a general rule, the principal reviewer (project manager) and specific reviewers for appropriate technical

disciplines (e.g., land use, hydrology) will be expected to make an onsite inspection of each proposed alternative site. If necessary, this inspection may be extended to all candidate sites. The reviewer will determine the extent to which the following basic sources of impact information were used:

a. General literature review

b. Reports from Federal, State, and local agencies such as State geological agencies, EPA or DOA, or county extension offices

c. Regional scientific, engineering, economic, and planning studies

d. Aerial photographs and topographic maps of candidate sites

e. Site-specific information from local citizens and from authorities associated with State and Federal agencies, universities, and museums

f. Onsite inspections (if any) by technical specialists.

The reviewer will determine how this information was used to predict site-specific impacts, and how the impacts were assembled for a site-to-site comparison. The reviewer will analyze the cost data associated with site acquisition, environmental review, site preparation, and plant construction, and will determine how these data were compared.

IV. EVALUATION

The reviewer's evaluation of the consideration of alternative sites and the site-selection procedure will require conclusions with respect to the following:

- Site-selection methodology
- Reconnaissance-level information (completeness and depth)
- Region of interest
- Candidate areas

- Potential sites
- Candidate sites
- Site comparison

Based on these conclusions the reviewer will determine if any alternative site is environmentally preferable to the applicant's proposed site. If environmentally preferable sites are identified, the reviewer will extend the analysis and evaluation procedures of this ESRP to determine, on a benefit-cost basis, if any such alternative is obviously superior to the applicant's proposed site.

The following general guidance is provided for the reviewer in arriving at conclusions:

The reviewer will determine if the applicant has employed a practicable site-selection process having as its principal objective the identification of candidate sites that would be among the best that could reasonably have been found for the proposed plant. This standard implies that all such candidate sites should be licensable. The reviewer will determine if the applicant's proposed site was selected from this list of candidate sites. The reviewer will determine whether the reconnaisance-level information used throughout the site-selection process was complete enough and of sufficient depth commensurate with the level of screening to support the decisions that were made.

The reviewer will determine if the applicant's candidate sites represent the best that could reasonably have been found within the region of interest, and if they do not, will request further information from the applicant. If the sites are the best that could be found, the reviewer will determine if any such site is environmentally preferable to the applicant's proposed site. When such a determination is made, the reviewer will conduct a benefit-cost analysis and comparison of the estimated costs (environmental, economic, and time) of completing construction of the proposed plant at the proposed site and at the environmentally preferable site or sites. The reviewer will use the results of this benefit-cost analysis to determine if any environmentally preferable site can be shown to be obviously superior to the applicant's proposed site.

The reviewer's evaluation of the individual elements of the applicant's site-selection process will include consideration of both the process (i.e., methodology) used by the applicant and the reasonableness of the product (e.g., potential sites) identified by that process. Evaluation procedures and criteria will include the following:

A. Objectives and Procedures

The reviewer will ensure that the applicant's site-selection process was based on a documented procedure that includes as a minimum those elements described in Section III.B.I of this plan. If no such procedure is available, or if the reviewer cannot determine how such a procedure was used in the site selection process, the reviewer will consult with the applicant as needed to obtain the procedure that describes the selection process used.

B. Region of Interest

The reviewer will ensure that the selected region of interest has been adequately described and that its boundaries are consistent with those factors (e.g., deficient power areas) outlined in Section III.B.2 of this plan. In making this determination, the reviewer will consider (1) how the applicant's ROI compares with the available geographical area, (2) the extent of and basis for restrictions to the ROI because of siting constraints, and (3) whether the ROI is consistent with the major load centers to be supplied by the proposed plant, and in particular, those centers identified as being deficient in power. As a general rule, and properly accounting for economic, environmental, and other costs of construction and operation, the plant should be located at a licenseable site in the area of the load center or centers that the plant is to serve over its lifetime. The reviewer will determine if the selected ROI will permit such siting and must determine that potentially desirable candidate areas have not been excluded on the basis of an arbitrarily defined region of interest. When the reviewer determines that some such areas appear to exist, the applicant will be consulted for additional information as to why these areas were excluded.

C. Candidate Areas

The reviewer will determine if the selection process used to identify candidate areas, was adequate. Areas may be selected on the basis of a screening process to identify unacceptable areas (e.g., population density) or on the basis of positive attributes. The reviewer will ensure that factors such as those described in Section III.B.3 of this plan have been considered, and whether the candidate areas identified by the applicant represent a reasonably complete list of such areas within the identified region of interest.

D. Potential Sites

As a rule, one or more potential sites should be selected from each identified candidate area. The reviewer will consider the site selection criteria that were used, and will determine if comparable criteria were used for each candidate area. The reviewer should expect that positive site attributes would be used for this process (e.g., land and water availability) and that screening criteria to reject sites would be used in the process of identifying potentially licensable candidate sites. The reviewer should conclude that there is reasonable assurance that the potentially licensable sites within a given candidate area have been identified. Although potential sites do not need to be defined with geographic precision, the reviewer must ensure that their definition is sufficiently precise to permit an adequate evaluation of such attributes as land and water availability. "Site areas," i.e., areas sufficiently large to support two or more sites, may be considered, but for the purposes of this evaluation will be considered as a single potential site.

E. Screening Process

The reviewer will determine if an adequate, well documented process for screening potential sites was employed, and that all potential sites were screened in a consistent manner. The reviewer will consider all screening criteria employed by the applicant in light of the objective of this process, i.e., to identify potentially licensable sites. The reviewer will ensure that the criteria described in Section III.B.5 of this plan have been used, or if not, that exclusion

of these criteria from the screening procedure was justified. The reviewer will compare the applicant's procedures with the recommendations of Regulatory Guide 4.7 and, when inconsistent, will consult with the applicant to determine the reasons for the variances.

Based on reconnaissance-level information, the reviewer will determine if the candidate sites identified by the screening process may be considered as potentially licensable, and will also determine that there is reasonable assurance that no potential sites in this category have been omitted. Although there can be no specific criteria for determining that an adequate number of candidate sites have been identified, the reviewer will make such a determination, based on the region of interest, the number of candidate areas, and the number and type of potential sites evaluated by the applicant. In general, however, the identification of two or more candidate areas and three to five candiate sites in addition to the proposed site could be viewed as adequate. When the reviewer determines that an insufficient number of candidate sites have been identified, the applicant will be consulted and the screening procedure will be reevaluated to determine if adjustments to this procedure can be made that would identify additional candidate sites that would still be considered as potentially licenseable.

F. Candidate-Site Evaluation

The objective of this phase of the evaluation procedure is (1) to determine if the applicant has reasonably identified candidate sites, predicted the environmental impacts of construction and operation at these sites, and developed and used a logical, reproducible means of comparing sites that has led to the applicant's selection of the proposed site, and (2) to determine if any candidate site can be shown to be obviously superior to the applicant's proposed site. Many of the following evaluation steps must be based on use of reviewer judgment. For these evaluations, the principal criterion will be that of reasonableness of the applicant's data and procedures. The reviewer will make the following determinations:

a. Site identification

That the candidate sites have been identified with sufficient precision to permit field inspections to determine specific environmental parameters. If the applicant is unable to provide precise candidate-site boundaries, and if the reviewer determines that the reasons for this are valid, the reviewer will evaluate the general site area instead.

b. Environmental descriptions

That environmental descriptions for the candidate sites are adequate to assess environmental impacts of plant construction and operation, and that the basic sources of information described in Section III.6 of this plan have been used to provide these data. The reviewer will determine if all sources of information reasonably available to the reviewer and providing useful environmental description data were used.

c. Impact predictions

That basic impact criteria (e.g., land use, water use) have been developed for each site, using the environmental descriptions established by the applicant and considering the basic construction and operational parameters of the proposed plant.

d. Cost data

That economic cost data associated with each site have been presented, are reasonable, and permit comparison between the candidate sites.

e. Site comparison

That the applicant's final site selection process is reasonable, makes full use of the candidate-site data available, and presents the data in a manner that permits valid comparisons between sites. The objective of this evaluation of the applicant's process is not to determine that the applicant has

selected the best site (since on the basis of previous evaluations the reviewer has determined those candidate sites that can reasonably be expected to be licenseable) but is to determine if any candidate site can be judged as obviously superior to the applicant's proposed site. The basis criterion for this determination is as follows:

> One or more important aspects, either singly or in combination, of a reasonably available alternative site are obviously superior* to the corresponding aspects of the applicant's proposed site, and the alternative site does not have offsetting deficiencies.

Since reviewer judgment is required for the decision that a site attribute is obviously superior, any such conclusion must be supported by the corresponding ES Sections 2, 4, and 5 reviewers. The reviewer need not establish or confirm a relative ranking of candidate sites but must determine by means of one-by-one comparisons that no alternative site is obviously superior to the proposed site.

When the reviewer determines that an obviously superior site can be identified, the reviewer will consult with the applicant to determine the applicant's reasons (if not already available) for not selecting that particular site. In addition, the reviewer will document the conclusion that an alternative site is obviously superior to the proposed site.

V. INPUT TO THE ENVIRONMENTAL STATEMENT

This section of the environmental statement should be planned to accomplish the following objectives: (1) a brief description and evaluation of the applicant's process for evaluating alternative sites, (2) presentation of the basis for the staff analysis, and (3) presentation of staff conclusions and recommendations regarding alternatives to the proposed site. The following information will usually be provided in ES Section 9.2 in a summary format:

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*Appendix C to this ESRP has been set aside to contain descriptions of those staff analyses that have lead to the identification of obviously superior sites.

A. Applicant's Site-Selection Process

1. A description of the applicant's documented site-selection process methodology, including a summary of the process objectives

2. A description of the selected region of interest

3. A description of the candidate areas

4. A list and general description of the potential sites

5. A description of the candidate sites.

B. Staff Analysis

1. A description of the process used by the staff to review the applicant's methodology, the selected region of interest, candidate areas, potential sites, and candidate sites, and the selection criteria used by the applicant.

C. Staff Conclusions

1. Conclusions with respect to the applicant's methodology

2. Conclusions with respect to the reconnaissance-level information

3. Conclusions with respect to the applicant's selection criteria

4. Conclusions with respect to the applicant's selection process

   a. Region of interest
   b. Candidate areas
   c. Potential sites
   d. Candidate sites

5. Conclusions with respect to the applicant's objective to identify candidate sites that are among the best that could reasonably have been found

6. Conclusions with respect to the identification of an obviously superior site

7. Recommendations for consideration of acceptance or rejection of the site proposed by the applicant.

In addition, the reviewer will provide inputs to the following ES Section:

Section 10.4.3. The reviewer will present the results of the evaluation of these data to the reviewer for ES Section 10.4.3 as a conclusion that (1) the proposed site is acceptable, or (2) that an obviously superior site reasonably available to the applicant has been identified and that rejection of the applicant's proposed site has been recommended.

VI. REFERENCES

1. Atomic Industrial Forum, Nuclear Power Plant Siting, A Generalized Process, National Environmental Studies Project, R-1578, August 1974.

2. R. L. Keeney, and H. Raiffa, Decisions with Multiple Objectives, John Wiley and Sons, New York, N.Y. 1976.

3. K. Nair and R. L. Keeney, Selecting Nuclear Power Plant Sites Using Decision Analysis, Woodward-Clyde Consultants, San Francisco, CA, 1975.

4. H. Raiffa, Decision Analysis, Addison-Wesley Publishing Company, Reading, Mass. 1970.

5. R. L. Keenye and C. W. Kirkwood, An Evaluation of Nuclear Power Plant Siting Methodologies, Woodward-Clyde Consultants, San Francisco, CA, 1977.

ENVIRONMENTAL STANDARD REVIEW PLAN

FOR ES SECTION 9.2 ALTERNATIVE SITES

APPENDIX A DEFINITIONS

A. Region of Interest

The geographical area considered in the site selection process, and from which candidate areas are selected. This area may represent the applicant's system, the power pool or area within which the applicant's planning studies are based, or the regional reliability council or the appropriate subregion or area of the reliability council. The region of interest may include or may be completely outside of the applicant's service area.

B. Candidate Area

Reasonably homogeneous areas within the region of interest investigated for potential sites. As a rule, the region of interest should contain more than one candidate area. It is expected that each candidate area will be small enough to have essentially similar characteristics (e.g., geology) and environmental relationships (e.g., land use patterns, water supply). Candidate areas should not be restricted to those containing land owned or controlled by the applicant.

C. Potential Sites

Sites within the candidate areas that have been identified for assessment in establishing candidate sites.

D. Candidate Sites

Sites selected by the applicant from the list of potential sites for a final evaluation process resulting in selection of the proposed site. To qualify as a candidate site, the site must be considered potentially licensable and capable of being developed.

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E. Proposed Alternative Sites

Sites selected by the applicant (from the list of condidate sites) as potential alternatives to the proposed site. All candidate sites are potential alternative sites, but a less-inclusive list may be proposed by the applicant.

F. Proposed Site

Site selected by the applicant from the list of candidate sites for collection of detailed technical and environmental data subsequently submitted in the environmental report as the subject of an application for a construction permit or early site review.

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FOR ES SECTION 9.2 ALTERNATIVE SITES

APPENDIX B EVALUATION FACTORS

Engineering and Environmental

Meteorology
Geology
Seismicity
Hydrology
Demography
Transportation access
Ecological sensitivity
Commitment of resources
Esthetics
Socioeconomics

Land Use

Dedicated areas
Recreational usage
Agriculture
Industry
Land use planning

Water Use

Water availability
Water accessability
Water quality

Institutional

State restrictions
Local/regional restrictions
Federal restrictions

Construction

Equipment and materials handling
Work force availability and accessability
Work force housing

Cost

Land and water
Station facilities
Cooling system
Intakes and discharges
Transmission and substations
Access roads and railways
Site preparation
Construction costs
Fuel costs
Operating and Maintenance costs

Transmission

Access to existing network
New corridors
Reliability
Transmission losses

ENVIRONMENTAL STANDARD REVIEW PLAN

FOR ES SECTION 9.2 ALTERNATIVE SITES

APPENDIX C CRITERIA FOR IDENTIFYING OBVIOUSLY SUPERIOR SITES

1. Demography

In terms of a review of demographic aspects of the site-selection process, the population density guidelines of Regulatory Guide 4.7 have been interpreted by the staff to mean

(a) Where, on balance, there are alternative sites of approximately equal merit regarding issues other than population density,

(b) Where the proposed site has a population density substantially greater than one of the alternative sites, and

(c) If that density is in excess of the stated guideline values,

there does exist a site obviously superior to the proposed site.

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