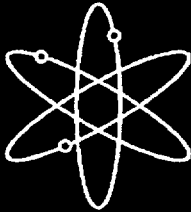
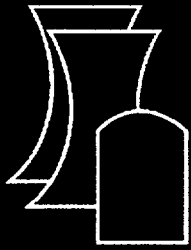


Environmental Standard Review Plan



Main Report

**U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555-0001**



Environmental Standard Review Plan

Standard Review Plans for Environmental Reviews for Nuclear Power Plants

(Chapters 1-4)

Main Report

Manuscript Completed: October 1999
Date Published: March 2000

**Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001**



AVAILABILITY NOTICE

Availability of Reference Materials Cited in NRC Publications

NRC publications in the NUREG series, NRC regulations, and *Title 10, Energy, of the Code of Federal Regulations*, may be purchased from one of the following sources:

1. The Superintendent of Documents
U.S. Government Printing Office
P.O. Box 37082
Washington, DC 20402-9328
<http://www.access.gpo.gov/su_docs>
202-512-1800
2. The National Technical Information Service
Springfield, VA 22161-0002
<<http://www.ntis.gov>>
1-800-553-6847 or locally 703-605-6000

The NUREG series comprises (1) brochures (NUREG/BR-XXXX), (2) proceedings of conferences (NUREG/CP-XXXX), (3) reports resulting from international agreements (NUREG/IA-XXXX), (4) technical and administrative reports and books [(NUREG-XXXX) or (NUREG/CR-XXXX)], and (5) compilations of legal decisions and orders of the Commission and Atomic and Safety Licensing Boards and of Office Directors' decisions under Section 2.206 of NRC's regulations (NUREG-XXXX).

A single copy of each NRC draft report for comment is available free, to the extent of supply, upon written request as follows:

Address: Office of the Chief Information Officer
Reproduction and Distribution
Services Section
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

E-mail: <DISTRIBUTION@nrc.gov>
Facsimile: 301-415-2289

A portion of NRC regulatory and technical information is available at NRC's World Wide Web site:

<<http://www.nrc.gov>>

After January 1, 2000, the public may electronically access NUREG-series publications and other NRC records in NRC's Agencywide Document Access and Management System (ADAMS), through the Public Electronic Reading Room (PERR), link <<http://www.nrc.gov/NRC/ADAMS/index.html>>.

Publicly released documents include, to name a few, NUREG-series reports; *Federal Register* notices; applicant, licensee, and vendor documents and correspondence; NRC correspondence and internal memoranda; bulletins and information notices; inspection and investigation reports; licensee event reports; and Commission papers and their attachments.

Documents available from public and special technical libraries include all open literature items, such as books, journal articles, and transactions, *Federal Register* notices, Federal and State legislation, and congressional reports. Such documents as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings may be purchased from their sponsoring organization.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at the NRC Library, Two White Flint North, 11545 Rockville Pike, Rockville, MD 20852-2738. These standards are available in the library for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from—

American National Standards Institute
11 West 42nd Street
New York, NY 10036-8002
<<http://www.ansi.org>>
212-642-4900



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

**STANDARD REVIEW PLANS FOR
ENVIRONMENTAL REVIEWS FOR
NUCLEAR POWER PLANTS**

October 1999

OFFICE OF NUCLEAR REACTOR REGULATION
U.S. NUCLEAR REGULATORY COMMISSION

October 1999

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

ABSTRACT

This document provides guidance to the staff in implementing provisions of 10 CFR 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," related to new site/plant applications. It supersedes "Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants," NUREG-0555, issued in 1978. New technical issues—such as environmental justice and severe-accident mitigation design alternatives—and new licensing structures—such as early site permits, combined licenses, and license renewal—have raised the need for new regulatory guidance. Supplement 1 to this document should be used for review of environmental reports related to license renewal.

CONTENTS

| | |
|--|---------|
| ABSTRACT | iii |
| ABBREVIATIONS AND ACRONYMS | ix |
| INTRODUCTION | 1 |
| 1.0 Introduction to the Environmental Impact Statement | 1.0-1 |
| 1.1 The Proposed Project | 1.1-1 |
| 1.2 Status of Reviews, Approvals, and Consultations | 1.2-1 |
| 2.0 Environmental Description | 2.0-1 |
| 2.1 Station Location | 2.1-1 |
| 2.2 Land | 2.2-1 |
| 2.2.1 The Site and Vicinity | 2.2.1-1 |
| 2.2.2 Transmission Corridors and Offsite Areas | 2.2.2-1 |
| 2.2.3 The Region | 2.2.3-1 |
| 2.3 Water | 2.3-1 |
| 2.3.1 Hydrology | 2.3.1-1 |
| 2.3.2 Water Use | 2.3.2-1 |
| 2.3.3 Water Quality | 2.3.3-1 |
| 2.4 Ecology | 2.4-1 |
| 2.4.1 Terrestrial Ecology | 2.4.1-1 |
| 2.4.2 Aquatic Ecology | 2.4.2-1 |
| 2.5 Socioeconomics | 2.5-1 |
| 2.5.1 Demography | 2.5.1-1 |
| 2.5.2 Community Characteristics | 2.5.2-1 |
| 2.5.3 Historic Properties | 2.5.3-1 |
| 2.5.4 Environmental Justice | 2.5.4-1 |
| 2.6 Geology | 2.6-1 |
| 2.7 Meteorology and Air Quality | 2.7-1 |
| 2.8 Related Federal Project Activities | 2.8-1 |
| 3.0 Plant Description | 3.0-1 |
| 3.1 External Appearance and Plant Layout | 3.1-1 |
| 3.2 Reactor Power Conversion System | 3.2-1 |
| 3.3 Plant Water Use | 3.3-1 |
| 3.3.1 Water Consumption | 3.3.1-1 |
| 3.3.2 Water Treatment | 3.3.2-1 |
| 3.4 Cooling System | 3.4-1 |
| 3.4.1 Description and Operational Modes | 3.4.1-1 |
| 3.4.2 Component Descriptions | 3.4.2-1 |

| | | |
|---------|--|-----------|
| 3.5 | Radioactive Waste Management System | 3.5-1 |
| 3.6 | Nonradioactive Waste Systems | 3.6-1 |
| 3.6.1 | Effluents Containing Chemicals or Biocides | 3.6.1-1 |
| 3.6.2 | Sanitary System Effluents | 3.6.2-1 |
| 3.6.3 | Other Effluents | 3.6.3-1 |
| 3.7 | Power Transmission System | 3.7-1 |
| 3.8 | Transportation of Radioactive Materials | 3.8-1 |
| 4.0 | Environmental Impacts of Construction | 4.0-1 |
| 4.1 | Land-Use Impacts | 4.1-1 |
| 4.1.1 | The Site and Vicinity | 4.1.1-1 |
| 4.1.2 | Transmission Corridors and Offsite Areas | 4.1.2-1 |
| 4.1.3 | Historic Properties | 4.1.3-1 |
| 4.2 | Water-Related Impacts | 4.2-1 |
| 4.2.1 | Hydrologic Alterations | 4.2.1-1 |
| 4.2.2 | Water-Use Impacts | 4.2.2-1 |
| 4.3 | Ecological Impacts | 4.3-1 |
| 4.3.1 | Terrestrial Ecosystems | 4.3.1-1 |
| 4.3.2 | Aquatic Ecosystems | 4.3.2-1 |
| 4.4 | Socioeconomic Impacts | 4.4-1 |
| 4.4.1 | Physical Impacts | 4.4.1-1 |
| 4.4.2 | Social and Economic Impacts | 4.4.2-1 |
| 4.4.3 | Environmental Justice Impacts | 4.4.3-1 |
| 4.5 | Radiation Exposure to Construction Workers | 4.5-1 |
| 4.6 | Measures and Controls to Limit Adverse Impacts During Construction | 4.6-1 |
| 5.0 | Environmental Impacts of Station Operation | 5.0-1 |
| 5.1 | Land-Use Impacts | 5.1-1 |
| 5.1.1 | The Site and Vicinity | 5.1.1-1 |
| 5.1.2 | Transmission Corridors and Offsite Areas | 5.1.2-1 |
| 5.1.3 | Historic Properties | 5.1.3-1 |
| 5.2 | Water-Related Impacts | 5.2-1 |
| 5.2.1 | Hydrologic Alterations and Plant Water Supply | 5.2.1-1 |
| 5.2.2 | Water-Use Impacts | 5.2.2-1 |
| 5.3 | Cooling System Impacts | 5.3-1 |
| 5.3.1 | Intake System | 5.3.1-1 |
| 5.3.1.1 | Hydrodynamic Descriptions and Physical Impacts | 5.3.1.1-1 |
| 5.3.1.2 | Aquatic Ecosystems | 5.3.1.2-1 |
| 5.3.2 | Discharge System | 5.3.2-1 |
| 5.3.2.1 | Thermal Description and Physical Impacts | 5.3.2.1-1 |
| 5.3.2.2 | Aquatic Ecosystems | 5.3.2.2-1 |
| 5.3.3 | Heat-Discharge System | 5.3.3-1 |
| 5.3.3.1 | Heat Dissipation to the Atmosphere | 5.3.3.1-1 |

| | | |
|---------|---|-----------|
| 5.3.3.2 | Terrestrial Ecosystems | 5.3.3.2-1 |
| 5.3.4 | Impacts to Members of the Public | 5.3.4-1 |
| 5.4 | Radiological Impacts of Normal Operation | 5.4-1 |
| 5.4.1 | Exposure Pathways | 5.4.1-1 |
| 5.4.2 | Radiation Doses to Members of the Public | 5.4.2-1 |
| 5.4.3 | Impacts to Members of the Public | 5.4.3-1 |
| 5.4.4 | Impacts to Biota Other than Members of the Public | 5.4.4-1 |
| 5.5 | Environmental Impacts of Waste | 5.5-1 |
| 5.5.1 | Nonradioactive-Waste-System Impacts | 5.5.1-1 |
| 5.5.2 | Mixed Waste Impacts | 5.5.2-1 |
| 5.6 | Transmission System Impacts | 5.6-1 |
| 5.6.1 | Terrestrial Ecosystems | 5.6.1-1 |
| 5.6.2 | Aquatic Ecosystems | 5.6.2-1 |
| 5.6.3 | Impacts to Members of the Public | 5.6.3-1 |
| 5.7 | Uranium Fuel Cycle Impacts | 5.7-1 |
| 5.8 | Socioeconomic Impacts | 5.8-1 |
| 5.8.1 | Physical Impacts of Station Operation | 5.8.1-1 |
| 5.8.2 | Social and Economic Impacts of Station Operation | 5.8.2-1 |
| 5.8.3 | Environmental Justice Impacts | 5.8.3-1 |
| 5.9 | Decommissioning | 5.9-1 |
| 5.10 | Measures and Controls to Limit Adverse Impacts During Operation | 5.10-1 |
| 6.0 | Environmental Measurements and Monitoring Programs | 6.0-1 |
| 6.1 | Thermal Monitoring | 6.1-1 |
| 6.2 | Radiological Monitoring | 6.2-1 |
| 6.3 | Hydrological Monitoring | 6.3-1 |
| 6.4 | Meteorological Monitoring | 6.4-1 |
| 6.5 | Ecological Monitoring | 6.5-1 |
| 6.5.1 | Terrestrial Ecology and Land Use | 6.5.1-1 |
| 6.5.2 | Aquatic Ecology | 6.5.2-1 |
| 6.6 | Chemical Monitoring | 6.6-1 |
| 6.7 | Summary of Monitoring Programs | 6.7-1 |
| 7.0 | Environmental Impacts of Postulated Accidents Involving Radioactive Materials | 7.0-1 |
| 7.1 | Design Basis Accidents | 7.1-1 |
| 7.2 | Severe Accidents | 7.2-1 |
| 7.3 | Severe Accident Mitigation Alternatives | 7.3-1 |
| 7.4 | Transportation Accidents | 7.4-1 |
| 8.0 | Need for Power | 8.0-1 |
| 8.1 | Description of Power System | 8.1-1 |
| 8.2 | Power Demand | 8.2-1 |
| 8.2.1 | Power and Energy Requirements | 8.2.1-1 |

| | | |
|------------|---|----------|
| 8.2.2 | Factors Affecting Growth of Demand | 8.2.2-1 |
| 8.3 | Power Supply | 8.3-1 |
| 8.4 | Assessment of Need for Power | 8.4-1 |
| 9.0 | Alternatives to the Proposed Action | 9.0-1 |
| 9.1 | No-Action Alternative | 9.1-1 |
| 9.2 | Energy Alternatives | 9.2-1 |
| 9.2.1 | Alternatives Not Requiring New Generating Capacity | 9.2.1-1 |
| 9.2.2 | Alternatives Requiring New Generating Capacity | 9.2.2-1 |
| 9.2.3 | Assessment of Alternative Energy Sources and Systems | 9.2.3-1 |
| 9.3 | Alternative Sites | 9.3-1 |
| 9.4 | Alternative Plant and Transmission Systems | 9.4-1 |
| 9.4.1 | Heat Dissipation Systems | 9.4.1-1 |
| 9.4.2 | Circulating Water Systems | 9.4.2-1 |
| 9.4.3 | Transmission Systems | 9.4.3-1 |
| 10.0 | Environmental Consequences of the Proposed Action | 10.0-1 |
| 10.1 | Unavoidable Adverse Environmental Impacts | 10.1-1 |
| 10.2 | Irreversible and Irretrievable Commitments of Resources | 10.2-1 |
| 10.3 | Relationship Between Short Term Uses and Long Term Productivity of the Human Environment | 10.3-1 |
| 10.4 | Benefit-Cost Balance | 10.4-1 |
| 10.4.1 | Benefits | 10.4.1-1 |
| 10.4.2 | Costs | 10.4.2-1 |
| 10.4.3 | Summary | 10.4.3-1 |
| Appendix A | - Guide to Relevant Environmental Standard Review Plans | A.1 |
| Appendix B | - Review Responsibilities | B.1 |

ABBREVIATIONS AND ACRONYMS

| | |
|-----------------|---|
| ADEP | Assistant Director for Environmental Projects |
| AEA | Atomic Energy Act |
| AEC | Atomic Energy Commission |
| AEP | Archaeology and Ethnography Program |
| ALARA | as low as is reasonably achievable |
| ALI | annual limit on intake |
| ANS | American Nuclear Society |
| ANSI | American National Standards Institute |
| AWWA | American Water Works Association |
| BEIR | Biological Effects of Ionizing Radiation |
| BMP | best management practice |
| BOD | biological oxygen demand |
| BWR | boiling-water reactor |
| CDC | Centers for Disease Control and Prevention |
| CEQ | Council on Environmental Quality |
| CFC | chlorinated fluorocarbons |
| CFR | Code of Federal Regulations |
| CH | Central Hudson Gas & Electric Corporation |
| CO ₂ | carbon dioxide |
| COD | chemical oxygen demand |

| | |
|------|--------------------------------------|
| COL | combined license |
| CP | construction permit |
| CWA | Clean Water Act |
| DAC | derived air concentration |
| DBA | design basis accident |
| DBF | design basis flood |
| DEIS | Draft Environmental Impact Statement |
| DOI | Department of the Interior |
| D/Q | relative deposition |
| EA | environmental assessment |
| EIA | Energy Information Administration |
| EIS | environmental impact statement |
| EPA | Environmental Protection Agency |
| EPM | Environmental Project Manager |
| EPRI | Electric Power Research Institute |
| ER | environmental report |
| ES | environmental standard |
| ESP | early site permit |
| ESRP | environmental standard review plan |
| FAA | Federal Aviation Administration |
| FDA | Food and Drug Administration |
| FEIS | Final Environmental Impact Statement |

| | |
|---------|--|
| FERC | Federal Energy Regulatory Commission |
| FES | Final Environmental Statement |
| FGD | flue-gas-desulfurization |
| FSAR | Final Safety Analysis Report |
| FWCA | Fish and Wildlife Coordination Act |
| FWPCA | Federal Water Pollution Control Act |
| FWS | Fish and Wildlife Service |
| GASPAR | computer code |
| GEIS | generic environmental impact statement |
| GEn&SIS | <u>Geographical, Environmental & Siting Information System</u> |
| GIS | Geographic Information System |
| HASL | Health and Safety Laboratory |
| HM | heavy metal in fuel |
| HTGR | high-temperature gas-cooled reactor |
| HUD | Department of Housing and Urban Development |
| IAEA | International Atomic Energy Agency |
| IASD | Interagency Archeological Service Division |
| ICRP | International Commission on Radiological Protection |
| IEEE | Institute of Electrical and Electronic Engineers, Inc. |
| INEEL | Idaho National Engineering and Environmental Laboratory |
| IPE | Individual Plant Examination |
| IPEEE | Individual Plant Examination of External Events |

| | |
|-----------------|---|
| ISO | Independent System Operator |
| kWh | kilowatt-hour |
| LADTAP | computer code |
| LR | license renewal |
| LWR | light-water-cooled reactor |
| MACCS | MELCOR Accident Consequence Code System |
| MOX | mixed oxide fuel |
| MWe | megawatts electrical |
| MWt | megawatts thermal |
| NAGPRA | Native Graves Protection and Repatriation Regulations |
| NCDC | National Climatic Data Center |
| NCRP | National Council on Radiation Protection and Measurements |
| NEPA | National Environmental Policy Act of 1969 |
| NESC | National Electrical Safety Code |
| NHPA | National Historical Preservation Act |
| NM | Niagara Mohawk Power Corporation |
| NOAA | National Oceanic and Atmospheric Administration |
| NO _x | nitrogen oxides |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRC | Nuclear Regulatory Commission |
| NRCS | Natural Resources Conservation Service |

| | |
|-------|---|
| NRR | Office of Nuclear Reactor Regulation |
| NWS | National Weather Service |
| OAHP | Office of Archaeology and Historic Preservation |
| O&R | Orange and Rockland Utilities, Inc. |
| OL | operating license |
| OSHA | Occupational Safety and Health Administration |
| PAM | primary amoebic meningoencephalitis |
| PPP | Public Power Plant |
| PRA | Probabilistic Risk Assessment |
| PSAR | Preliminary Safety Analysis Report |
| PSDAR | post-shutdown decommissioning activities report |
| PUD | Public Utility District |
| PWR | pressurized-water reactor |
| RAI | request for additional information |
| RCRA | Resource Conservation and Recovery Act |
| RG&E | Rochester Gas and Electric Corporation |
| ROI | region of interest |
| RRY | reference reactor year |
| SAMA | severe accident mitigation alternatives |
| SAMDA | severe accident mitigation design alternatives |
| SAR | safety analysis report |
| SEIS | supplemental environmental impact statement |

| | |
|-----------------|--|
| SER | Safety Evaluation Report |
| SF | sinking fund rate |
| SHPO | State Historic Preservation Officer |
| SO _x | sulfur oxides |
| SPP | Sterling Power Plant |
| SRP | Standard Review Plan |
| SSER | Supplemental Site Safety Evaluation Report |
| STORET | STorage and RETrieval System for Water and Biological Data |
| TEDE | total effective dose equivalent |
| TLD | thermoluminescence dosimetry |
| TSP | total suspended particulates |
| TVA | Tennessee Valley Authority |
| USGS | U.S. Geological Survey |
| UTM | Universal Transverse Mercator |
| VOC | volatile organic compounds |
| χ/Q | normalized concentration |

INTRODUCTION

This document contains environmental standard review plans (ESRPs) that constitute a series of instructions developed for Nuclear Regulatory Commission (NRC) staff to use when conducting environmental reviews of applications related to nuclear power plants. The ESRPs are companions to regulatory guides that address siting and environmental issues, for example,

- Regulatory Guide 4.2, Rev. 2. *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), and its Supplement 1, *Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses* (NRC 1999a)
- Regulatory Guide 4.7, Rev. 2. *General Site Suitability Criteria for Nuclear Power Stations* (NRC 1998).

ESRPs were initially developed by NRC staff and NRC contractors who were intimately involved in the preparation of environmental impact statements (EISs) in the early and mid 1970s. Following an extensive review process and public comment period, those ESRPs were published in 1978 as NUREG-0555, *Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants* (NRC 1978). The present ESRPs supersede the ESRPs published in 1978 and expand the scope of guidance beyond the construction permit licensing stage. Many changes in the ESRPs are associated with changes in environmental legislation and regulations, executive orders, and judicial or administrative hearing board decisions. Other changes reflect open access to power transmission lines and changes in State regulation of utilities.

Any questions regarding the content of any plan in this document may be directed to the responsible organization within NRC, at the following address:

Generic Issues Environmental Financial and Rulemaking Branch (O-11F-1)
Attn: NUREG-1555 Comments
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Additional copies of these plans may be obtained as indicated on the inside front cover of this document.

NRC's Implementation of the NEPA Process

The National Environmental Policy Act of 1969 (NEPA), as amended, directs that all agencies of the Federal Government comply with the procedures in Section 102(2) of NEPA, except where compliance would be inconsistent with other statutory requirements. In the *Code of Federal Regulations* (CFR), 10 CFR 51, Subpart A, "National Environmental Policy Act— Regulations Implementing Section 102(2)," implements NEPA Section 102(2) in a manner that is consistent with NRC's domestic licensing and related regulatory authority under the Atomic Energy Act of 1954, as amended, and the

Energy Reorganization Act of 1974, as amended, and that reflects the Commission's policy to voluntarily take account of the regulations of the Council on Environmental Quality (CEQ), subject to certain conditions. The Commission recognizes a continuing obligation to conduct its domestic licensing and related regulatory functions in a manner that is both receptive to environmental concerns and consistent with the Commission's responsibility as an independent regulatory agency for protecting the radiological health and safety of the public.

Accordingly, the Commission has presented in 10 CFR 51.20(b) the types of actions that require an EIS or a supplement to an EIS. Similarly, the Commission has presented in 10 CFR 51.22(c) and (d) lists of licensing and regulatory actions that have been given categorical exclusions from the requirement for an EIS or environmental assessment (EA). All other licensing and regulatory actions subject to 10 CFR 51, Subpart A, require an EA (10 CFR 51.21).

The level of environmental review associated with proposed actions is determined by the appropriate NRC staff director. If the proposed action is not of the type listed in 10 CFR 51.22(c) as a categorical exclusion, the NRC staff director determines whether an EIS or an EA should be prepared. Whenever the appropriate NRC staff director determines that an EIS should be prepared by the NRC in connection with a proposed action, a notice of intent should be published in the *Federal Register*, and an appropriate scoping process should be conducted.

The contents of the notice of intent and the participants in and covered by the scoping process are outlined in 10 CFR 51.27, 10 CFR 51.28, and 10 CFR 51.29, respectively. In general, the scoping process is open to anyone who requests an opportunity to participate. However, participation in the scoping process for an EIS does not entitle the participant to become a party to the proceeding to which the EIS relates (10 CFR 51.28(c)). Areas covered in the scoping process include (10 CFR 51.29(a))

- defining the proposed action
- determining the scope of the EIS and identifying significant issues
- identifying, and eliminating from detailed study, issues that are peripheral, not significant, or that have been covered by prior environmental reviews
- identifying other EAs or EISs related to, but not part of, the scope of the EIS under consideration
- identifying other environmental reviews and consultations that are required
- indicating the relationship of EIS preparation timing to the Commission's planning and decisionmaking schedule
- identifying cooperating agencies
- describing the means by which the EIS will be prepared.

At the conclusion of the scoping process, the appropriate NRC staff director will prepare a concise summary of the determinations made by the NRC, including the significant issues identified, and send a copy of the summary to each participant in the scoping process.

Responsibility for environmental reviews and preparation of EISs rests with the NRC Environmental Project Manager (EPM). The EPM interacts with the applicant's or licensee's top-level technical and supervisory personnel as well as with NRC management. In addition, the EPM coordinates the efforts of numerous staff personnel in many complex disciplines within both formal requirements and management-approved guidance. With assistance from review personnel and consultants, the EPM develops the overall recommendations for action to be taken by the Director of the Office of Nuclear Reactor Regulation (NRR) with respect to the many aspects of siting and nuclear-facility design and operation.

The details of EPM responsibilities related to environmental reviews are discussed in NUREG/BR-0073, *Project Manager's Handbook* (NRC 1989a). They include managing the acceptance review of the applicant's environmental report (ER) and managing the environmental reviews performed by the staff and consultants. The acceptance review determines whether the information included is sufficient to satisfy Commission requirements for a detailed review. If the application is not sufficiently complete, the staff specifically requests additional information through the EPM. When the application is reasonably complete, it is docketed, and the detailed review process begins.

The applicant's ER is reviewed technically by the functional review branches in the NRR divisions and by the EPM. Details of the responsibility of each branch in carrying out review functions, including criteria for acceptability, are contained in the ESRPs. During the course of the staff's review, it is usually necessary to request additional information about a number of issues. Reviewers formulate questions to elicit this additional information from the applicant. Requests for additional information (RAIs) are transmitted to the applicant by the EPM. RAIs also serve as a public record of the staff's concerns about the application at the review stage.

When the review and evaluation of the applicant's ER have progressed to the point at which the EPM and reviewers have completed their review and evaluation, sections of the draft environmental impact statement (DEIS) are prepared; depending on the licensing application, the DEIS may be a stand alone document or a supplement to an existing EIS or generic environmental impact statement (GEIS). Material for the DEIS is provided to the EPM, who is responsible for critically reviewing each submittal from the reviewers and ensuring that the conclusions of the DEIS are representative of the review team and reflect NRC policy.

CEQ regulations in Chapter V of Title 40 of the Code of Federal Regulations and guidance related to the NEPA process (CEQ 1981) set standards for EISs. In accordance with these standards, it is expected that each EIS prepared using the guidance in these ESRPs will

- stand on its own as an analytical document that fully informs decisionmakers and the public of the environmental effects of the proposed action and those of reasonable alternatives

- emphasize the issues that are significant and reduce emphasis on other issues and background material
- be written in plain language.

Tiering will be used when appropriate to reduce EIS length. However, it should not be carried to the point where it is necessary to refer to other documents to obtain information essential to a basic understanding of the issues addressed in the EIS. Rather, tiering should be used to direct interested readers to more detailed discussions of specific issues.

When an acceptable DEIS has been assembled, the DEIS is submitted for review and comment to the project director, the Office of the General Counsel, and the division directors of the participating review groups. Final approval is obtained from the EPM's division director before publication of the DEIS.

The DEIS issued to the public is a summary of the staff's initial conclusions regarding an application. The DEIS is not a draft in that it is incomplete. Rather, it is a draft discussion of the proposed action and alternatives and the staff's assessment of potential benefits and environmental costs. The DEIS provides the public with an opportunity to comment, request clarification, recommend changes, or provide additional information to the staff for consideration in assessing the benefit-cost balance.

If no comments are received, the DEIS can be published as a final environmental impact statement (FEIS). If comments are received, they are considered by the staff. Staff responses are located in one section of the FEIS so that readers can determine the staff's response to comments. Responses to comments may take one or more of several forms: a portion of the DEIS may be changed, new material may be added to the appropriate section identified in the discussion of comments, or no change may ensue.

The FEIS is a summary of the evaluation of the environmental portion of the application relative to the anticipated impact of the proposed action on the environment. It is provided to the public and is used as the main body of environmental evidence at the public hearing to support the Commission's conclusion that the proposed action should be approved or rejected.

Scope of the Environmental Standard Review Plans

The original ESRPs were prepared specifically for the environmental review of applications for construction permits (CPs) for nuclear power plants under 10 CFR 50 and for the initial operating license (OL). Since the initial set of ESRPs was published, the range of applications for which environmental reviews are conducted has been expanded with the addition of 10 CFR 52 and 54.

The updated and revised ESRPs will guide the staff's environmental reviews for the range of applications including "green field" reviews of CP and OL applications in 10 CFR 50, reviews of applications for early site permits (ESPs) in 10 CFR 52, Subpart A, and reviews of applications for combined licenses (COLs) in 10 CFR 52, Subpart C, when the application does not reference an ESP. These ESRPs are also

appropriate for use in environmental reviews of applications for COLs in 10 CFR 52, Subpart C, when the applications reference an ESP. Reviews of ESP applications are limited in the sense that (1) the reviews focus on the environmental effects of construction and operation of a reactor, or reactors, that have characteristics that fall within the postulated site parameters and (2) the reviews need not include an assessment of benefits (for example, need for power). The environmental reviews of COL applications that reference an ESP are limited to consideration of (1) information to demonstrate that the design of the facility falls within the parameters specified in the ESP and (2) any significant environmental issue not considered in any previous proceeding on the site or design. Appendix A provides guidance on the ESRPs that are appropriate for each type of application.

The NRC has prepared a GEIS that covers applications for license renewal (LR) under 10 CFR 54. When an LR application is received, the NRC staff prepares a site-specific supplement to the GEIS. The supplement addresses a set of environmental issues listed in 10 CFR 51, Appendix B. An LR application does not require a "green field" review; many of the environmental issues related to LRs were resolved with the GEIS. Consequently, a set of ESRPs has been prepared specifically to assist the staff in environmental reviews related to license renewal. These ESRPs are included in Supplement 1.

A number of other NRC actions require environmental reviews, including issuance of limited work authorizations (10 CFR 50.10(e)(1) to (e)(3), 10 CFR 52.25, and 10 CFR 52.91), early partial decisions (10 CFR 2, Subpart F; 10 CFR 100.10; and 10 CFR 100.20), and pre-application early reviews of site suitability issues (10 CFR 50, Appendix Q; 10 CFR 52, Appendix Q; and 10 CFR 100.10). The staff may refer to the appropriate ESRPs in this document for insight in performing these reviews. NRC's Office of Nuclear Reactor Regulation (NRR) Office Letter 906, Revision 1, "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues" (NRC 1996a), guides staff in performing environmental reviews for operating reactors, including reviews associated with license amendments.

The ESRPs (1) provide specific instructions to the NRC staff responsible for conducting environmental reviews, (2) provide detailed descriptions of the manner in which the NRC reaches judgments on the kinds of environmental impacts caused by construction and operation of nuclear power plants, and (3) specify the means for determining the significance of these impacts. Use of ESRPs by the NRC staff in the environmental review process will ensure the following:

- Data essential to a specific environmental review and subsequent decisionmaking process are provided in the applicant's submittal and reviewed.
- Appropriate consideration, including coordination and consultation, is given to requirements of other Federal, State, regional, local, and affected Native American tribal agencies applicable to a particular environmental review.
- The analysis and evaluation procedures for review of a given technical area are standardized, thus achieving uniformity of approach.

- Each impact assessment concentrates on review of the potential environmental impacts of significance, and analysis of irrelevant data or of insignificant impacts is minimized.
- The methods to be used for analysis and staff judgments are objective and based on sound analytical procedures.

The ESRPs have been prepared for an EIS outline that embraces the range of environmental factors and site-specific environmental conditions expected for the majority of nuclear power plant applications. Conditions will occur from time to time that do not fall within the ESRP outline. These plans permit the inclusion of such conditions in the environmental review.

Organization of the Environmental Standard Review Plans

The ESRPs are numbered as sections of 10 chapters. These chapters form a general outline for an EIS or supplement. The chapters are

- 1 Introduction
- 2 Environmental Description
- 3 Plant Description
- 4 Plant Construction Impacts
- 5 Plant Operation Impacts
- 6 Environmental Monitoring
- 7 Impacts of Postulated Accidents
- 8 Need for Power
- 9 Alternatives
- 10 Environmental Consequences

These chapters may be logically considered in three groups. Chapters 1 through 3 are descriptive in nature. They guide the staff's review of the regional setting for the proposed action, the detailed description of the site and its environment, and the plant and the detailed description of those features of the plant that are most likely to affect the environment. Chapters 4 through 7 are related to the technical analyses. They guide the staff's review of potential environmental impacts associated with construction and operation of the plant. Finally, Chapters 8 through 10 are related to the overall evaluation of the

proposed action. They guide the staff's review of the need for power, compare the proposed action with alternatives, and summarize the conclusions related to the proposed action.

In-text references to ESRPs, such as "ESRP Chapter 3," refer to the entire chapter (all sections), while "ESRP 3.0," for example, refers only to the specific ESRP 3.0.

The format of the ESRPs in this document conforms to the format of NUREG-0800, the NRC's *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants* (NRC 1987). The ESRP format consists of the following six sections:

- I. Areas of Review
- II. Acceptance Criteria
- III. Review Procedures
- IV. Evaluation Findings
- V. Implementation
- VI. References

Areas of Review describes the purpose and scope of the review for which the ESRP provides guidance. It includes a list of review interfaces. These interfaces define the expected flow of information in the review process. **Acceptance Criteria** provides guidance on determining the acceptability of the applicant's submission with respect to the topic under review. **Review Procedures** describes the methods that the staff should use in conducting the review. The level of detail in the description of methods varies from ESRP to ESRP. **Evaluation Findings** provides guidance on how to summarize the conclusions of the review. This guidance frequently includes samples of the types of statements that should be included in an EIS. **Implementation** contains a standard statement that describes how the ESRP is expected to be used. Finally, the **References** section contains the bibliographic information related to material cited in the ESRP.

Each ESRP contains a list of data and information needs under **Areas of Review**. In many cases, a likely source of an item is indicated in parentheses or brackets at the end of the item identification in the list. Reviewers may need to search for items when the item is not found in the likely source, or when a likely source is not listed. In these cases the following sources of information should be considered, as appropriate:

- applicant's ER
- previous NRC final environmental statements (FESs)
- applicant's safety analysis report (SAR) or updated final SAR
- NRC Safety Evaluation Reports (SERs)

- generic EISs, especially NUREG-1437
- other Federal agencies
- State environmental agencies.

Information may also be found in databases maintained by other Federal agencies. These databases should be accessible through the NRC Geographical Environmental & Siting Information System (GEn&SIS).

Information that is general to all ESRPs is included in this introduction and is regarded as though it were in each ESRP. Although the intent of the ESRPs is that they be used collectively in reviewing ERs submitted with applications, they may also be used individually. The information in this introduction must be considered when an ESRP is used individually.

Changes in the Environmental Standard Review Plans

Each ESRP has been prepared with regard for the NRC's obligations under NEPA and applicable interpretations of the Act, including, for example, the Calvert Cliffs decision (1971) regarding consideration of nonradiological environmental impacts and the CEQ guidelines regarding environmental justice. The contents of Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976) and Regulatory Guide 4.7, Rev. 2, *General Site Suitability Criteria for Nuclear Power Stations* (NRC 1998) were considered in preparing each ESRP, but were not a constraint in developing the data or information requirements. Thus, the overall scope of data and information considered in these ESRPs is generally consistent with the guidelines of Regulatory Guides 4.2 and 4.7.

Since 1978, there have been many changes to the regulatory environment in which the NRC and its licensees operate. New environmental laws and regulations have been established, policies and procedures resulting from decisions of courts and administrative hearing boards have been changed, and the types of authorizations, permits, and licenses issued by the NRC have been changed. Some of these changes and their impacts on the ESRPs are highlighted in the paragraphs that follow.

- **Early Site Permits, Standard Design Certifications, and Combined Licenses**

The original ESRPs were prepared to guide staff in their review of ERs prepared by applicants for CPs for nuclear power plants and in preparing the NRC EISs related to the proposed actions. At that time, CPs and OLs for nuclear power plants were issued under 10 CFR 50. Although CPs and OLs may still be issued under 10 CFR 50, other licensing options have been made available through 10 CFR 52. These options include

- (1) **Subpart A, Early Site Permits**, which provides for approval of a site for one or more nuclear power facilities separate from an application for a standard design certification or COL for such a facility

- (2) **Subpart B, Standard Design Certifications**, which provides for certification of a standard reactor design for nuclear power facilities separate from an application for an ESP or COL for such a facility
- (3) **Subpart C, Combined Licenses**, which provides for issuance of a COL for construction and operation of a nuclear power facility at a specific site.

Environmental reviews of ESP and COL applications are covered by the procedures contained in the revised ESRPs. A benefits assessment is required for a COL, but not for an ESP. An applicant who is submitting a benefits assessment in the ESP application only needs to reference the ESP assessment rather than resubmitting a benefits assessment when preparing a COL application. Appendix A provides guidance related to the scope of environmental reviews for these types of applications.

- **Environmental Justice**

The President issued Executive Order 12898 in October 1994 mandating that Federal agencies make "environmental justice" part of each agency's mission by addressing disproportionately high and adverse human health or environmental effects of Federal programs, policies, and activities on minority populations and on low-income populations. NRR Office Letter 906 (NRC 1996) contains guidance to NRR staff on conducting environmental justice reviews. The latest revision of this letter should be reviewed to obtain current guidance.

The guidance in NRR Office Letter 906 is reflected in this document by the addition of three new ESRPs. ESRP 2.5.4 contains procedures for identifying and describing minority and low-income populations that could be impacted by a proposed action. ESRPs 4.4.3 and 5.8.3 cover the subsequent staff assessment and evaluation of specific impacts for plant construction and operation, respectively. In addition, wording changes in other ESRPs now reflect the NRC commitment to address environmental justice issues.

- **Yellow Creek Decision**

In October 1978, the Atomic Safety and Licensing Board, in a partial initial decision on environmental and site suitability matters, sanctioned a Limited Work Authorization (see 10 CFR 50.10(e)) for the Tennessee Valley Authority's Yellow Creek facility (7 NRC 215 [1978]). In that partial initial decision, subsequently upheld by the Atomic Safety and Licensing Appeal Board (8 NRC 702 [1978]), the Licensing Board held that the NRC authority does not extend to matters within the jurisdiction of the U.S. Environmental Protection Agency (EPA). More specifically, the NRC authority is limited for those matters expressly assigned to the EPA by the Federal Water Pollution Control Act Amendments (FWPCA) of 1972. According to the Appeal Board, "The role of the NRC is one of factoring anticipated water pollution into its NEPA benefit-cost balance analyses on proposed nuclear plants."

The rulings of the Licensing and Appeal Boards have been factored into revision of the ESRPs that are related to water issues. The ESRPs that are in this document related to water quality contain procedures to identify and evaluate potentially adverse impacts associated with nuclear power plant construction and operation. However, the text now reflects the NRC's limited role in this area. In addition, ESRP 9.3.3, "Alternative Plant and Transmission Systems: Nonradioactive Waste Treatment Systems," which was included in NUREG-0555, has not been carried forward to the present document, and subsequent ESRPs have been renumbered.

- **Open Access to Transmission Lines and Economic Deregulation**

Recent changes in the economic regulation of utilities have expanded the options to be addressed in consideration of the need for power in EISs required by 10 CFR 51, Appendix A. Regulatory agencies in some States have initiated the process of economic deregulation, and the Federal Energy Regulatory Commission has adopted regulations to ensure all power generators open access to power transmission facilities (61 FR 21540-21736). The effects of these changes on environmental review procedures are likely to be significant, especially with respect to the definitions of demand, service areas, and benefits. They are also likely to be significant with respect to selecting and considering alternatives.

The ESRPs related to the need for power (ESRPs 8.1 through 8.4), consideration of alternatives (ESRPs 9.1 through 9.4), and benefit-cost balance (ESRPs 10.1 through 10.4.3) have been modified to facilitate environmental reviews of applications that fall outside the bounds of the traditional structure of regulated utilities. However, economic deregulation will continue to evolve; standard procedures for environmental reviews in an unregulated, open access regulatory arena have neither been developed nor stood the test of time. The ESRPs in this document provide guidance, but may not be appropriate for all reviews. If the NRC is faced with an application of this sort, the reviewers should review the current Commission policy before starting the review.

- **Severe Accident Mitigation Alternatives**

At the time the original ESRPs were published, the NRC staff EISs did not consider alternatives to mitigate the consequences of severe accidents. Current NRC policy developed after the Limerick decision (Limerick Ecology Action vs. NRC, 869 F.2d 719 [3rd Cir. 1989]) requires consideration of design alternatives to mitigate the consequences of severe accidents in EISs prepared at the OL stage. Consideration of severe accident mitigation alternatives (SAMAs) is required at the LR stage for the plants for which a site-specific SAMA has not been included in an EIS or supplemental EIS.

Design alternatives to mitigate the consequences of severe accidents have been included in FESs for the Limerick 1 and 2 (NRC 1989b) and Comanche Peak 1 and 2 (NRC 1989c) operating license reviews and in the Watts Bar Supplemental Final EIS (NRC 1995). A new ESRP (ESRP 7.2) has been prepared to guide staff in the consideration of SAMAs.

- **License Renewal**

Consideration of the license renewal process is discussed separately in Supplement 1 to this document.

General Instructions

The following instructions, applicable to most of the ESRPs, are provided here to avoid repetition in each plan:

- **Project Overview.** As an initial step in each individual environmental review, the reviewer is expected to develop an understanding of the entire project proposed by the applicant. The purpose of this instruction is to ensure that reviewers put their individual reviews in perspective with the overall project and concentrate their efforts on issues of substance. This general project review is to be conducted as the first step (acceptance review phase) of the overall environmental review process and is to be completed before developing requests for additional information.
- **Internal Review Coordination.** The EPM is the central point of contact for all reviewers. Although each ESRP represents a discrete segment of the NRC's overall environmental review, no review can be completed without coordination with related reviews. For example, the technical analysis ESRPs (Chapters 4 through 7) rely on the descriptive chapters (1 through 3) for background information. All reviewers are instructed to maintain close communication with other reviewers throughout the review procedure. With very few exceptions, the reviews on a given project are conducted in parallel; thus, completed "output" of related reviews may not be available to reviewers before their own environmental review is initiated.
- **External Review Coordination.** The EPM usually initiates contacts with outside groups and must be informed of all such contacts as outlined in NUREG/BR-0073, the *NRC Project Manager's Handbook* (NRC 1989a). Each reviewer is expected to seek out and be aware of any related technical analyses and assessments in areas of concurrent jurisdiction, such as air and water quality and aquatic impacts. Particular attention should be given to those analyses and assessments prepared under provisions of memoranda of understanding between the NRC and other Federal, State, regional, local, and affected Native American tribal agencies. When so directed by the specifics of the memoranda of understanding, the reviewer participates with officials in developing the impact assessments directed by these ESRPs. Working through the EPM, the reviewer is responsible for resolving any differences of opinion between staff analyses and analyses of other agencies. When resolution of differences is not possible, the reviewer ensures that all viewpoints are addressed in the EIS or that the specific provisions of the memoranda of understanding for this contingency are followed.
- **Consultation with Other Agencies.** The environmental reviews leading to preparation EISs involve interactions with other Federal, State, local, regional, and affected Native American tribal agencies. The agencies that may be consulted include, but are not limited to, the U.S. Fish and Wildlife Service

and National Marine Fisheries Service related to threatened and endangered species, the State Historic Preservation Officer (SHPO) and local and affected Native American tribal agencies related to historic and archeological resources that are eligible for listing on the National Register of Historic Places, relevant State agencies relative to consistency determinations under the Coastal Zone Management Act, and relevant State agencies relative to determination that the proposed action conforms to applicable State Implementation Plans under the Clean Air Act. These consultations should be started as soon as possible in the review process and should be made through the EPM.

- **Consultation With the Applicant.** The analysis procedures for many of the ESRPs direct the reviewer to "consult with the applicant" in certain specified circumstances. All consultations of this nature are made through the EPM.
- **Site Visit.** In most environmental reviews, reviewers benefit from a visit to the site of the applicant's proposed action. This visit gives the reviewer first-hand knowledge of the location and position of the applicant's facilities within the site. It also gives the reviewer an opportunity to observe the environment in the vicinity of the site.
- **Depth of Review.** Where an analysis procedure, as outlined in an ESRP, has been conducted by an applicant and reported in the applicant's ER, the applicant's work is evaluated in sufficient depth to permit independent verification of the analysis and its results. The reviewer may conduct independent analyses, if necessary.
- **Consideration of Mitigation.** Mitigation measures should be considered in proportion to the level of the impact when a potentially adverse impact is identified. Statements related to mitigation should describe the potential effectiveness of the mitigation measures considered and state whether mitigation measures are warranted or not.
- **GEN&SIS.** The NRC has developed a geographical information system for staff use (GEN&SIS). This system includes environmental data and links to other Internet sites that have data that may be important in environmental analyses. Reviewers are expected to make use of GEN&SIS and its links to other sources of information in reviewing an applicant's ER and in performing independent analyses.
- **Best Management Practices.** The analysis procedures in ESRPs often direct the reviewer to evaluate the applicant's commitments to use construction or maintenance practices that limit adverse impacts. These practices, often referred to as best management practices (BMPs), are construction activities that tend to mitigate adverse environmental impacts. Many practices are chosen to prevent or control water pollution and minimize soil erosion resulting from land disturbance or other land-management activities. Examples of construction activities recognized as BMPs can be found in a number of sources, some of which are referenced below. BMPs not referenced below are generally acceptable when they have been used by another Federal agency.

- **Quality Assurance.** In evaluating the applicant's environmental information, reviewers should identify and evaluate the quality assurance measures taken by the applicant in collecting and analyzing data. Quality assurance measures, including verification and validation, are also evaluated where computer models have been used to predict environmental consequences of the proposed actions.
- **Findings.** The sections of an EIS that summarize findings for the NRC decisionmakers should reflect the results of a "consensus" agreement among the reviewers. This requires input from the reviewer, the EPM, and any other reviewers who would be affected by the findings.
- **Documentation.** Each reviewer maintains documentation, logs, and other records to ensure that records of contacts with outside agencies and organizations are maintained.
- **Definitions.** Use of the following terminology applies only to the environmental review process. Terms such as plant and station as used in an EIS continue to reflect an applicant's choice of terms to identify the proposed project (e.g., Calvert Cliffs Nuclear Power Plant, Oonce Nuclear Station, Unit 1).

STATION: All facilities (reactors, control buildings, intakes, discharges, etc.) that are located or are proposed to be located on the applicant's site. Generally, the station includes everything located on the applicant's property that surrounds the proposed or existing reactors. In some cases, intakes and discharges may be beyond this property line, but are considered part of the station. Transmission lines and their associated facilities are not considered part of the station. Existing or proposed facilities not associated with the production of electricity (e.g., a visitor center or a fish hatchery) are considered part of the station.

PLANT: The proposed nuclear reactors, steam-electric systems, intakes, discharges, and all other on-station facilities involved with the production of electricity. Plant can be more than one reactor steam-electric system, but does not include existing units already in operation. Transmission lines and other off-station facilities are not part of the plant.

UNIT: One reactor steam-electric system. Generally, unit is used only when the applicant is proposing a multi-unit plant.

FACILITY: Any identifiable part of the station or associated portions of the applicant's system, both existing and proposed. Examples: The visitor center is a facility. A substation is a facility. An intake system could be a facility (if separated from the remainder of the plant).

PROJECT: Everything the applicant is proposing. This includes transmission lines, access roads, communications stations, etc.

As used in these ESRPs, mitigation and avoidance will have the following meanings:

MITIGATION: Impact mitigation is the process of modifying a design or practice (either a construction practice or an operating procedure) to lessen its environmental impact. Successful mitigation will remove an impact from the “adverse” category.

AVOIDANCE: Impact avoidance is the process of using an alternative design or practice that avoids the identified adverse impact. Note that alternatives may have adverse impacts of their own and must be evaluated to ensure that any such impacts can be successfully mitigated.

Related Documents

These ESRPs are only one of several sets of procedures used by the NRC to meet its responsibilities under NEPA. Other documents that provide guidance relevant to environmental reviews include

- NUREG/BR-0073, *Project Manager’s Handbook* (NRC 1989a). (More recent versions of this document exist; however, such documents do not provide substantive guidance on environmental impact statement development)
- Office of Nuclear Reactor Regulation Office Letter 906, “Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues” (NRC 1996a)
- Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976) and its Supplement 1, *Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses* (NRC 1999a)
- Regulatory Guide 4.7, *General Site Suitability for Nuclear Power Stations* (NRC 1998)
- NUREG-1555, Supplement 1, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants Supplement 1: Operating License Renewal* (NRC 1999b)
- NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants* (NRC 1987).

NUREG/BR-0073 provides staff with guidance on determining when an environmental document must be prepared, the type of environmental document that should be prepared, and procedural matters related to the preparation of environmental documents. The collection and evaluation of material for environmental documents generally involves frequent interactions with the applicant as the staff examines the available information and identifies issues requiring clarification or additional information. The handbook provides guidance on these interactions and on interactions with other NRC staff who deal with the applicant on other matters. More current versions of the handbook are focused on operating nuclear power plants and do not provide guidance in the environmental area.

NRR Office Letter 906 establishes procedures and provides guidance related to preparing environmental assessments and considering environmental issues for licensing actions.

Procedures and guidance in the office letter specifically relate to the Coastal Zone Management Act, the Endangered Species Act, the National Historical Preservation Act, and Executive Order 12898 (1994) dealing with environmental justice.

Regulatory Guide 4.2 provides guidance to applicants on the preparation of ERs for nuclear power stations. This guidance is specifically intended for CP and OL applications submitted under 10 CFR 50. However, Regulatory Guide 4.2 should provide reasonable guidance for preparing ERs for ESP and COL applications. Supplement 1 provides guidance for preparing supplemental ERs for license-renewal applications.

NUREG-1555, Supplement 1 contains guidance to the NRC staff on environmental reviews related to renewal of nuclear power plant operating licenses. These supplemental ESRPs are keyed directly to the NUREG-1437, *Generic Impact Statement for License Renewal of Nuclear Plants* (NRC 1996b) and Regulatory Guide 4.2, Supplement 1. The approach in the supplemental ESRPs concentrates on establishing that the conclusions in NUREG-1437 remain valid for environmental issues that are classified as Category 1 issues in Table B-1 of 10 CFR 51 Subpart A Appendix B, and resolving Category 2 issues in the table. The approach also provides for consideration of significant new information on the environmental impacts of license renewal.

Regulatory Guide 4.7 provides applicants with guidance in the initial stage of selecting potential sites for nuclear power stations. It discusses the major site characteristics related to public health and safety and the environmental issues considered in determining the suitability of sites for light-water-cooled reactors. Sites that appear to be compatible with the general criteria have to be examined in greater detail before they can be considered "candidate" sites (i.e., sites that are considered in selecting a "proposed" or "preferred" site).

The NUREG-0800 deals primarily with issues related to safety. It contains several sections on the evaluation of the consequences of accidental releases of radioactive material. Although the emphasis of the analyses conducted under the SRPs is somewhat different than that of the analyses conducted under the ESRPs, the results of the SRP analyses are relevant to environmental reviews. For example, the reviews conducted under ESRP Chapter 7 draw upon the results of reviews conducted under the SRP.

References

10 CFR 2, Subpart F, "Additional Procedures Applicable to Early Partial Decisions on Site Suitability Issues in Connection with an Application for a Permit to Construct Certain Utilization Facilities."

10 CFR 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR 50, Appendix Q, "Pre-application Early Review of Site Suitability Issues."

10 CFR 50.10, "License required."

10 CFR 51, Subpart A, "National Environmental Policy Act—Regulations Implementing Section 102(2)."

10 CFR 51, Appendix A, "Format for Presentation of Material in Environmental Impact Statements."

10 CFR 51, Appendix B, "Environmental Effect of Renewing the Operating License of a Nuclear Power Plant."

10 CFR 51.20, "Criteria for and identification of licensing and regulatory actions requiring environmental impact statements."

10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments."

10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review."

10 CFR 51.27, "Notice of intent."

10 CFR 51.28, "Scoping—participants."

10 CFR 51.29, "Scoping—environmental impact statement."

10 CFR 52, "Subpart A: Early Site Permits; Subpart B: Standard Design Certifications; and Subpart C: Combined Licenses for Nuclear Power Plants."

10 CFR 52, Appendix Q, "Pre-application Early Review of Site Suitability Issues."

10 CFR 52.25, "Early site permits; extent of activities permitted."

10 CFR 52.91, "Combined licenses; authorization to conduct site activities."

10 CFR 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

10 CFR 100.10, "Factors to be considered when evaluating sites."

10 CFR 100.20, "Factors to be considered when evaluating sites."

61 FR 21540-21736—Federal Energy Regulation Commission "ensure all power generators open access to power transmission facilities."

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

Calvert Cliffs' Coordinating Committee, Inc. vs. Atomic Energy Commission, 449 F. 2d 1109 (D.C. Cir. 1971).

Coastal Zone Management Act, as amended, 16 USC 1451 et seq.

Council on Environmental Quality (CEQ). 1981. "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 *Federal Register* 18026-18037.

Endangered Species Act, as amended, 16 USC 1531 et seq.

Energy Reorganization Act, as amended, 42 USC 5801 et seq. (1974).

Executive Order 12898. "Federal Actions To Address Environmental Justice in Minority and Low-Income Populations," 59 *Federal Register* 7629-7633 (1994).

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Limerick Ecology Action vs. NRC, 869 F. 2d 719 [3rd Cir. 1989].

National Environmental Policy Act of 1969 (NEPA), as amended, 42 USC 4321 et seq.

National Historic Preservation Act, as amended, 16 USC 470 et seq.

Tennessee Valley Authority (Yellow Creek nuclear plant Units 1 and 2), LBP-78-7, 7 NRC 215 (1978).

Tennessee Valley Authority (Yellow Creek nuclear plant Units 1 and 2), ALAB-515, 8 NRC 702 (1978);

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). 1978. *Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants*. NUREG-0555, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1987. *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants*. NUREG-0800, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1989a. *Project Manager's Handbook*, NUREG/BR-0073, Rev. 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1989b. *Limerick 1 and 2 Operating License*, NUREG-0974, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1989c. *Comanche Peak 1 and 2 Operating License Review*, NUREG-0775, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1995. *Final Environmental Impact Statement Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2*. NUREG-0498, Supplement No. 1, Docket Nos. 50-390 and 50-391, Tennessee Valley Authority, U.S. Nuclear Regulatory Commission, Washington, D.C.

U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (NRC). 1996a. "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues." NRR Office Letter No. 906, Revision 1, U.S. Nuclear Regulatory Commission, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1996b. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437, Vol. 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999a. *Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses*. Regulatory Guide 4.2, Supplement 1, Washington, D. C.

U.S. Nuclear Regulatory Commission (NRC). 1999b. *Standard Review Plans for Environmental Reviews for Nuclear Power Plants Supplement 1: Operating License Renewal*. NUREG-1555, Supplement 1. Washington, D.C.



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

1.0 INTRODUCTION TO THE ENVIRONMENTAL IMPACT STATEMENT

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of introductory paragraphs for the environmental impact statement (EIS). The scope of the paragraphs covered by this plan is to (1) outline the purpose and organization of the EIS and (2) introduce the material to be presented in the EIS based on the reviews conducted under ESRPs 1.1 and 1.2.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

The introductory paragraph prepared under this ESRP should be consistent with the intent of the following regulations:

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

October 1999

1.0-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- 10 CFR 51, Subpart A, Appendix A, "Format for Presentation of Material in Environmental Impact Statements" with respect to the format and content of an EIS.

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

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

10 CFR 51, Subpart A, Appendix A, lists the information that must be included in an EIS prepared by the Commission to meet its responsibilities under NEPA. The format for an EIS may expand upon or differ from the format suggested in 10 CFR 51, Appendix A. Therefore, the introduction should describe the format and organization of the EIS and relate them to the format presented in Appendix A. Introductory paragraphs that orient the reader with respect to the relevance of material to overall organization and goals of the EIS add clarity to the presentation.

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer for this ESRP should prepare at least two introductory paragraphs for the EIS. The first paragraph(s) should describe the organization and format of the EIS and relate that information to the format presented in 10 CFR 51, Appendix A. Following these paragraphs, there should be a paragraph that introduces the information to be presented by the reviewers of information covered by ESRPs 1.1 and 1.2. This paragraph should list the types of information to be presented and describe their relationships to information to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51, Subpart A, Appendix A, "National Environmental Policy Act—Regulations Implementing Section 102(2)."

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

1.1 THE PROPOSED PROJECT

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of a brief introductory description of the proposed project and the site location and identification of the applicant. The scope of the review directed by this plan includes identifying the applicant and other owners, specifying the site location and major features of the project, and summarizing the staff's procedures in conducting the environmental review.

Review Interfaces

The reviewer for this ESRP should provide the reviewers for other ESRPs with the location and official description of the site and plant.

Data and Information Needs

The following data or information should be obtained during the course of reviewing the environmental report (ER) and preparing input to the environmental impact statement (EIS):

- full names of all organizations (e.g., utilities, municipalities) sharing ownership of the proposed project (from the ER)
- name of the organization designated as the applicant. This organization is the contact with NRC during the licensing process and will be responsible for construction and operation of the proposed project (from the ER)

October 1999

1.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- site location with respect to nearby towns and natural features (from the ER)
- number and type of reactors, highest anticipated gross thermal megawatt output, and net electrical output (from the ER)
- cooling system description (intake type, heat dissipation type, discharge type, source of cooling water) (from the ER)
- transmission system description (kilometers of new rights-of-way, new towers or conductors on existing rights-of-way) (from the ER)
- the nature of the proposed action and the constraints that are placed on the review because of the type of action
- proposed dates for start and completion of major activities (from the ER).

II. ACCEPTANCE CRITERIA

The reviewer should ensure that the information provided by the applicant is adequate to prepare input to the EIS similar to that shown in Appendix A to this plan. Acceptance criteria for a description of the proposed project are based on the relevant requirements of the following:

- 10 CFR 51, Subpart A, with respect to listing of procedural matters and the availability of environmental documents
- Executive Order 12898 (1994) with respect to public involvement in the process, specifically involvement of minority and low-income populations.

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's proposed project is discussed in the following paragraphs:

ESRP 1.1 contains basic information on the proposed project by specifically identifying the applicant and concisely describing the proposed action. In addition, the section outlines the process followed by NRC in implementing the National Environmental Policy Act (NEPA) process related to the proposed action under the requirements of 10 CFR 51.

Executive Order 12898 (1994) requires that Federal agencies consider environmental justice as part of the NEPA process. NRC is committed to implement a process to consider environmental justice in its decisionmaking. Involvement of the public, especially minorities and low-income populations, is essential to the assessment of environmental justice. Measures designed to enhance involvement of minority and low-income populations should be identified specifically.

III. REVIEW PROCEDURES

The material to be reviewed is informational in nature, and no specific analysis of the data is required. The reviewer should identify the plant owners, those organizations sharing ownership of the station location, and major design features of the proposed project.

IV. EVALUATION FINDINGS

Appendix A to this plan presents a sample format for ESRP 1.1. In some circumstances, the reviewer may need to prepare additional information to fully cover the subject material (e.g., multiple applicants, unusual siting, State-applicant relationships). The statement in Appendix A is appropriate for applications for construction permits under 10 CFR 50 and combined licenses under 10 CFR 52, Subpart C. Reviews related to other applications will require revision of the statement to fit the specific nature of the review.

The description of the information considered in the preparation of the EIS should discuss opportunities for public participation during the process. Efforts to obtain input from minority and low-income populations related to environmental justice should be called out specifically.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR 51, Subpart A, "National Environmental Policy Act—Regulations Implementing Section 102(2)."

10 CFR 52, Subpart C, "Combined Licenses."

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." *59 Federal Register*, 7629-7633 (1994).

National Environmental Policy Act (NEPA) of 1969, as amended, 42 USC 4321 et seq.

APPENDIX A

EIS SAMPLE FORMAT FOR ESRP 1.1

Pursuant to the Atomic Energy Act, as amended, and the Commission's regulations in Title 10 of the *Code of Federal Regulations*, an application, with an accompanying environmental report (ER), was filed by Community Gas and Electric Corporation (CG&E) and accepted for docketing on December 31, 1999. A contract for the joint ownership of the proposed station was signed in January 2000 by CG&E and Public Power Corporation (PPC). The shares to be owned by the participating utilities in the public power plant (PPP) are CG&E 80% and PPC 20%.

CG&E will act as project manager on behalf of itself and the other applicant (hereinafter collectively referred to as the applicant) for a combined license to build and operate a pressurized-water nuclear reactor designated as the PPP Nuclear Unit No. 1 (Docket No. STN 52-1), which is designed for ultimate operation at 3500 megawatts thermal (MWt) with a nominal net electrical output of 1100 mega watts (MW) electrical. Waste heat is proposed to be dissipated by a natural draft cooling tower. Water will be withdrawn from Lake Washington through a submerged intake structure. The proposed station is to be located in Any County, Any State, approximately 15 km (9 miles) SW of Lincoln on the south shore of Lake Washington. About 30 km (20 miles) of new transmission line rights-of-way will be required to link the proposed station to existing transmission grids.

The applicant proposes to start site preparation and limited construction activities in 2001, conduct full-construction activities over the period 2001 to 2005, and begin commercial operation in 2007.

The major documents used in preparing this EIS were the applicant's ER, Design Certification 52-10, the preliminary safety analysis report (PSAR), and supplements thereto. Independent calculations and sources of information were also used as a basis for the assessment of environmental impact. In addition, some of the information was gained from a visit in January 2000 by the staff and the contractor supporting the staff to the station site and surrounding areas.

Public scoping meetings were held in Lincoln and Washington, D.C. Public hearings were held before and after completion of the draft statement, and the public was invited to comment on the draft statement. Notices of these opportunities for participation in the process were published in newspapers and broadcast on radio and television. Advertisements of these were sent to representatives of Native American tribes and to churches in areas of minority and low-income populations.

Although the staff examined data from all of these sources in making their assessments, only summaries of the most pertinent data are given in this statement. To avoid repetition, the staff provides references to the sources of detailed information, much of which is found in the applicant's ER.

As a part of its safety evaluation, the Commission conducts a detailed evaluation of the applicant's plans and equipment for minimizing and controlling the release of radioactive materials under both normal operating conditions and postulated potential accident conditions, including the effects of natural

phenomena. Inasmuch as these aspects are considered fully in other documents, only the salient features that bear directly on the anticipated environmental effects are repeated in this EIS.

Copies of this draft EIS and the applicant's ER are available for public inspection at the Commission's Public Document Room, 2120 L St N.W., Washington, D.C. 20037, and at the Lincoln City Library, 100 Main Street, Lincoln, Any State.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

1.2 STATUS OF REVIEWS, APPROVALS, AND CONSULTATIONS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification and assessment of environmentally related authorizations^(a) required by Federal, State, regional, local, and affected Native American tribal agencies as a prerequisite to plant licensing and construction.

The scope of the review directed by this plan includes identification of the authorizations (and the authorizing agencies) that address environmental issues. This should include (1) determination of status, (2) identification of environmental concerns, and (3) evaluation of potential administrative problems that could delay or prevent agency authorization. This environmental review should be used by the reviewers for ESRP Chapters 4.0 and 5.0 to help identify areas of environmental concern and determine applicant compliance with existing standards and regulations.

Review Interfaces

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

- ESRP Chapters 2.0, 4.0, and 5.0. Based on the information in the environmental report (ER), provide updated lists of environmentally related authorizations required by Federal, State, regional,

(a) As used in this ESRP, the term "authorizations" includes consideration of reviews and approvals that might be conducted by other agencies or organizations.

October 1999

1.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

local, and affected Native American tribal agencies. The lists should include the status of the authorization, environmental concerns identified by the agencies, and potential administrative problems that could delay or prevent agency authorization.

- ESRPs 3.7, 5.3.3.1, and 6.4. If transmission towers taller than 61 m (200 ft) are planned, then provide the reviewers with the status of Federal Aviation Authority (FAA) approval for construction.

Data and Information Needs

A list of the environmentally related authorizations required by Federal, State, regional, local, and affected Native American tribal agencies should be developed as part of the review process. The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- the name of each related authorization, including the responsible agency and the applicable law, ordinance, or regulation (from the ER)
- the principal environmental factors to be covered by the authorization (from the ER)
- the date of application/initiation and scheduled date of issuance of each authorization (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- the current status of each authorization (from consultation with Federal, State, regional, local, and affected Native American tribal agencies).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of environmental approvals and consultations are based on the relevant requirements of the following:

- 10 CFR 51.45(d) with respect to the requirement for applicants to list all Federal permits, licenses, approvals, and other entitlements that must be obtained in connection with the proposed action and to discuss the status of compliance with applicable environmental quality standards and requirements that have been imposed by Federal, State, regional, local, and affected Native American tribal agencies
- 10 CFR 51.70 with respect to the requirement that NRC staff independently evaluate and be responsible for the reliability of all information used
- 10 CFR 51.71 with respect to the requirement that the environmental impact statement (EIS) list all Federal permits, licenses, approvals, and other entitlements that must be obtained in implementing the proposed action and discuss the status of compliance with those requirements.

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's reviews, approvals, and consultations is discussed in the following paragraph:

Responsibility for protection of the environment has been assigned to many agencies. The NRC staff is required by the referenced sections of 10 CFR 51 to consider in its analysis of environmental impacts the concerns and requirements of the agencies that have regulatory authority.

III. REVIEW PROCEDURES

The basic list and status of authorizations can be obtained from the applicant's ER to guide the reviewer. The reviewer should take the following steps:

- (1) Consult the reviewers of ESRP Chapters 2.0, 4.0, and 5.0 to determine
 - if any authorizations should be added to the applicant's ER
 - which of the authorizations deal with environmental concerns.
- (2) For each such environmentally related authorization, establish the following:
 - current status of each authorization
 - environmental concerns of the authorizing agency that are to be addressed by the impact section reviewers
 - potential problems that may affect granting of the authorization
 - administrative requirements of the authorizing agencies.
- (3) Give particular attention to the status of authorizations that must be granted before the NRC can issue a construction permit (e.g., Sections 401 and 402 of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act).

IV. EVALUATION FINDINGS

Appendix A to this plan provides a sample format for including a list of the status of authorizations relevant to this ESRP. In some circumstances (e.g., a potential problem in State siting authorizations), the reviewer may need to prepare additional information to fully cover the subject material.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report."

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

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

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

APPENDIX A

SAMPLE FORMAT FOR ESRP 1.2

The applicant's ER includes a status listing of related authorizations required from Federal, State, regional, local, and affected Native American tribal agencies in connection with the proposed station. The staff reviewed that listing and consulted with some of the appropriate agencies in an effort to identify any significant environmental issues of concern to the reviewing agencies. The status of the authorizations are summarized in Table 1.2-1.

Table 1.2-1. Federal, State, and Local Authorizations

| Agency | Authority | Requirement | License/ Permit No. | Expiration Date | Activity Covered |
|--|--|---|------------------------|--------------------|--|
| NRC | Atomic Energy Act, 10 CFR 54.23, 10 CFR 51 | Environmental Report | | | Refurbishment and operation during the operating license renewal term |
| State Environmental Agency | Federal Water Pollution Control Act, Sec. 401 | State water quality certification | | | Discharges under the NPDES permit |
| State Environmental Agency | Federal Water Pollution Control Act, Sec. 402 | Stormwater permit | | | Stormwater discharges |
| State Environmental Agency | Clean Air Act, Sec. 502 | Operating permit | | | Air emissions |
| State Water Resources Agency | | Surface water appropriation permit | | | Use of surface water for cooling or other uses |
| State Water Resources Agency | | Groundwater appropriation permit | | | Use of groundwater |
| Fish and Wildlife Service and National Marine Fisheries Service | Endangered Species Act, Sec. 7 | Consultation | | | Impacts on endangered species during the renewal term |
| State Coastal Zone Management Agency | Coastal Zone Management Act, Sec. 307 | Certification that action is consistent with the State's coastal zone management program | | | Impacts on the coastal zone during the license renewal term |
| State Historic Preservation Agency | National Historic Preservation Act, Sec. 106 | Consultation | | | Impacts on historic sites during the license renewal term |



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.0 ENVIRONMENTAL DESCRIPTION

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the site. The scope of the paragraph covered by this plan is to introduce the material to be presented in the EIS based on the reviews conducted under ESRPs 2.1 through 2.8.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

2.0-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's environmental description is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 2.1 through 2.8. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



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

2.1 STATION LOCATION

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of a description of the geographical location of the site. The scope of the review directed by this plan should include consideration of geography in sufficient detail to orient the reader and to establish a geographical point of reference for other descriptive material (e.g., land and water use, local ecology, or demography).

Review Interfaces

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

- ESRPs 2.5.3, 2.7, 4.2.1, and 4.2.2. Provide information regarding the plant location, site description and layout, and surrounding region.
- ESRPs 5.8.1 and 5.8.2. Provide a detailed description of the plant location and surrounding region affected by the proposed plant operation.
- ESRP 9.3. Provide access to maps, photographs, and descriptions of the proposed site and surrounding region.

October 1999

2.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- site location: State; county; latitude and longitude Universal Transverse Mercator (UTM) coordinates; and township, range, and section(s) (from the environmental report [ER])
- area of the site (from the ER)
- distance and direction from the nearest major city (from the ER and population center)
- distance and direction from several nearby towns and readily recognized landmarks, including major nearby highways, rivers, or other bodies of water, within 10 km (6 mi) of the plant site (from the ER and site visit).
- for geographical orientation, simplified maps (based on an official source of information such as a State highway map) centered on the plant site: one general map with about an 80-km (50-mi) radius and a second map with about a 10-km (6-mi) radius of the plant (orient true north at the top of the map) (from the ER)
- a high-oblique aerial view or perspective drawing of the site with an indication of the plant boundary (plant site should occupy about 10% of the view) (from the ER upon request [reproducible copy] from the applicant).

The reviewer should also verify, both by site visit and by independent review of geographical information, that the descriptive material is correct and sufficiently detailed for environmental analysis.

II. ACCEPTANCE CRITERIA

Acceptable criteria for the inclusion of descriptive site information are based on the relevant requirements of the following:

- 10 CFR 51.45 with respect to requirements of a description of the affected environment.

Regulatory positions and specific criteria 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 inclusion of a site location and description

- Regulatory Guide 4.7, Rev. 2, *General Site Suitability Criteria for Nuclear Power Stations* (NRC 1998) with respect to establishing descriptive material for analysis of land and water use, aquatic and terrestrial ecology, and demographics.

Technical Rationale

The technical rationale for evaluating the applicant's station location is discussed in the following paragraph:

This evaluation assembles descriptive information useful for clearly and concisely orienting the reader to the location of the station. It also is intended to provide reviewers with a general orientation of plant location in the region.

III. REVIEW PROCEDURES

Because this section is primarily for orientation, the information needed can usually be obtained from the applicant's ER. The reviewer should visit the site to ensure that important features have been noted.

IV. EVALUATION FINDINGS

When presenting evaluation findings, the reviewer should verify that the descriptive information is useful for clearly and concisely orienting the reader to the location of the station and that the descriptive material is correct and complete.

The material should be presented in a narrative style maintaining both brevity and clarity. Usually the topic can be covered in a few sentences accompanied by figures as described in the Data and Information Needs section.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental reports—general requirements."

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). 1998. *General Site Suitability Criteria for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.



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

2.2 LAND

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the land area description portion of the environmental impact statement (EIS). The scope of the paragraph covered by this plan introduces the material to be presented from the reviews conducted under ESRPs 2.2.1 through 2.2.3.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

The introductory paragraph prepared under this ESRP should be consistent with the intent of the following regulation:

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

October 1999

2.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's land description is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer for this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph should introduce the nature of the material to be presented by the reviewers for ESRPs 2.2.1 through 2.2.3. This paragraph should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS. It should also highlight the differences in emphasis of the reviews conducted under the three ESRPs.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.2.1 THE SITE AND VICINITY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review of land use of the site and vicinity.^(a) The scope of the review directed by this plan should include the establishment of the nature and extent of present and planned land use within the site and vicinity that might be impacted or modified as a result of station construction and operation.

Review Interfaces

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

- ESRP 2.3.2. Provide land-use data as needed to describe surface-water and groundwater uses.

-
- (a) For the purpose of these environmental reviews, "site" and "vicinity" are defined as follows:
1. "Site"—The site is defined as that area of land owned or controlled by the applicant for the principal purpose of constructing and operating a nuclear power station. As a general rule, the applicant's "site boundary" should be accepted as defining the site.
 2. "Vicinity"—For small sites (on the order of 2 km²), the vicinity is the area encompassed within a radius of 10 km (6 mi). For larger irregularly shaped sites, the vicinity is a band or belt 10-km (6-mi) wide surrounding the plant site. The intent is to investigate land use in an area in which the site makes up no more than 10% of the area. If a lake or pond is to be created for use by the station, the entire water-body area should be included in the vicinity. The vicinity considered may follow natural or political boundaries.

October 1999

2.2.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.4.1. Provide land-use data as needed to describe terrestrial ecology.
- ESRP 2.5.2. Provide land-use data as needed to describe community characteristics.
- ESRP 2.5.3. Provide land-use data as needed to describe historic and archeological sites and natural landmarks.
- ESRP 3.1. Provide land-use data as needed to relate the description of the proposed plan and related offsite structures to the site and vicinity.
- ESRPs 4.1.1, 4.1.3, and 4.4. Provide land-use descriptions that are adequate to support the construction impact assessments for land use, historic and archeological sites, and socioeconomics.
- ESRP 4.2.2. Provide land-use data as needed to assess construction impacts on water use.
- ESRPs 5.1.1, 5.1.3, 5.4, and 5.8. Provide land-use descriptions that are adequate to support the operational impact assessments for land use, historic and archaeological sites, socioeconomics, and radiological impacts of normal operations.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- maps showing land use within the site boundary. (These maps should be of the same scale as maps showing the plant and construction areas in ESRP Chapters 3.0 and 4.0.) Land-use categories should be classified consistently with the U.S. Geological Survey (USGS) land-use classification codes listed in "USGS Land Use and Land Cover Data" (USGS 1997). Maps should show general patterns of ownership by outlining boundaries of parcels owned by individuals, corporations, governments, or other entities. Special land-use categories within the site boundary, such as Native American or military reservations, State and national parks, national monuments, national forests, wild and scenic rivers, designated coastal-zone areas, and wilderness areas, should be shown (from the environmental report [ER], "USGS Land Use and Land Cover Data" consultations with resource agencies, and USGS [1997]).
- land areas (hectares) devoted to major uses within the site boundary (from the ER)
- maps showing major land uses in the site vicinity with land uses classified consistently with the USGS categories (USGS 1997) (from the ER)
- land areas (hectares) that are devoted to major uses within the site vicinity (from the ER)

- maps showing highways, railroad lines, and utility rights-of-way that cross the site and vicinity (from the ER)
- egress limitations from the area surrounding the site (from the ER or application)
- special land uses (e.g., recreation) other than major land uses in the site and vicinity that could be significantly affected by construction of the proposed project (from the ER and consultation with local agencies)
- mineral resources (e.g., sand and gravel, coal, oil, natural gas, and ores) adjacent to or within the site boundary presently being exploited or of known commercial value (from the ER)
- ownership of mineral resources (i.e., whether the mineral resources are owned by the surface landowner or by another owner)
- land-use plans that include the site and vicinity within their scope (from applicable Federal, State, regional, local, and affected Native American tribal planning agencies).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of land use at the site and vicinity of the site are based on the relevant requirements of the following:

- 10 CFR 51.71(d) with respect to analysis requirements to be included in environmental impact statements (EISs) prepared by NRC
- 10 CFR 51, Appendix A(7), with respect to discussion in EISs prepared by NRC of possible conflicts between alternatives and the objectives of applicable land-use plans.

Regulatory positions and specific criteria necessary to meet the regulations as identified above are provided in

- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), Chapter 2.1, which sets out the land-use information requirements for inclusion in an applicant's ER
- Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (NRC 1998), which sets out the land use and aesthetic considerations related to site suitability.

Technical Rationale

The technical rationale for evaluating the applicant's description of planned land use within the site and vicinity is discussed in the following paragraph:

NRC's regulations implementing NEPA provide that NRC EISs are to include a section discussing the environmental consequences of alternatives (10 CFR 51, Appendix A[7]). The section is to include a discussion of "possible conflicts between the alternatives and the objectives of Federal, State, regional, and local (and in the case of a reservation, Native American tribal) land-use plans, policies, and controls for the area concerned." In addition, the regulations provide that due consideration is to be given in an EIS to comply with applicable zoning and land-use regulations [10 CFR 51.71(d)].

Guidance on (1) what constitutes a land-use plan or policy and (2) how an agency should handle potential conflicts between a proposal and the objectives of land-use plans is provided by the Council on Environmental Quality (CEQ) in Question 23 of "Forty Most Asked Questions" (CEQ 1981). With respect to what constitutes a land-use plan or policy, CEQ states on page 18033 that

The term "land-use plans" includes all types of formally adopted documents for land-use planning, zoning and related regulatory requirements. Local general plans are included, even though they are subject to future change. Proposed plans should also be addressed if they have been formally proposed by the appropriate government body in a written form, and are being actively pursued by officials of the jurisdiction. Staged plans, which must go through phases of development ... should also be included even though they are incomplete.

With regard to how an agency should handle potential conflicts between a proposal and the objectives of land-use plans, CEQ states on page 18033 (CEQ 1981) that

The agency should first inquire of other agencies whether there are any potential conflicts. If there would be immediate conflicts, or if conflicts could arise in the future when the plans are finished ... the EIS must acknowledge and describe the extent of those conflicts. If there are any possibilities of resolving the conflicts, these should be explained as well. The EIS should also evaluate the seriousness of the impact of the proposal on the land-use plans and policies, and whether, or how much, the proposal will impair the effectiveness of land-use control mechanisms for the area. Comments from officials of the affected area should be solicited early and should be carefully acknowledged and answered in the EIS.

NRC's Regulatory Guide 4.2, Rev. 2, identifies the information needed by the staff in its assessment of the potential environmental effects of a proposed nuclear facility and establishes a format acceptable to the staff for its presentation. NRC's Regulatory Guide 4.7, Rev. 2, discusses land-use considerations that may render a proposed site unsuitable for a nuclear power station and procedures for evaluating land-use impacts.

III. REVIEW PROCEDURES

The reviewer's analysis of land-use characteristics should be closely linked with the impact assessment review described in ESRP Chapters 4.0 and 5.0 (e.g., 4.1.1 and 5.1.1) to establish the land-use characteristics most likely to be affected. With this in mind, the reviewer should take the following steps:

(1) Identify the present land use within the site boundary and vicinity according to categories defined by the USGS (1997).

- Base the level of detail in selecting land-use categories on the needs of subsequent assessments.
- Identify total area by land-use category.
- Compare the land uses of the site and vicinity to be changed as a result of station construction and operation (ESRP Chapters 4.0 and 5.0) with the land use of the region as described in ESRP 2.2.3.

(2) Identify the following characteristics:

- waterways, highways, roads, and railroads that cross the site. Of particular interest are those that would be closed to public use.
- docking facilities or barge slips on any waterways within the site vicinity
- natural gas, electrical transmission, communications, and other utility lines that cross the site
- golf courses and picnic, swimming, fishing, boating, and other recreational areas within the site and vicinity
- visually sensitive areas or viewsheds that would be affected by plant construction
- residential areas, airports, and industrial or commercial facilities within the site vicinity
- agricultural areas within the site and vicinity
- commercially exploitable mineral resources
- land-use plans that include the site and vicinity within their scope.

IV. EVALUATION FINDINGS

The reviewer should ensure that the information is adequate as a basis for assessing the effects of construction and operation of the station on land use. The reviewer should use the site visit and consultation with appropriate Federal, State, regional, local, and Native American tribal agencies to assess the accuracy of the land-use designations.

The depth and extent of the input to the EIS will be governed by the land-use characteristics of the site and vicinity in which the station is to be located and the potential land-use impacts of plant construction and operation. The information should be presented in a concise form. Data should be given in tables showing the land use of the site and vicinity.

The following information should be included:

- a brief description of the land-use characteristics of the site and vicinity
- a tabulation of areas dedicated to each land-use category in the site and vicinity. The tabulations may be supplemented by land-use maps as necessary for clarity. The tabulations needed for ESRPs 2.2.1, 2.2.2, and 2.2.3 should be combined into one table.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51, Appendix A, "Format for Presentation of Material in Environmental Impact Statements."

10 CFR 51.71, Draft environmental impact statement contents.

Council on Environmental Quality (CEQ). 1981. "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 *Federal Register*, 18026-18037.

U.S. Geological Survey (USGS). 1997. "USGS Land Use and Land Cover Data," USGS Survey Earth Resources Observation Data Center, Sioux Falls, South Dakota.

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). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.



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

2.2.2 TRANSMISSION CORRIDORS AND OFFSITE AREAS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review of land use of transmission line corridors,^(a) access corridors, and other offsite areas that will be modified for the sole purpose of supporting construction or operation of the proposed project. The scope of the review directed by this plan should include consideration of these areas in sufficient detail to form a basis for assessing the land-use impacts from the construction or maintenance of offsite facilities.

Review Interfaces

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

- ESRP 2.3.2. Provide land-use data as needed to describe surface-water and groundwater uses.
- ESRPs 2.4.1 and 2.5.2. Provide land-use data as needed to describe terrestrial ecology and community characteristics.
- ESRP 2.5.3. Provide land-use data as needed to describe historic and archaeological sites and natural landmarks.

(a) See ESRP 3.7 for a definition of transmission line "corridors."

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 3.1. Provide land-use data as needed to relate the description of the proposed plant and related offsite structures to the site and vicinity.
- ESRP 3.7. Provide land-use data as needed to support descriptions of transmission corridors and offsite areas.
- ESRPs 4.1.2, 4.1.3, and 4.4. Provide land-use descriptions that are adequate to support the construction impact assessments for land use, historic and archaeological sites, and socioeconomics.
- ESRP 4.2.2. Provide land-use data as needed to assess construction impacts on water use.
- ESRPs 5.1.2, 5.1.3, and 5.8.1. Provide land-use descriptions that are adequate to support the operational impact assessments for land use, historic and archaeological sites, and socioeconomics.
- ESRP 5.6.1 and 5.6.3. Provide land-use descriptions that are adequate to support the operational impacts assessments of the transmission system and the terrestrial ecosystem on humans.

Data and Information Needs

The types of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- proposed routes for corridors that will be used for construction of transmission lines from the station site to an interconnecting point or points on the existing high-voltage transmission systems (from the environmental report [ER])
- proposed routes of access corridors to serve the proposed station (from the ER)
- corridor lengths, widths, and areas (from the ER)
- land-use restrictions, if any, contained in any easements (from the ER and consultation with land-resource agencies)
- land use within the corridors using the categories defined by the U.S. Geological Survey (USGS 1997). Land-use information should be subdivided into corridor segments having predominantly similar land-use types (from the ER, consultation with applicable Federal, State, regional, local, and affected Native American tribal agencies, and USGS [1997]).
- identification of offsite areas by land use, size, and location (from ER, site visit, and consultation with Federal, State, regional, local, and Native American tribal agencies)

- local and regional land-use plans of State, regional, and local agencies (from consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- special land-use classifications (e.g., Native American or military reservations, wild and scenic rivers, State and national parks, national forests, designated coastal-zone areas, floodplains, wildlife refuges, and wilderness areas) (from the ER, consultation with Federal, State, regional, local, and affected Native American tribal agencies, and USGS [1997]).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of land use in transmission line corridors, access corridors, and other offsite areas that will be modified for the sole purpose of supporting construction or operation of the proposed project are based on the relevant requirements of the following:

- 10 CFR 51.71(d) with respect to analysis requirements to be included in environmental impact statements (EISs) prepared by NRC
- 10 CFR 51, Appendix A(7), with respect to discussion in EISs prepared by NRC of possible conflicts between alternatives and the objectives of applicable land-use plans.

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

- Chapter 2.1 of NRC Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), which sets out the land-use information requirements for inclusion in an applicant's ER
- Rev. 2 to NRC Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (NRC 1998), which sets forth the land-use and aesthetic considerations related to site suitability.

Technical Rationale

The technical rationale for evaluating the applicant's description of planned land use of transmission corridors and offsite areas is discussed in the following paragraph:

NRC's regulations implementing NEPA provide that NRC EISs are to include a section discussing the environmental consequences of alternatives (10 CFR 51, Appendix A[7]). The section is to include a discussion of "possible conflicts between the alternatives and the objectives of Federal, State, regional, and local (and in the case of a reservation, Native American tribal) land-use plans, policies, and controls for the area concerned." In addition, the regulations provide that due consideration is to be given in an EIS to compliance with applicable zoning and land-use regulations [10 CFR 51.71(d)].

Guidance on (1) what constitutes a land-use plan or policy and (2) how an agency should handle potential conflicts between a proposal and the objectives of land-use plans is provided by the Council on Environmental Quality (CEQ) in Question 23 of "Forty Most Asked Questions" (CEQ 1981). With regard to what constitutes a land-use plan or policy, CEQ states on page 18033 that

the term "land-use plans" includes all types of formally adopted documents for land-use planning, zoning and related regulatory requirements. Local general plans are included, even though they are subject to future change. Proposed plans should also be addressed if they have been formally proposed by the appropriate government body in a written form, and are being actively pursued by officials of the jurisdiction. Staged plans, which must go through phases of development ... should also be included even though they are incomplete.

With regard to how an agency should handle potential conflicts between a proposal and the objectives of land-use plans, CEQ states on page 18033 (CEQ 1981) that

the agency should first inquire of other agencies whether there are any potential conflicts. If there would be immediate conflicts, or if conflicts could arise in the future when the plans are finished ... the EIS must acknowledge and describe the extent of those conflicts. If there are any possibilities of resolving the conflicts, these should be explained as well. The EIS should also evaluate the seriousness of the impact of the proposal on the land-use plans and policies, and whether, or how much, the proposal will impair the effectiveness of land-use control mechanisms for the area. Comments from officials of the affected area should be solicited early and should be carefully acknowledged and answered in the EIS.

NRC's Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), identifies the information needed by the staff in its assessment of the potential environmental effects of a proposed nuclear facility and establishes a format acceptable to the staff for its presentation. Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (NRC 1998), discusses land-use considerations that may render a proposed site unsuitable for a nuclear power station and procedures for evaluating land-use impacts.

III. REVIEW PROCEDURES

The reviewer's analysis of land-use characteristics should be closely linked with the impact assessment review described in ESRP Chapters 4.0 and 5.0 (e.g., 4.1.2 and 5.1.2) to establish the land-use characteristics most likely to be affected. With this in mind, the reviewer should take the following steps:

(1) Identify the present land use within the transmission corridors, access corridors, and offsite areas according to categories defined in USGS (1997).

- Base the level of detail in selecting land-use categories on the needs of subsequent assessments.
- Identify total area by land-use categories.

- Compare the land use of the corridors that would be changed in ESRP Chapters 4.0 and 5.0 with land use within the region as described in ESRP 2.2.3.

(2) Identify the following characteristics of the transmission corridors, access corridors, and offsite areas:

- waterways, highways, roads, railroads, airports, and airplane flight paths
- natural gas, electrical transmission lines, communication lines, and other utilities
- golf courses and picnic, swimming, fishing, boating, and other recreational areas
- residential areas and industrial or commercial facilities
- Federal, State, regional, local, and Native American tribal land-use plans
- special land-use classifications.

IV. EVALUATION FINDINGS

The reviewer should ensure that the land-use information is adequate as a basis for assessing the effects of construction and operation of transmission lines, access corridors, and offsite areas. The reviewer should use the site visit and consultation with appropriate Federal, State, regional, local, and affected Native American tribal agencies to assess the accuracy of the land-use designations.

The depth and extent of the input to the EIS should be governed by the land-use characteristics of the transmission corridors and offsite areas in which the plant is to be located and the potential land-use impacts of plant construction and operation.

The information should be presented in a concise form. Data should be given in tables showing land use in the transmission corridors, access corridors, and offsite areas.

The following information should be included:

- a brief description of the characteristics of the transmission corridors, access corridors, and offsite areas
- a tabulation of the areas dedicated to each land-use category in the transmission corridors, access corridors, and offsite areas. Information on transmission corridors should be subdivided into corridor segments having predominantly similar land uses. The tabulations may be supplemented by land-use maps as necessary for clarity. The tabulations required for ESRPs 2.2.1, 2.2.2, and 2.2.3 should be combined into a single table.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51, Appendix A, "Format for Presentation of Material in Environmental Impact Statements."

10 CFR 51.71, Draft environmental impact statement contents.

Council on Environmental Quality (CEQ). 1981. "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations." 46 *Federal Register*, 8026-18037.

U.S. Geological Survey (USGS). 1997. *USGS Land Use and Land Cover Data*. USGS Earth Resources Observation Data Center, Sioux Falls, South Dakota.

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). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.



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

2.2.3 THE REGION

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review and description of land use in the region^(a) of the site. The scope of the review directed by this plan should include establishing the nature and extent of existing and planned land use within the region that might be impacted or modified as a result of construction or operation of the proposed project.

Review Interfaces

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

- ESRP 2.2.1. Obtain land-use information and categories.
- ESRPs 2.5.2, 3.1, 4.2.2, 4.4, 5.4.1, and 5.8.1. Provide regional land-use data as required to allow these ESRP reviewers to complete their descriptions or impact assessments.

(a) For the purpose of these environmental reviews, the "region" is defined as an area within an 80-km (50-mi) radius of the station site, but excluding the "site and vicinity" (defined in ESRP 2.2.1).

October 1999

2.2.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- maps showing major land use within the site boundary. Land-use categories should be consistent with those defined by the U.S. Geological Survey (USGS 1997) (from the environmental report [ER], consultation with resource agencies, and USGS [1997]).
- land areas (hectares) devoted to major uses within the site boundary (from the ER)
- principal agricultural products of the region and average annual yields (from the ER)
- maps showing the major transportation and utility networks within the region (from the ER)
- maps showing major public and trust land areas in the region (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of land use in the region are based on the relevant requirements of the following:

- 10 CFR 51.71(d) with respect to analysis requirements to be included in environmental impact statements (EISs) prepared by NRC
- 10 CFR 51, Appendix A(7), with respect to discussion in EISs prepared by NRC of possible conflicts between alternatives and the objectives of applicable land-use plans.

Regulatory positions and specific criteria necessary to meet the regulations identified above are provided in

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's description of land use in the region is discussed in the following paragraph:

NRC's regulations implementing NEPA provide that NRC EISs are to include a section discussing the environmental consequences of alternatives (10 CFR 51, Appendix A[7]). The section is to include a discussion of "possible conflicts between the alternatives and the objectives of Federal, State, regional, and local (and in the case of a reservation, Native American tribal) land-use plans,

policies, and controls for the area concerned.” In addition, the regulations provide that due consideration is to be given in an EIS to compliance with applicable zoning and land-use regulations (10 CFR 51.71[d]).

Guidance on (1) what constitutes a land-use plan or policy, and (2) how an agency should handle potential conflicts between a proposal and the objectives of land-use plans is provided by the Council on Environmental Quality (CEQ) in Question 23 of “Forty Most Asked Questions” (CEQ 1981). With regard to what constitutes a land-use plan or policy, CEQ states on page 18033 that

the term “land-use plans” includes all types of formally adopted documents for land-use planning, zoning and related regulatory requirements. Local general plans are included, even though they are subject to future change. Proposed plans should also be addressed if they have been formally proposed by the appropriate government body in a written form, and are being actively pursued by officials of the jurisdiction. Staged plans, which must go through phases of development ... should also be included even though they are incomplete.

With respect to how an agency should handle potential conflicts between a proposal and the objectives of land-use plans, CEQ states on page 18033 (CEQ 1981) that

the agency should first inquire of other agencies whether there are any potential conflicts. If there would be immediate conflicts, or if conflicts could arise in the future when the plans are finished ... the EIS must acknowledge and describe the extent of those conflicts. If there are any possibilities of resolving the conflicts, these should be explained as well. The EIS should also evaluate the seriousness of the impact of the proposal on the land-use plans and policies, and whether, or how much, the proposal will impair the effectiveness of land-use control mechanisms for the area. Comments from officials of the affected area should be solicited early and should be carefully acknowledged and answered in the EIS.

III. REVIEW PROCEDURES

The reviewer’s analysis of land-use characteristics should be closely linked with the impact assessment review described in ESRPs Chapters 4.0 and 5.0 to establish the land-use characteristics most likely to be affected by the proposed project. With this in mind, the reviewer should take the following steps:

- (1) Identify present land use within the region according to the categories defined by the USGS (1997):
 - Determine the level of detail used in selecting land-use categories in consultation with the reviewers for construction and operational impacts on land use and socioeconomics and with the reviewer for radiological impacts.
 - Provide land-use categories for the entire region.

- Include all land-use categories used by the reviewer of ESRP 2.2.1.

(2) Identify the following characteristics of the region:

- major waterways, highways, roads, railroads, airports, and other transportation routes within the region. Of particular interest are those routes that would be used during construction or operation of the proposed project and routes that could be affected by construction or operational activities.
- electric-transmission corridors and other utility rights-of-way (e.g., natural gas line corridors) within the region
- principal agricultural products, crop areas, and average annual yields
- special land-use classifications within the region (e.g., Native American or military reservations, wild and scenic rivers, State and national parks, national forests, designated coastal-zone areas, wildlife refuges, and wilderness areas)
- Federal, State, regional, local, and Native American tribal land-use plans.

IV. EVALUATION FINDINGS

The reviewer should ensure that the information is adequate as a basis for assessing the effects of the proposed project construction and operation on regional land use and accounts for all major regional land uses. The reviewer should consult with appropriate Federal, State, regional, local, and affected Native American tribal agencies to assess the accuracy of the land-use designations and should ensure that the regional land-use categories are consistent with those selected for ESRP 2.2.1.

The depth and extent of the input to the EIS should be governed by the land-use characteristics of the region in which the station is located and the potential land-use impacts of the proposed project construction and operation.

The information for ESRP 2.2.3 should be presented in a concise form, and should include the following:

- a brief description of the land-use characteristics of the region
- a tabulation of the areas dedicated to each land-use category in the region. The tabulations may be supplemented by land-use maps as necessary for clarity. The tabulations required for ESRPs 2.2.1, 2.2.2, and 2.2.3 should be combined into one table.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51, Appendix A, "Format for Presentation of Material in Environmental Impact Statements."

10 CFR 51.71, Draft environmental impact statement—contents.

Council on Environmental Quality (CEQ). 1981. "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations." 46 *Federal Register*, 18026-18037.

U.S. Geological Survey (USGS). 1997. *USGS Land Use and Land Cover Data*. USGS Earth Resources Observation Data Center, Sioux Falls, South Dakota.



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

2.3 WATER

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portions of the environmental impact statement (EIS) that address hydrological and water-quality issues. The scope of the paragraph covered by this plan introduces the material to be presented from the reviews conducted under ESRPs 2.3.1, 2.3.2, and 2.3.3.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

The introductory paragraph prepared under this ESRP should be consistent with the intent of the following regulation:

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

October 1999

2.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's hydrological and water quality program is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 2.3.1, 2.3.2, and 2.3.3. This paragraph should list the types of information to be presented and describe the relationships of this information to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

2.3.1 HYDROLOGY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the surface-water bodies and groundwater aquifers that could affect the plant-water supply and effluent disposal or that could be affected by plant construction or operation of the proposed project, including transmission corridors and offsite facilities. The scope of the review directed by this plan includes consideration of site-specific and regional data on the physical and hydrological characteristics of ground and surface water in sufficient detail to provide the basic data for other reviews addressing the evaluation impacts on water bodies, aquifers, aquatic ecosystems, and social and economic structures of the area.

Review Interfaces

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

- ESRP 2.3.2. Obtain descriptions of the region's water uses (e.g., the location and nature of water users and water-use areas) for the area surrounding the proposed plant site (for the purpose of determining the level of detail required for the description of the hydrology).
- ESRPs 2.3.2, 2.3.3, 2.4.2, 3.4.2, 4.1.1 through 4.1.3, 4.2.1, 4.2.2, 4.3.1, 4.3.2, 5.2.1, 5.2.2, 5.3.1.1, 5.3.1.2, 5.3.2.1, 5.3.2.2, 5.4.1, 5.5.1, 5.5.2, 6.1, 6.3, 6.6, and 9.4.1. Provide descriptive information in ESRP 2.3.1 in sufficient detail to support the descriptions and assessments given in these ESRPs.

October 1999

2.3.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts and distance from the site. General, surface-water, and groundwater data and information should be obtained as described in the following sections. The following general^(a) data or information should be obtained:

- maps (including digital databases such as a Geographic Information System [GIS]) of sufficient detail to show the relationship of the site to major hydrological systems that could affect or be affected by plant construction or operation (from the environmental report [ER] and the general literature)
- for surface-water bodies used as a heat sink, maximum, average-maximum, average, average-minimum, and minimum monthly temperature of the water body (from the ER and the general literature)
- for surface-water bodies and wetlands, estimated erosion characteristics and sediment transport, including rate, bed, and suspended load fractions, and gradation analyses; a description of the floodplain^(b) and its relationship to the site; a description of wetlands and their relationship to the site; the design-basis flood (DBF) elevation; and, where applicable, the DBF discharge (from the ER and the general literature).

Surface-water data and information to be obtained fall under three categories: freshwater streams, lakes and impoundments, and estuaries and oceans.

The following data and information about freshwater streams (for the watershed containing the site) should be obtained:

- a list of major streams, size of drainage areas, and gradient (from the ER and consultation with Federal, State, regional, local, and Native American tribal agencies)

(a) Features necessary to describe the hydrosphere but that do not provide a basis for assessing impacts need not be described in great detail.

(b) "Floodplain" is defined as the lowland and relatively flat areas adjoining inland and coastal waters, including floodplain areas of offshore islands. This includes, at a minimum, that area subject to a 1% or greater chance of flooding in any given year. The base floodplain shall be used to designate the 100-year floodplain (1% chance floodplain). The critical action floodplain is defined as the 500-year floodplain (0.2% chance floodplain) (from Executive Order 11988, "Floodplain Management").

- maximum, average maximum, average, average minimum, and minimum monthly flow (from the ER and the general literature)
- flood frequency distributions (from the ER and the general literature), including levee failures (from the ER and the general literature)
- flood control measures (reservoirs, levees, flood forecasting) (from the ER, the general literature, and the site visit)
- historical drought stages and discharges by month, and the 7-day once-in-10-years low flow (from the ER and the general literature)
- important short-duration flow fluctuations (e.g., diurnal release variations from peaking operation of upstream hydroelectric project) (from the ER and consultation with local agencies)
- within the influence of the intake and discharge structures, velocity distribution (horizontal and vertical), bathymetry at and near the intake structure, bathymetry at and downstream of the discharge structure, and stream cross-sections (from the ER)
- other hydrographic modifications (e.g., diversion dams, channelization) (from the ER and site visit)
- a list of wetlands and floodplains and their seasonal characteristics.

The following data and information about lakes and impoundments should be obtained:

- a description of lake or impoundment (from the ER and site visit)
- where influenced by the intake or discharge structures, or vice versa, size, location, and elevation of outlets (from the ER and the general literature)
- where influenced by the intake or discharge structures, or vice versa, elevation-area-capacity curves (from the ER and the general literature)
- a summary description of reservoir operating rules (from the ER and consultation with local agencies)
- annual yield and dependability (from the ER and consultation with local agencies)
- variations in inflows, outflows, water surface elevations, and storage volumes and retention time (from the ER and the general literature)
- net loss, including evaporation and seepage (from the ER and the general literature)

- current patterns, including frequency distributions of current speed, direction, and persistence (from the ER and the general literature)
- temperature distribution (horizontal and vertical) and stratification and seasonal variations of density-induced currents (from the ER)
- detailed bathymetry in vicinity of station intake and outfall (from the ER).

The following data and information about estuaries and oceans should be obtained:

- shoreline and bottom descriptions, including seasonal variations due to sediment transport (from the ER and site visit)
- tidal current patterns (velocities and phases), range, and excursion (from the ER and the general literature)
- nontidal circulation patterns, including frequency distributions of current speed, direction, and persistence (from the ER and the general literature)
- temperature and salinity distribution (horizontal and vertical), including temporal variations (from the ER and the general literature)
- detailed bathymetry in the vicinity of the station intake and outfall (from the ER)
- for estuaries, maximum, average maximum, average, average minimum, and minimum monthly river discharge and flushing characteristics (from the ER and the general literature).

The following groundwater data and information should be obtained:

- the areal extent of aquifers, recharge and discharge areas, elevation and depth, and geologic formations (from the ER and the general literature)
- piezometric contour maps and hydraulic gradients (historical, if available, and current) (from the ER and the general literature)
- flow travel times (from the ER and the general literature)
- soil properties, including permeabilities or transmissivities, storage coefficients or specific yields, total and effective porosities, clay content, and bulk densities (from the ER and the general literature)
- interactions between site surface and groundwaters (from the ER and the general literature)

- historical and seasonal trends in groundwater elevation or piezometric levels; interactions between different aquifers (from the ER and the general literature)
- recharge rates, soil moisture characteristics, and moisture content in vadose zone
- existence of any local aquifers designated or proposed to be designated as “sole source aquifers.”

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the hydrology at the proposed plant site are based on the relevant requirements of the following:

- 33 CFR 322 with respect to definition of activities requiring permits
- 33 CFR 330, Appendix A, with respect to conditions, limitations, and restrictions on construction activities
- 40 CFR 6, Appendix A, with respect to procedures on floodplain and wetlands protection
- 40 CFR 122 with respect to the National Pollutant Discharge Elimination System (NPDES) permit conditions for discharges, including stormwater discharges
- 40 CFR 124 with respect to the NPDES process
- 40 CFR 227 with respect to criteria for evaluating environmental impacts
- 40 CFR 149 with respect to possible supplemental restrictions on waste disposal and water use in or above a sole source aquifer
- State and Native American tribal water laws and water rights.

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

- Compliance with environmental quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of the environmental impacts in striking an overall benefit-cost balance. When no

such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) will establish its own impact determination.

- Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In Jefferson County PUD #1 vs. Department of Ecology (U.S. Supreme Court Case), the United States Supreme Court granted the States additional authority to limit hydrological alterations beyond the State's role in regulating water rights.
- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs including hydrology, water-use, and water-quality issues.

Technical Rationale

The technical rationale for evaluating the applicant's description of the area's hydrology is discussed in the following paragraph:

A detailed and thorough description of the hydrologic environment is essential for the evaluation of potential impacts to the environment that may result from plant construction or operation. This ESRP provides the key background material that is essential for understanding the impacts on water use, water quality, land use, ecological systems, and monitoring programs.

III. REVIEW PROCEDURES

The reviewer's analysis of hydrology will be closely linked with the environmental reviews described by ESRP Chapters 3.0, 4.0, 5.0, and 6.0 to establish the hydrological characteristics that are most likely to be affected and the adequacy of the related monitoring programs. The reviewer should take the following steps:

- (1) Identify the monthly and annual ranges and averages, and the historical extremes of the physical and hydrological characteristics of the hydrosphere potentially affecting or affected by plant construction and operation.
- (2) Adjust the historical data to present or known future conditions (e.g., reservoirs built and operated during the period of record, scheduled construction of dams).
- (3) Develop data or take measurements using acceptable hydrological techniques if observations are incomplete or unavailable.
- (4) Determine if the site or any plant-related structure or alteration of the natural topography is on a floodplain or wetland.

(5) Use river-basin commissions, State agencies, and Federal agencies, such as the Corps of Engineers and the U.S. Geological Survey (USGS), as possible sources for site-specific data, including the following:

- comprehensive framework studies of water and related lands by river basin planning organizations and regional interagency committees
- reports and data from Federal agencies, including the USGS, Bureau of Reclamation, Natural Resources Conservation Service, Forest Service, Agricultural Research Service, Weather Service, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration (NOAA), Coast Guard, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Federal Highway Administration
- reports and data by regional power administrations such as the Bonneville Power Administration and Tennessee Valley Authority
- STOrage and RETrieval System for Water and Biological Data (STORET) water-quality data for specified geographic area, time period, and water-quality constituents from the EPA
- State 303(d) list
- well logs from water well drillers
- reports and data from State agencies, including ecology, conservation, public health, fish and game, forestry, agriculture, water resources, State lands, State engineer, and highway departments and special natural resources commissions (names and functions vary from State to State), and from Native American tribes
- standard handbooks (Maidment 1992; Linsley, Kohler, and Paulhus 1982; Mays 1996).

The depth and extent of the input to the environmental impact statement (EIS) will be governed by the hydrological resources that could affect or be affected by plant construction or operation and by the nature and magnitude of the expected impacts. With this in mind, the reviewer should take the following steps:

(1) Ensure that

- data are sufficient to provide quantitative information on the hydrological resources potentially affecting or affected by plant construction and operation
- Federal, State, regional, local, and affected Native American tribal agencies appropriate to the objectives of this environmental review have been consulted

- sufficient data are provided for the assessment of anticipated impacts during the period of plant operation.
- (2) Where necessary, evaluate the collection of additional data and the substantiation of methodology used to estimate hydrological parameters.
 - (3) Assess the hydrological descriptions with respect to relevancy, completeness, reliability, and accuracy of input to the impact assessments of other sections.
 - (4) Verify that the measurements and data development programs use accepted hydrological practice (which includes those identified in the references listed in this ESRP).

IV. EVALUATION FINDINGS

The reviewer should verify that sufficient information has been provided to support the analyses required in subsequent reviews.

The depth and extent of the input to the EIS will be governed by the nature of the surface-water bodies and groundwater aquifers in the region and the extent to which they could affect or be affected by plant construction or operation. The following information should be included in the EIS:

- a description of the sources of water to be used by the plant
- a description of the potential impacts of the water bodies on the plant
- a description of the potential impacts of the plant on water bodies.

V. IMPLEMENTATION

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

VI. REFERENCES

33 CFR 322, "Permits for Structures and Work in or Affecting Navigable Waters of the United States."

33 CFR 330, Appendix A, "Nationwide Permit and Conditions."

40 CFR 6, Appendix A, "Statement of Procedures on Floodplain Management and Wetlands Protection."

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 124, "Procedures for Decisionmaking."

40 CFR 149, "Sole Source Aquifers."

40 CFR 227, "Criteria for the Evaluation of Permit Applications for Ocean Dumping of Materials."

Executive Order No. 11988, "Floodplain Management," 42 *Federal Register* 46499 (1977) (see U.S. Water Resources Council for guidelines for implementing EO 11988).

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 152 et seq. (also known as Clean Water Act).

Jefferson County PUD #1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994).

Linsley, R. K., M. A. Kohler, and J. L. H. Paulhus. 1982. *Hydrology for Engineers*, Third Edition, McGraw-Hill Book Company, New York.

Maidment, D., ed. 1992. *Handbook of Hydrology*, McGraw Hill Book Company, New York.

Mays, L. W., ed. 1996. *Water Resources Handbook*. McGraw-Hill Book Company, New York.

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. Water Resources Council, Floodplain Management Guidelines for Implementing E.O. 11988, 43 *Federal Register* 6030 (1978).



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

2.3.2 WATER USE

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of surface-water and groundwater uses that could affect or be affected by the construction or operation of the proposed project, including transmission corridors and offsite facilities. The scope of the review directed by this plan includes (1) consideration of such water uses as domestic, municipal, agricultural, industrial, mining, recreation, navigation, and hydroelectric power, (2) identification of their locations, and (3) quantification of water diversions, consumption, and returns. The review should be limited to present and known future water uses.

Review Interfaces

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

- ESRP 2.2. Obtain descriptions of the regional land uses for the area surrounding the proposed plant site.
- ESRP 2.3.1. Obtain descriptions of the hydrology of the region surrounding the proposed plant site.
- ESRP 2.3.1. Provide descriptions of the regional water uses (e.g., the location and nature of water users and water-use areas) for the area surrounding the proposed plant site (for the purpose of assisting that reviewer in determining the level of detail required for the description of the hydrology).

October 1999

2.3.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 2.3.3, 3.3, 3.3.1, 3.3.2, 4.2, 4.2.1, 4.2.2, 4.3, 4.3.1, 4.3.2, 4.4, 5.2, 5.2.1, 5.2.2, 5.3, 5.3.2.1, 5.3.2.2, 5.4, 5.4.1, 5.5, 5.5.1, 5.5.2, 5.8, 5.8.1, 6.2, 6.3, 6.6, and 9.4.2. Provide descriptive information in ESRP 2.3.2 in sufficient detail to support the descriptions and assessments given in these ESRPs.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts on existing and known future water uses during the period of project operation. The following data or information should be obtained:

- maps (including digital databases such as a Geographic Information System [GIS]) showing the relationship of the site to the major hydrological systems (from the environmental report [ER] and the general literature)
- maps showing the relationship of the site to surface-water bodies that could affect or be affected by plant water use (from the ER and the general literature)
- maps (and cross sections where feasible) showing those portions of groundwater aquifer systems that could be affected by plant withdrawals and/or discharges (from the ER and the general literature)
- quantitative description of present and known future groundwater withdrawals on the site and for distances great enough to cover aquifers that may affect or be adversely affected by the plant. The following should be included for each withdrawal or discharge:
 - location and depth of well with respect to the site (from the ER, the site visit, peer-reviewed technical literature, and consultation with State and local agencies)
 - identification of aquifers (from the ER, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - the average monthly withdrawal rates by use category (from the ER, the site visit, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - identification of any aquifers designated by EPA as sole source aquifers.
- quantitative description of present and known future surface-water uses (withdrawals, consumptions, and returns) that are within the hydrological system in which the site is located and that may affect or be affected by the plant. This should include a quantitative description of any water uses that provide potential liquid pathways for both radiological and nonradiological effluents. The following should be included for each withdrawal or discharge:

- locations of diversions and returns with respect to the site and the water body (from the site visit, the general literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- identification of the water body (from the ER and the general literature)
- the average monthly withdrawal and return rate for each diversion by use category.
- quantitative and qualitative description of recreational, navigational, instream, and other nonconsumptive present and known future water uses. For a 10-km (6-mi) radius, this should include the following (from the ER, site visit, peer-reviewed technical literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies):
 - identification of water bodies and locations with respect to the site (maps may be useful)
 - the kind and location of activity on the water body (maps may be useful)
 - the use rate with time variation.
- summary of statutory and other legal restrictions relating to water use or specific water-body restrictions on water use imposed by Federal or State regulations (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies).
- a water-use diagram for the plant (Rosaler 1994) showing flow rates to and from the various water systems (e.g., circulating water system, sanitary system, radwaste and chemical waste systems, service water systems), points of consumption, and source and discharge locations (from the ER)
- for the water-use diagram, the data and narrative description for maximum water consumption, water consumption during periods of minimum water availability, and average operation by month and by plant operating status (from the ER)
- a description of other station water uses (i.e., all facilities not associated with the proposed plant) showing flow rates to and from the facility, average water consumption, and maximum water consumption (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of water use are based on the relevant requirements of the following:

- 33 CFR 322 with respect to definition of activities requiring permits
- 33 CFR 330, Appendix A, with respect to conditions, limitations, and restrictions on construction activities

- 40 CFR 6, Appendix A, with respect to procedures on floodplain and wetlands protection
- 40 CFR 122 with respect to National Pollutant Discharge Elimination System (NPDES) permit conditions for discharges including storm water discharges
- 40 CFR 149 with respect to possible supplemental restrictions on waste disposal and water use in or above a sole-source aquifer
- Federal, State, regional, local, and Native American tribal water laws and water rights.

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

- Compliance with environmental-quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of the environmental impacts in striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) should establish its own impact determination.
- Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In Jefferson County PUD #1 vs. Department of Ecology (U.S. Supreme Court Case), the United States Supreme Court granted the States additional authority to limit hydrological alterations beyond the State's role in regulating water rights.
- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including hydrology, water-use, and water-quality issues.

Technical Rationale

The technical rationale for evaluating the applicant's description of surface-water and groundwater uses that could affect or be affected by construction or operation is discussed in the following paragraph:

A detailed and thorough description of the regional and plant water use is essential for the evaluation of potential impacts on the environment that may result from plant construction or operation. This

ESRP reviews the key water-use background material that is essential for understanding the impacts on water use, water quality, land use, ecological systems, and monitoring programs during both construction and operation.

III. REVIEW PROCEDURES

The reviewer's analysis of surface-water and groundwater use should consider the aspects of water use that are concerned with consumptive use, nonconsumptive use, and effluent pathways. The depth of analysis will be related to the importance of water use and proximity of the use to the plant. With this in mind, the reviewer should take the following steps:

- (1) Identify consumptive water uses that could affect the water supply of the plant or that may be adversely affected by the plant, including the following important characteristics:
 - water source
 - locations of diversions and returns
 - amount and time variation of use
 - water rights.

- (2) Identify recreational, navigational, and other nonconsumptive water uses, including those that could be affected by transmission line and offsite area construction and operation. The important characteristics to be quantified are
 - location
 - activity
 - amount and time variation of use.

- (3) Identify the water uses that provide potential pathways for both radiological and nonradiological effluents, including the following important characteristics:
 - water sources
 - location of diversions for consumptive uses
 - location of receptors for nonconsumptive uses
 - amount and time variation of use for each.

- (4) In addition to information obtained from the applicant's ER and from responses to subsequent questions to the applicant, use additional sources of data, such as
 - local water supply companies or agencies
 - river basin commissions
 - State agencies (e.g., water resources, fish and wildlife)

- various Federal agencies, such as the Corps of Engineers and the U.S. Geological Survey, and Native American tribal agencies when needed to complete the analysis. Local water users may be questioned during the site visit.
- (5) Using the above information, compile and tabulate water uses by the categories and characteristics described in this ESRP section, but limit the analysis to consideration of present and known future water uses.
- (6) Ensure that water-use data and information are adequate to serve as a basis for assessing the impacts of proposed project construction and operation on consumptive and nonconsumptive water uses.
- (a) In evaluating the adequacy of this material, the reviewer should ensure that data are
- sufficient to provide quantitative information on water-use characteristics to be impacted by construction and operation
 - are adequate to predict water-use impacts to the plant during construction and operation.
- (b) Consult with appropriate Federal, State, regional, local, and affected Native American tribal agencies in making this evaluation.

IV. EVALUATION FINDINGS

The depth and extent of the input to the environmental impact statement (EIS) will be governed by the water uses that could be affected by the proposed project construction or operation (or that may affect the plant) and by the nature and magnitude of the expected impacts to water use. The following information should be included in the EIS:

- a summary of present and known future groundwater withdrawals on the site and for distances great enough to cover potentially affected groundwater aquifers. Appropriate maps or descriptions from ESRP 2.3.1 will be referenced to depict the groundwater hydrology. References to applicable State and Native American tribal water-use laws should also be included.
- a summary of present and known future surface-water uses that are within the hydrological system in which the plant is located and that may affect or be adversely affected by the plant. Appropriate maps or descriptions from ESRP 2.3.1 will be referenced to depict the surface-water hydrological system being used. References to applicable State and Native American tribal water-use laws should also be included.
- a summary of present and known future recreational, navigational, and other nonconsumptive water uses (maps may be useful).

V. IMPLEMENTATION

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

VI. REFERENCES

33 CFR 322, "Permits for Structures and Work in or Affecting Navigable Waters of the United States."

33 CFR 330, Appendix A, "Nationwide Permit and Conditions."

40 CFR 6, Appendix A, "Statement of Procedures of Floodplain Management and Wetlands Protection."

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 149, "Sole Source Aquifers."

Federal Water Pollution Control Act (FWCPA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Jefferson County PUD #1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994).

Rosaler, R. (ed.). 1994. *Standard Handbook of Plant Engineering*, Second Edition, McGraw-Hill, New York.

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**

OFFICE OF NUCLEAR REACTOR REGULATION

2.3.3 WATER QUALITY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the water-quality characteristics of surface-water bodies and groundwater aquifers that could (1) affect plant-water use and effluent disposal or (2) be affected by the construction or operation of the proposed project. The scope of the review directed by this plan should include consideration of site-specific and regional data on the physical, chemical, and biological water-quality characteristics of ground and surface water in sufficient detail to provide the basic data for other reviews dealing with the evaluation of construction or operational water-quality impacts to water bodies, aquifers, aquatic ecosystems, and water use.

Review Interfaces

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

- ESRP 2.3.1. Obtain descriptions of the hydrology of the region surrounding the proposed plant site.
- ESRP 2.3.2. Obtain descriptions of the regional water uses (e.g., the location and nature of water users and water-use areas) for the area surrounding the proposed plant site.
- ESRP 2.4.2. Provide sufficient detail in this ESRP to support the description of the aquatic environment in ESRP 2.4.2.

October 1999

2.3.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 3.3.1 and 3.3.2. Provide descriptive water-quality information in these ESRPs in sufficient detail to support the descriptions of the plant water treatment in ESRPs 3.3.1 and 3.3.2.
- ESRP 3.6. Provide descriptive water-quality information in this ESRP in sufficient detail to support the description of the characteristics of the plant water treatment systems discharge in ESRP 3.6.
- ESRPs 4.2.2, 4.3.2, 5.2.2, 5.3, and 5.5. Provide descriptive water-quality information in these ESRPs in sufficient detail to support the assessment of the water-use and aquatic ecosystem impacts of plant construction and operation proposed by the reviewers for ESRPs 4.2, 4.3, 5.2, 5.3, and 5.5.
- ESRPs 6.5.2 and 6.6. Provide descriptive water-quality information in these ESRPs in sufficient detail to support the assessment of the adequacy of the baseline aquatic ecology and water-quality monitoring program in ESRPs 6.5.2 and 6.6.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors. The degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data and information should be obtained:

- the mean, range, and temporal and spatial variations of the surface-water and groundwater-quality characteristics
 - For surface waters: water temperature, suspended solids, total dissolved solids, hardness, turbidity, color, odor, conductivity, dissolved oxygen, biological oxygen demand (BOD), chemical oxygen demand (COD), phosphorus forms (total and orthophosphate), nitrogen forms (ammonia, nitrate, nitrite, organic), alkalinity, chlorides, sulfate, sodium, potassium, calcium, magnesium, heavy metals (e.g., Hg, Pb), pH, phytoplankton (chlorophyll *a*), and indicator microorganisms (e.g., total coliform, fecal coliforms, fecal streptococci) (from the environmental report [ER] and from consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - For groundwaters: the above surface-water data, minus phytoplankton and with silica, iron, carbon dioxide, and bicarbonate added (from the environmental report [ER] and from consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- other site-specific water-quality characteristics (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- descriptions, such as 303(d) lists, of pre-existing aquatic environmental stresses and their effects on surface or groundwater quality for waters that interact with the plant (e.g., water bodies at or near the site that do not meet established water-quality standards) (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)

- descriptions of pollutant sources with discharges to water that may interact with the plant, including locations relative to the site and the affected water bodies, and the magnitude and nature of the pollutant discharges, including spatial and temporal variations (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- comparison of standard practices to plant waste water treatment system (AWWA 1990)
- State 303(d) lists of impaired waters.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of water quality in water bodies affected by the proposed project are based on the relevant requirements of the following:

- 33 CFR 322 with respect to definition of activities requiring permits
- 33 CFR 330, Appendix A, with respect to conditions, limitations, and restrictions on construction activities
- 40 CFR 6, Appendix A, with respect to procedures on floodplain and wetlands protection
- 40 CFR 122-133 with respect to the National Pollutant Discharge Elimination System (NPDES) permit conditions for discharges including storm-water discharges
- 40 CFR 147 with respect to restrictions on waste disposal options
- 40 CFR 149 with respect to possible supplemental restrictions on waste disposal and water use in or above a sole source aquifer
- 40 CFR 165 with respect to the disposal and storage of pesticides and pesticide containers
- 40 CFR 227 with respect to criteria for evaluating environmental impacts
- 40 CFR 403 with respect to waste effluents
- 40 CFR 423 with respect to effluent limitations on existing and new point sources
- 40 CFR 700-716 with respect to practices and procedures for managing toxic chemicals
- State and Native American tribal water laws and water rights.

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

- Compliance with environmental quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC should consider the assessment in its determination of the magnitude of the environmental impacts in striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (to the degree possible in conjunction with the permitting authority and other agencies having relevant expertise) should establish its own impact determination.
- Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In Jefferson County PUD #1 vs. Department of Ecology (U.S. Supreme Court Case), the U.S. Supreme Court granted the States additional authority to limit hydrological alterations beyond the State's role in regulating water rights.
- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including hydrology, water-use, and water-quality issues.

Technical Rationale

The technical rationale for evaluating the applicant's description of water-quality characteristics, surface-water bodies, and groundwater aquifers is discussed in the following paragraph:

A detailed and thorough description of the water quality is essential for evaluating potential impacts to the environment that may result from plant construction or operation. This ESRP contains background water-quality material that is essential for understanding the impacts on water use, water quality, land use, ecological systems, and monitoring programs during both construction and operation.

III. REVIEW PROCEDURES

The reviewer's analysis of water quality should be closely linked with the reviews described in the Review Interfaces section of this ESRP to ensure that the physical, chemical, and biological water-quality parameters that could affect or be affected by plant construction or operation have been described. With this in mind, the reviewer should take the following steps:

- (1) Identify the location and spatial distribution of the physical, chemical, and biological characteristics, the monthly and annual ranges, and the historical extremes of those water-quality characteristics that could potentially affect or be affected by plant construction or operation.

- Adjust the data for present day conditions.
- If historical observations are incomplete or unavailable for the locations of concern, obtain these data through consultation with the applicant or with appropriate resource agencies.

(2) Determine the presence of environmental stresses related to existing water quality.

- Determine stresses on the bases of the quality criteria requirements of other water users, as indicated by the approved water-use classification (such as 303(d) lists) or water-resource planning documents for the water body in question.
- As part of the determination, consult the historical literature addressing water-quality issues for the water body in question.

(3) When applicable, discuss the water-quality conditions, water rights, and agreements as they affect water-quality and water-resource plans for the site and vicinity with Federal, State, regional, local, and affected Native American tribal water resource and pollution control and monitoring agencies.

(4) Obtain the information primarily from the applicant's

- ER
- responses to questions to the applicant
- consultation with Federal, State, regional, local, and affected Native American tribal agencies.

Use sources of data, such as river basin planning organizations, and State and Federal agencies, such as the EPA, the U.S. Army Corps of Engineers, and the U.S. Geological Survey, if additional information or verification is deemed necessary.^(a)

(a) If site-specific data are unavailable, the following sources are recommended:

- comprehensive framework studies of water and related lands by river-basin planning organizations and regional interagency committees
- Storage and Retrieval System for Water and Biological Data (STORET) water-quality data, time period, and water-quality constituents from the EPA
- reports and data from State agencies, including ecology, conservation, public health, fish and game, forestry, agriculture, water resources, State lands, State engineer, and highway departments and special natural resources commissions (names and functions vary from State to State), and from Native American tribes.

(5) Ensure that

- data are sufficient to provide quantitative information on the physical, chemical, and biological water-quality characteristics potentially affecting or affected by plant construction or operation
- the water-quality descriptions are sufficient, with respect to relevancy, completeness, reliability, and accuracy for input to the impact assessments of other sections
- Federal, State, regional, local, and affected Native American tribal agencies appropriate to the objectives of this environmental review have been consulted.

(6) When evaluating the adequacy of this material,

- consult the applicable standards and guides for this environmental review and use the site visit and/or consultations to permitting agencies to evaluate the completeness of the water-quality descriptions
- evaluate, when necessary, the collection of additional data, the verification of data, and the substantiation of the methodology used to estimate water-quality parameters.

(7) Include the appropriate depth and extent of the input to the environmental impact statement (EIS) as governed by the water-quality characteristics that could affect or be affected by plant construction or operation and by the nature and magnitude of the expected impacts. The following information should be included as input to the EIS:

- descriptions of site and vicinity surface-water and groundwater quality that could affect or be affected by plant construction and operation. The description may consist of statistical summaries of the water-quality characteristics, including mean, mean low and high, and historical low and high values (as available) for the site and vicinity. The data included should be commensurate with the anticipated impacts. Figures may be used to show long-term and seasonal trends, such as variations in dissolved oxygen and nutrient concentrations and pH variations.
- a description of the water-quality-related environmental stresses in the site and vicinity.

IV. EVALUATION FINDINGS

The reviewer should verify that sufficient information has been provided to support the analyses required in subsequent reviews.

The depth and extent of the input to the environmental impact statement (EIS) will be governed by the nature of the surface-water bodies and groundwater aquifers in the region and the extent to which they could affect or be affected by plant construction or operation. The following information should be included in the EIS:

- a description of the applicable water quality regulations
- a description of the existing water quality in vicinity of the plant
- a description of the potential impacts of the water on plant operations
- a description of the potential impacts of the plant on water quality.

V. IMPLEMENTATION

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

VI. REFERENCES

33 CFR 322, "Permits for Structures and Work in or Affecting Navigable Waters of the United States."

33 CFR 330, Appendix A, "Nationwide Permit and Conditions."

40 CFR 6, Appendix A, "Statement of Procedures on Floodplain Management and Wetlands Protection."

40 CFR 122-133, Relevant sections of "The NPDES Pollution Elimination System."

40 CFR 147, "State Underground Injection Control Programs."

40 CFR 149, "Sole Source Aquifers."

40 CFR 165, "Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers."

40 CFR 227, "Criteria for the Evaluation of Permit Applications for Ocean Dumping of Material."

40 CFR 403, "General Pretreatment Regulations for Existing and New Sources of Pollution."

40 CFR 423, "Steam Electric Power Generating Point Source Category."

40 CFR 700-716, Relevant sections of "Toxic Substances Control Act."

American Water Works Association (AWWA). 1990. *Water Quality and Treatment*, 4th Edition, McGraw-Hill, New York.

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1252 et seq. (also known as Clean Water Act).

Jefferson County PUD #1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994).

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**
 OFFICE OF NUCLEAR REACTOR REGULATION

2.4 ECOLOGY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the ecological description portions of the environmental impact statement (EIS). The scope of the paragraph covered by this plan introduces the material to be presented from the reviews conducted under ESRPs 2.4.1 and 2.4.2.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

The introductory paragraph prepared under this ESRP should be consistent with the intent of the following regulation:

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

October 1999

2.4-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's ecology description application of this criterion is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 2.4.1 and 2.4.2. This paragraph should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



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

2.4.1 TERRESTRIAL ECOLOGY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the terrestrial environment and biota of the site, transmission corridors, and offsite areas likely to be impacted by the construction, maintenance, or operation of the proposed project. This review should provide input to reviews dealing with evaluation of construction or operational impacts on terrestrial ecosystems and to other reviews that are concerned with land use.

The scope of the review directed by this plan includes identification and description of species composition, spatial and temporal distribution, abundance, and other structural and functional attributes of biotic assemblages that could be impacted by the proposed action. The scope should also include the identification of any "important" terrestrial natural resources (see Table 2.4.1-1 on p. 2.4.1-7) and the location of wildlife sanctuaries and natural areas that might be impacted by the proposed action.

Review Interfaces

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

- ESRP 2.2.1. Obtain information about land use of the site and vicinity to complete the description of the site's terrestrial ecology.
- ESRP 2.2.2. Obtain information about land use of the transmission line corridors, access corridors, and other pertinent offsite areas to complete the description of the site's terrestrial ecology.

October 1999

2.4.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.8. Provide appropriate information on the principal terrestrial ecological features of the site and vicinity in sufficient detail to allow for an evaluation of the cumulative impacts to the terrestrial ecosystems resulting from related Federal project activities.
- ESRP 4.1.1. Provide appropriate information on the principal terrestrial ecological features of the site and vicinity in sufficient detail to allow for an evaluation of land-use impacts resulting from site and vicinity construction.
- ESRP 4.1.2. Provide appropriate information on the principal terrestrial ecological features of the transmission corridors and offsite areas in sufficient detail to allow for an evaluation of land-use impacts resulting from transmission corridor and other offsite facility construction.
- ESRP 4.3.1. Provide information on the principal terrestrial ecological features of the site and vicinity in sufficient detail to allow for an evaluation of the impacts on the terrestrial ecosystems resulting from construction.
- ESRPs 5.1.1 and 5.1.2. Provide information on the principal terrestrial ecological features of the site and vicinity in sufficient detail to allow for an evaluation of land-use impacts resulting from operation of the power station.
- ESRP 5.3.3.2. Provide information on the site's terrestrial ecology so that a description of impacts on the terrestrial ecosystem from operation of the heat-dissipation systems can be completed.
- ESRP 5.4.4. Provide information on the principal terrestrial ecological features of the site and vicinity in sufficient detail to allow for the evaluation of the radiological impacts on the terrestrial ecosystem due to normal plant operation.
- ESRP 5.6.1. Provide information on the site's terrestrial ecology so that an evaluation of impacts on the terrestrial ecosystem from operation or maintenance of the transmission system can be completed.
- ESRP 6.5.1. Provide information on the principal terrestrial ecological features of the site and vicinity in sufficient detail to allow for the evaluation of the terrestrial monitoring programs.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. Refer to Table 2.4.1-1 (see p. 2.4.1-7) for a listing of species and habitat criteria for designation of "important" species and resources. The following data or information should be obtained:

- a map that identifies "important" terrestrial habitats on and in the vicinity of the site

- a description and map of the area occupied by each natural and man-made habitat type (from the environmental report [ER])
- U.S. Geological Survey (USGS) topographic maps of the site (7½ min. scale, when available) (from the general literature)
- list and description of “important” species and their spatial and temporal distributions on and in the vicinity of the site, including, as appropriate, their relative abundance, critical habitat, and their life histories—critical life stages, biologically significant activities, seasonal habitat requirements and population fluctuations, food chain, and other interspecific relationships (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- list of species that are of concern as disease vectors or pests. Detailed field surveys of such species are not needed (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies).
- a qualitative estimate of the importance of habitat of threatened, endangered, and other “important” species on and in the vicinity of the site relative to the habitat of such species throughout their entire range (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- locations of travel corridors for “important” terrestrial species and alternate routes for those corridors that could potentially be blocked by use of the site (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- a description of natural and man-induced effects (e.g., farming, logging, grazing, burning), preexisting environmental stresses (e.g., infestations, epidemics, catastrophes), and the current ecological conditions that are indicative of such stresses (from the ER)
- a description and location of any ecological or biological studies of the site or its environs that are recent or currently in progress (from the ER and the general literature)
- documentation that the applicant has consulted with the appropriate Federal and State agencies (e.g., as required by the Fish and Wildlife Coordination Act) and affected Native American tribes (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies).

The following data and information about transmission corridors and offsite areas should be obtained:

- a list of “important” terrestrial habitats and a map that identifies these habitats along routes of transmission and access corridors from the station site to interconnecting points on the high voltage system

- major vegetation types within the proposed corridors (from the ER, site visit, and through consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- a list of "important" species known to occur within and adjacent to the proposed corridors, their spatial and temporal distributions, critical habitats (as appropriate), and their life histories (including critical life stages, biologically significant activities, seasonal habitat requirements and population fluctuations, food chain and other interspecific relationships) (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- where proposed transmission lines cross important waterfowl areas, a list of descriptions of these areas and data on the local abundance and distribution of waterfowl, their seasonal status, and local flight patterns (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- lists of species that are of concern as disease vectors or pests. Detailed field surveys of such species are not needed (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- a more-detailed examination of any segment of the rights-of-way determined to be particularly sensitive to impacts of construction
- a summary of any preexisting environmental stress from such sources such as pollutants, as well as pertinent ecological conditions suggestive of such stresses. A discussion of histories of any infestations, epidemics, or catastrophes (caused by natural phenomena) that have had a significant impact on biota in the vicinity of the transmission corridors should also be included.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of terrestrial ecology on and in the vicinity of the site and transmission corridors are based on the relevant requirements of the following:

- 10 CFR 51.75 with respect to descriptions of the environment affected by the issuance of a construction permit
- 10 CFR 52, Subpart A, with respect to descriptions of the environment affected by the issuance of an early site permit
- 10 CFR 51.95 with respect to the preparation of supplemental environmental impact statements (EISs) in support of the issuance of an operating license
- Bald and Golden Eagle Protection Act with respect to the prohibition of taking, possessing, selling, transporting, importing, or exporting the bald or golden eagle, dead or alive, without a permit

- Endangered Species Act of 1973 with respect to identifying threatened and endangered species, critical habitats, formal or informal consultation with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service
- Fish and Wildlife Coordination Act of 1958 with respect to consideration of fish and wildlife resources in the planning of development projects that affect water resources
- Migratory Bird Treaty Act with respect to declaring that it is unlawful to take, import, export, possess, buy, sell, purchase, or barter any migratory bird. Feathers or other parts of nests and eggs, and products made from migratory birds are also covered by the Act. "Take" is defined as pursuing, hunting, shooting, poisoning, wounding, killing, capturing, trapping, or collecting.

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

- Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (NRC 1998), contains guidance concerning the ecological systems and biota at potential sites and their environs should be sufficiently well-known to allow reasonably certain predictions that there would be no unacceptable or unnecessary deleterious impacts on populations of important species or on ecological systems with which they are associated from the construction or operation of a nuclear power station at the site. The reviewer should ensure that the applicant's description of the site and transmission corridors identifies important species or ecological systems that could potentially be impacted by station and transmission corridor construction or operation.
- Regulatory Guide 4.11, Rev. 1, *Terrestrial Environmental Studies for Nuclear Power Stations* (NRC 1977), contains technical information for the design and execution of terrestrial environmental studies, the results of which may be appropriate for inclusion in the applicant's ER. The reviewer should ensure that the appropriate results are included in the ER.

Technical Rationale

The technical rationale for evaluating the applicant's description of the area's terrestrial ecology is discussed in the following paragraph:

A detailed and thorough description of the terrestrial ecology in the vicinity of the power station site and associated transmission corridors is essential for the evaluation of potential impacts to the terrestrial environment that may result from plant construction or operation. Use of these acceptance criteria should help ensure inclusion of the terrestrial ecological attributes most needed to predict impacts.

III. REVIEW PROCEDURES

The reviewer should ensure that the ecological information is adequate to serve as a basis for assessment of the impacts of design and siting of the plant, and plant construction and operation. In evaluating the adequacy of the description of terrestrial resources of the site and offsite areas, the reviewer should consult the applicable acceptance criteria of this ESRP. Within these criteria, the reviewer will find a framework of those descriptive features of terrestrial resources judged adequate for most situations of nuclear power station siting. The reviewer should also become familiar with the provisions of the legislation listed in this ESRP.

With these guidelines in mind, the reviewer should take the following steps:

- (1) Identify the species and habitats that will be considered "important" ecological resources of the site, vicinity, transmission corridors, and offsite areas for evaluation of potential impacts on them, using Table 2.4.1-1 as a reference.
- (2) Consult with local offices of the appropriate Federal, State, regional, local, and affected Native American tribal agencies to determine the possible presence of such species.
- (3) Identify the threatened and endangered species that, based on known distributions, could be present within these areas, but that have not been recorded by documented observations.
- (4) In the case of commercially or recreationally valuable species, list the types of wildlife and plants that could be adversely impacted by the proposed action, and in addition to the applicant's ER, consult with State or local agencies or organizations that maintain records of harvest levels of these species.
- (5) Review the available site-specific data for adequacy, accuracy, and completeness.

IV. EVALUATION FINDINGS

The depth and extent of the input to the EIS should be governed by the kinds of terrestrial ecological resources that could be affected by plant construction or operation and by the nature and magnitude of the expected impacts to these resources. The reviewer should prepare input to the EIS descriptions of the site and offsite areas potentially affected by the proposed project. The input should be brief and should include the following information:

- the principal terrestrial ecological features of the site and vicinity, transmission and access corridors, and offsite areas, with emphasis on the communities that will be potentially affected by proposed project construction, operation, or maintenance. This information should be based on an analysis of at least one full year of data, to reflect seasonal variations in terrestrial populations. Thus, the extent of discussion of various plant and animal communities should be adequate to support the impact assessments for ESRP Chapters 4.0 and 5.0.

Table 2.4.1-1. Important Species and Habitats

| Species | Habitat |
|---|--|
| <p>Rare species</p> <ul style="list-style-type: none"> • Listed as threatened or endangered at 50 CFR 17.11 (Fish and wildlife) or 50 CFR 17.12 (Plants). This information may also be found via the Internet at the U.S. Fish and Wildlife Homepage in GEN&SIS. • Proposed for listing as threatened or endangered, or is a candidate for listing in the most current list of such species as published in the <i>Federal Register</i>. This information may also be found via the Internet at the U.S. Fish and Wildlife Homepage in GEN&SIS. • Listed as a threatened, endangered, or other species of concern by the State or States in which the proposed facilities are located <p>Commercially or recreationally valuable species</p> <p>Species that are essential to the maintenance and survival of species that are rare and commercially or recreationally valuable (as defined previously)</p> <p>Species that are critical to the structure and function of the local terrestrial ecosystem</p> <p>Species that may serve as biological indicators to monitor the effects of the facilities on the terrestrial environment</p> | <p>Wildlife sanctuaries, refuges, or preserves, if they may be adversely affected by plant or transmission line construction or operation</p> <p>Habitats identified by State or Federal agencies as unique, rare, or of priority for protection, if these areas may be adversely affected by plant or transmission line operation and maintenance</p> <p>Wetlands (Executive Order 11990), floodplains (Executive Order 11988), or other resources specifically protected by Federal regulations or Executive Orders, or by State regulations</p> <p>Land areas identified as "critical habitat" for species listed as threatened or endangered by the U.S. Fish and Wildlife Service</p> |

- wildlife sanctuaries, natural areas, and related areas that could be affected
- a discussion of "important" species that may be affected by plant or transmission corridor construction or operation. Estimates of their abundance should be provided when appropriate. Special habitat needs, such as cover, forage, and prey species, should be emphasized if the proposed project would potentially disrupt these needs.
- a summary of the consultations with appropriate Federal, State, regional, local, and affected Native American tribal agencies, including the U. S. Fish and Wildlife Service (through the regional director) and the director of the State Fish and Wildlife agency.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51, Subpart A, "National Environmental Policy Act—Regulations Implementing Section 102(2)."

10 CFR 51.45, "Environmental report."

10 CFR 51.75, "Draft environmental impact statements—production and utilization facilities: draft environmental impact statement—construction permit."

10 CFR 51.95, "Final environmental impact statements—production and utilization facilities: supplement to final environmental impact statement."

10 CFR 52, Subpart A, "Early Site Permits."

10 CFR 52.79, "Contents of application; technical information."

50 CFR 17.11, "Fish and wildlife."

50 CFR 17.12, "Plants."

Bald and Golden Eagle Protection Act of 1940, as amended, 16 USC 668 et. seq.

Endangered Species Act, as amended, 16 USC 1531 et seq.

Executive Order 11988, "Floodplain Management."

Executive Order 11990, "Protection of Wetlands."

Fish and Wildlife Coordination Act Amendment, 16 USC 661 et seq.

Migratory Bird Treaty Act, as amended, 16 USC 703 et seq.

U.S. Nuclear Regulatory Commission (NRC). 1977. *Terrestrial Environmental Studies for Nuclear Power Stations*. Regulatory Guide 4.11, Rev. 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.4.2 AQUATIC ECOLOGY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the aquatic environment and biota at and in the vicinity of the site and other areas likely to be impacted by the construction, maintenance, or operation of the proposed project. This review should provide input to reviews dealing with evaluation of construction or operational impacts on aquatic ecosystems and to other reviews that deal with the aquatic environment.

The scope of the review directed by this plan should include the spatial and temporal distribution, abundance, and other structural and functional attributes of biotic assemblages on which the proposed action could have an impact. The review should also identify any "important" (see Table 2.4.2-1) or irreplaceable aquatic natural resources and the location of sanctuaries and preserves that might be impacted by the proposed actions.

Review Interfaces

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

- ESRP 2.3.1. Obtain information about the hydrology of the site to complete the description of the site and vicinity's aquatic ecology.
- ESRP 2.3.3. Obtain information about water-quality areas to complete the description of the site and vicinity's aquatic ecology.

October 1999

2.4.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 4.3.2. Provide information on the principal aquatic ecological features of the site and vicinity in sufficient detail to allow for an evaluation of the impacts to the aquatic ecosystems resulting from construction.
- ESRP 5.3.1. Provide information on the principal aquatic ecological features of the site and vicinity in sufficient detail to allow for an evaluation of the impacts of the cooling system intake structures.
- ESRP 5.3.1.1. Provide information regarding the site's aquatic ecology so that a description and assessment of the hydrodynamics and physical impacts of the intake structures can be completed.
- ESRP 5.3.1.2. Provide information regarding the site's aquatic ecology so that a description of impacts from operation of the intake system can be completed.
- ESRP 5.3.2. Provide information on the principal aquatic ecological features of the site and vicinity in sufficient detail to allow for an evaluation of the impacts of the cooling system discharge structures.
- ESRP 5.3.2.1. Provide information regarding the site's aquatic ecology so that a description and assessment of the plant's hydrothermal discharge and associated physical impacts can be completed.
- ESRP 5.3.2.2. Provide information regarding the site's aquatic ecology so that a description of impacts from operation of the discharge system can be completed.
- ESRP 5.6.2. Provide information regarding the site's aquatic ecology so that an evaluation of the impacts to aquatic ecosystems from transmission facility operation and maintenance can be completed.
- ESRP 6.5.2. Provide information regarding the site's aquatic ecology so that an evaluation of monitoring programs as they relate to the aquatic ecology of the site can be completed.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- characterization of the aquatic environment of the water body and onsite streams, including the following information categories:

- biological (from the environmental report [ER] and the general literature)
 - hydrological (from ESRP 2.3.1)
 - physiochemical (from ESRP 2.3.3).
- maps showing “important” aquatic habitats (“important” habitat defined in Table 2.4.2-1 [see p. 2.4.2-7]) of the site and vicinity
 - the temporal and spatial (including depth) distribution and abundance of “important” aquatic species, especially in the discharge area and receiving water body. Such critical life-support requirements as spawning areas, nursery grounds, food habits, feeding areas, wintering areas, and migration routes (to the extent that power plant construction or operation is expected to affect these parameters). Map where applicable (from the ER, the general literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - the location and value of the commercial and sport fisheries and the seasonal distribution of harvest by species (from the ER, the general literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - endangered and threatened aquatic species that are known to be present or could potentially occur onsite and an identification of their other locations and critical habitats within the region. Also identify specific habitat requirements (e.g., thermal tolerance ranges), community interrelationships, and relative abundance (from the ER, the general literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies).
 - key aquatic indicator organisms expected to gauge changes in the distribution and abundance of species populations that are particularly vulnerable to impacts from plant construction or operation (from ER)
 - the presence of “nuisance” species such as *Corbicula* sp. or *Mytilus* sp. onsite or in the vicinity of the plant and that are capable of blocking or bio-fouling the cooling water intake system or that can cause other significant problems (from ER)
 - the relative significance of important aquatic habitats in a regional context (from the ER, the general literature, and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - a description of onsite natural, man-induced, and pre-existing environmental stresses, and the current ecological conditions that are indicative of such stresses (from the ER).

The following data or information about transmission corridors and offsite areas should be obtained only when the proposed transmission corridors and offsite areas intersect or are adjacent to aquatic resources:

- a map and description of the location and extent of threatened or endangered or other "important" aquatic species that are known or expected to be present in the vicinity of the transmission corridors together with any specific habitat requirements or community interrelationships (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- any physical, chemical, and biological factors known to influence distribution and abundance of threatened and endangered aquatic life in the vicinity of the transmission corridors (from the general literature)
- documentation that the applicant has consulted with the appropriate Federal, State, regional, local, and affected Native American tribal agencies (e.g., as required by the Fish and Wildlife Coordination Act) (from the ER)

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of aquatic ecology on and in the vicinity of the site and transmission corridors are based on the relevant requirements of the following:

- 10 CFR 51.75 with respect to descriptions of the environment affected by the issuance of a construction permit
- 10 CFR 51.95 with respect to the preparation of supplemental environmental impact statements (EISs) in support of the issuance of an operating license
- 10 CFR 52, Subpart A, with respect to descriptions of the environment affected by the issuance of an early site permit
- Coastal Zone Management Act of 1972 with respect to natural resources, and land or water use of the coastal zone
- Endangered Species Act of 1973 with respect to identifying threatened and endangered species, critical habitats, and initiating formal or informal consultation with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service
- Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, Amendments of 1972 with respect to restoration and maintenance of the chemical, physical, and biological integrity of water resources
- Fish and Wildlife Coordination Act of 1958 with respect to consideration of fish and wildlife resources in the planning of development projects that affect water resources
- Marine Mammal Protection Act of 1972 with respect to the protection of marine mammals

- Marine Protection, Research, and Sanctuaries Act of 1972 with respect to dumping of dredged material into the ocean
- Rivers and Harbors Appropriations Act of 1899 with respect to the deposition of debris in navigable waters, or tributaries to such waters.

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), details the means by which the applicant collects baseline data used to compare subsequent data to evaluate plant construction and operation impacts. The reviewer should ensure that the applicant's measurement of conditions before site preparation includes all environmental parameters necessary to evaluate impacts during station operation, as well as during site preparation and construction.
- Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (1998), contains guidance concerning the ecological systems and biota at potential sites and requires that their environs be sufficiently well-known to allow reasonably certain predictions that there would be no unacceptable or unnecessary deleterious impacts on populations of important species or on ecological systems with which they are associated from the construction or operation of a nuclear power station at the site. The reviewer should ensure that the applicant's description of the site and transmission corridors identify important species or ecological systems that could potentially be impacted by station and transmission corridor construction or operation.

Technical Rationale

The technical rationale for evaluating the applicant's description of the area's aquatic ecology is discussed in the following paragraph:

A detailed and thorough description of the aquatic ecology in the vicinity of the power station site and associated transmission corridors is essential for the evaluation of potential impacts to the aquatic environment that may result from plant construction or operation. Use of the above acceptance criteria will help ensure inclusion of the aquatic ecological attributes most needed to predict impacts.

III. REVIEW PROCEDURES

The reviewer should ensure that the regional and site-specific aquatic ecological information is adequate to serve as a basis for assessment of the effects of design and siting of the plant, construction, and operation. In assessing the adequacy of the description of aquatic resources of the site and offsite areas, the reviewer should consult the applicable acceptance criteria of this ESRP section. Within these

criteria, the reviewer may find a framework of those descriptive features of aquatic resources judged adequate for most situations of nuclear power station siting. The reviewer should also become familiar with the provisions of the legislation listed in the "Acceptance Criteria" section.

With these guidelines in mind, the reviewer should take the following steps:

- (1) Identify the species and habitats that will be considered "important" ecological resources of the site, vicinity, transmission corridors, and offsite areas for evaluation of potential impacts on them, using Table 2.4.2-1 as a reference.
- (2) Consult with local offices of the appropriate Federal agencies and the appropriate State agencies to verify the possible occurrence of such species.
- (3) Identify the threatened or endangered species that, based on known distributions, could be present within these areas, but that have not been recorded by documented observations.
- (4) In the case of commercially or recreationally valuable species, list the types of wildlife and plants that could be adversely impacted by the proposed action, and in addition to the applicant's ER, consult with State or local agencies or organizations that maintain records of harvest levels of these species.
- (5) Review the available site-specific data for adequacy, accuracy, and completeness.

IV. EVALUATION FINDINGS

The depth and extent of the input to the EIS should be governed by the kinds of aquatic ecological resources that could be affected by plant construction or operation and by the nature and magnitude of the expected impacts to these resources. The reviewer should prepare as input to the EIS descriptions of the onsite and offsite areas potentially affected by the proposed project. The input should be brief and should contain the following information:

- the principal aquatic ecological features of the site and vicinity and those sensitive offsite areas affected by transmission and access corridors and related facilities, with emphasis on the communities of the ecosystem that will be potentially affected by project construction, operation, or maintenance. This information should be based on an analysis of at least one full year of data to reflect seasonal variations in aquatic populations. Thus, the extent of discussion of various biotic components should be in proportion to the estimated severity of impacts and should be adequate to support the assessment of ESRP Chapters 4.0 and 5.0.
- descriptions of environmental or man-induced stresses to aquatic biota at the existing site and vicinity

Table 2.4.2-1. Important Species and Habitats

| Species | Habitat |
|---|--|
| <p>Rare species</p> <ul style="list-style-type: none"> • Listed as threatened or endangered at 50 CFR 17.11 (Fish and wildlife) or 50 CFR 17.12 (Plants). This information may also be found via the Internet at the U.S. Fish and Wildlife Homepage in GEN&SIS. • Proposed for listing as threatened or endangered, or is a candidate for listing in the most current list of such species as published in the <i>Federal Register</i>. This information may also be found via the Internet at the U.S. Fish and Wildlife Homepage in GEN&SIS. • Listed as a threatened, endangered, or other species of concern by the State or States in which the proposed facilities are located <p>Commercially or recreationally valuable species</p> <p>Species that are essential to the maintenance and survival of species that are rare and commercially or recreationally valuable (as defined previously)</p> <p>Species that are critical to the structure and function of the local terrestrial ecosystem</p> <p>Species that may serve as biological indicators to monitor the effects of the facilities on the terrestrial environment</p> | <p>Wildlife sanctuaries, refuges, or preserves, if they may be adversely affected by plant or transmission line construction or operation</p> <p>Habitats identified by State or Federal agencies as unique, rare, or of priority for protection, if these areas may be adversely affected by plant or transmission line operation and maintenance</p> <p>Wetlands (Executive Order 11990), floodplains (Executive Order 11988), or other resources specifically protected by Federal regulations or Executive Orders, or by State regulations</p> <p>Land areas identified as "critical habitat" for species listed as threatened or endangered by the U.S. Fish and Wildlife Service</p> |

- a discussion of "important" aquatic species that may be affected by plant or transmission corridor construction or operation. Estimates of their abundance should be provided where appropriate. Special habitat and forage needs should be emphasized, if the proposed project would potentially disrupt these.
- a summary of consultations with appropriate Federal, State, regional, local, and affected Native American tribal agencies, including the U.S. Fish and Wildlife Service (through the regional director), and the director of the State fish and wildlife agency.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report."

10 CFR 51.75, "Draft environmental impact statement—construction permit."

10 CFR 51.95, "Supplement to final environmental impact statement."

10 CFR 52, Subpart A, "Early Site Permits."

50 CFR 17.11, "Fish and wildlife."

50 CFR 17.12, "Plants."

Coastal Zone Management Act, as amended, 16 USC 1451 et seq.

Endangered Species Act, as amended, 16 USC 1531 et seq.

Executive Order 11988, "Floodplain Management."

Executive Order 11990, "Protection of Wetlands."

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Fish and Wildlife Coordination Act Amendment, 16 USC 661 et seq.

Marine Mammal Protection Act of 1972, Pub. L. 92-522, Oct. 21, 1972, 86 Stat. 1027, as amended, 16 USC 1361 et seq.

Marine Protection, Research, and Sanctuaries Act, as amended, 33 USC 1401 et seq.

Rivers and Harbor Appropriations Act, as amended, 33 USC 401 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). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.5 SOCIOECONOMICS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the socioeconomic description portion of the environmental impact statement (EIS). The scope of the paragraph covered by this plan introduces the material to be presented from the reviews conducted under ESRPs 2.5.1 through 2.5.4.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

The introductory paragraph prepared under this ESRP should be consistent with the intent of the following regulation:

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

October 1999

2.5-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's socioeconomic description of the area is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 2.5.1 through 2.5.4. This paragraph should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.5.1 DEMOGRAPHY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's analysis of population distribution within an 80-km (50-mi) radius of the proposed site in sufficient detail to provide input to analyses of radiological impacts and accident impacts and to provide support for socioeconomic analysis.

The scope of the review directed by this plan should include verification of current population distributions, population distributions predicted at the time of plant startup, and for 10-year increments reaching 40 years from the latest decennial census. Both permanent and transient populations should be identified.

Review Interfaces

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

- ESRP 2.5.2. Provide population forecast data.
- ESRP 2.5.4. Provide demographic data for comparison with data obtained on minority and low-income populations.
- ESRPs 4.4.1, 4.4.2, 5.8.1, and 5.8.2. Provide community distribution and population forecast data.
- ESRPs 5.4.1, 5.4.2, and 7.1. Provide population forecast data.

October 1999

2.5.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts.

Because this plan is primarily for orientation and to provide a baseline, the information needed can usually be obtained from the applicant's environmental report (ER). Population data presented should be based on the current decade census data and, where available, more recent data. The following data or information should be obtained:

- Population Within 16 km (10 mi). On a map of suitable scale that identifies places of significant population grouping, such as cities and towns within a 16-km (10-mi) radius, concentric circles should be drawn (with the reactor at the center point) at distances of 2, 4, 6, 8, 10, and 16 km. The circles should be divided into $22\frac{1}{2}^\circ$ sectors with each sector centered on one of the 16 compass points (with reference to true north; e.g., north-northeast, northeast, etc.). A table appropriately keyed to the map should provide the current residential and transient populations within each area of the map formed by the concentric circles and radial lines. The same table or separate tables should provide the projected resident and transient populations within each area for (1) the expected first year of station operation and (2) for 10-year increments reaching 40 years from the latest decennial census. The tables should provide population totals for each sector and concentric ring and a total for the 0- to 16-km (0- to 10-mi) enclosed population. The basis for population projections should be described (from the ER, latest decennial census, other local/regional demographic sources).
- Population Between 16 and 80 km (10 and 50 mi). A map of suitable scale and appropriately keyed tables should be used in the same manner as described above to present the population and its distribution at 20-km intervals between the 16- and 80-km (10- and 50-mi) radii from the reactor (from the ER, the latest decennial census, other local/regional demographic sources).
- Demographic Characteristics of the 0- to 80-km (0- to 50-mi) Enclosed Population. This should include specific reporting of population characteristics and projections for the emergency planning zone defined as the area within a 16-km (10-mi) radius of the plant. Demographic characteristics and projections should also be shown for the "low-population zone" or "exclusion area" populations. Demographic characteristics should include age and sex distribution, transient or migrant population, racial and ethnic background, and income distribution (from the ER, latest decennial census, other local/regional demographic sources such as planning commissions).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of socioeconomic demographics are based on the relevant requirements of the following:

- 10 CFR 50.34(a)(1) with respect to site acceptance, which is based on the consideration of factors relating to the proposed reactor design and the characteristics peculiar to the site. One of the factors

involves population density and use characteristics of the site environs, including the exclusion area, low population zone, and population center distance.

- 10 CFR 51.45(c) with respect to analysis of socioeconomic data
- 10 CFR 51.45(d) and 51.71(d) with respect to the analyses required in the development of the ER and environmental impact statement (EIS). In accordance with 10 CFR 51.45(d), the applicant is required to submit in the ER information needed for evaluating these factors. Similar information is required to be present in the EIS pursuant to 10 CFR 51.71.
- 10 CFR 52.18 with respect to reviewing applications for early site permits
- 10 CFR 52.81 with respect to reviewing applications for combined licenses.

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), addresses population distribution within the vicinity of the plant.

Technical Rationale

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

Regulations 10 CFR 100.10(b) and 10 CFR 50.34(a)(1) require that detailed population density and use characteristics of the site environs be developed.

Reasonably detailed information about the demographic characteristics of the site environs in question is required to assess any potential social or economic impacts that might occur as a result of plant construction or operation. Data in the ER must be adequate to make these determinations. Demographic data are also necessary to assess the impact of both routine and accidental releases to the environment.

III. REVIEW PROCEDURES

To analyze the population distribution within an 80-km (50-mi) radius of the proposed site, the reviewer should take the following steps:

- (1) Prepare population distribution charts that provide population data for both permanent and transient populations as they presently exist and as predicted at the time of plant startup and for 10-year increments reaching 40 years from the latest decennial census; present the data as shown in Table 2.5.1-1.

Table 2.5.1-1. Sample Population Distribution Table

| Sectors/Distances (km) | Sector 0-2 Total | 2-4 | 4-6 | 6-8 | 8-10 | 10-16 | 16-40 | 40-60 | 60-80 |
|--|------------------------|-----|-----|-----|------|-------|-------|-------|-------|
| North (Present date) (Startup date) (40-yr date) | | | | | | | | | |
| NNE (Present date) (Startup date) (40-yr date) | | | | | | | | | |
| " | | | | | | | | | |
| " | | | | | | | | | |
| " | | | | | | | | | |
| " | | | | | | | | | |
| " | | | | | | | | | |
| " | | | | | | | | | |
| Annual Total (Present date) (Startup date) (40-yr date) | | | | | | | | | |
| Cumulative Total (Present date) (Startup date) (40-yr date) | | | | | | | | | |

(2) Determine that the data are based on the appropriate geographical coordinates.

(3) Review the following:

- data used to update the basic decennial census data
- the methods used to establish population data within 80 km (50 mi) of the site
- the applicant's methods for population projections.

IV. EVALUATION FINDINGS

Input from this ESRP to the EIS input should include the following:

- a sector chart superimposed on a map extending to a 16-km (10-mi) radius (see Figure 2.5.1-1)

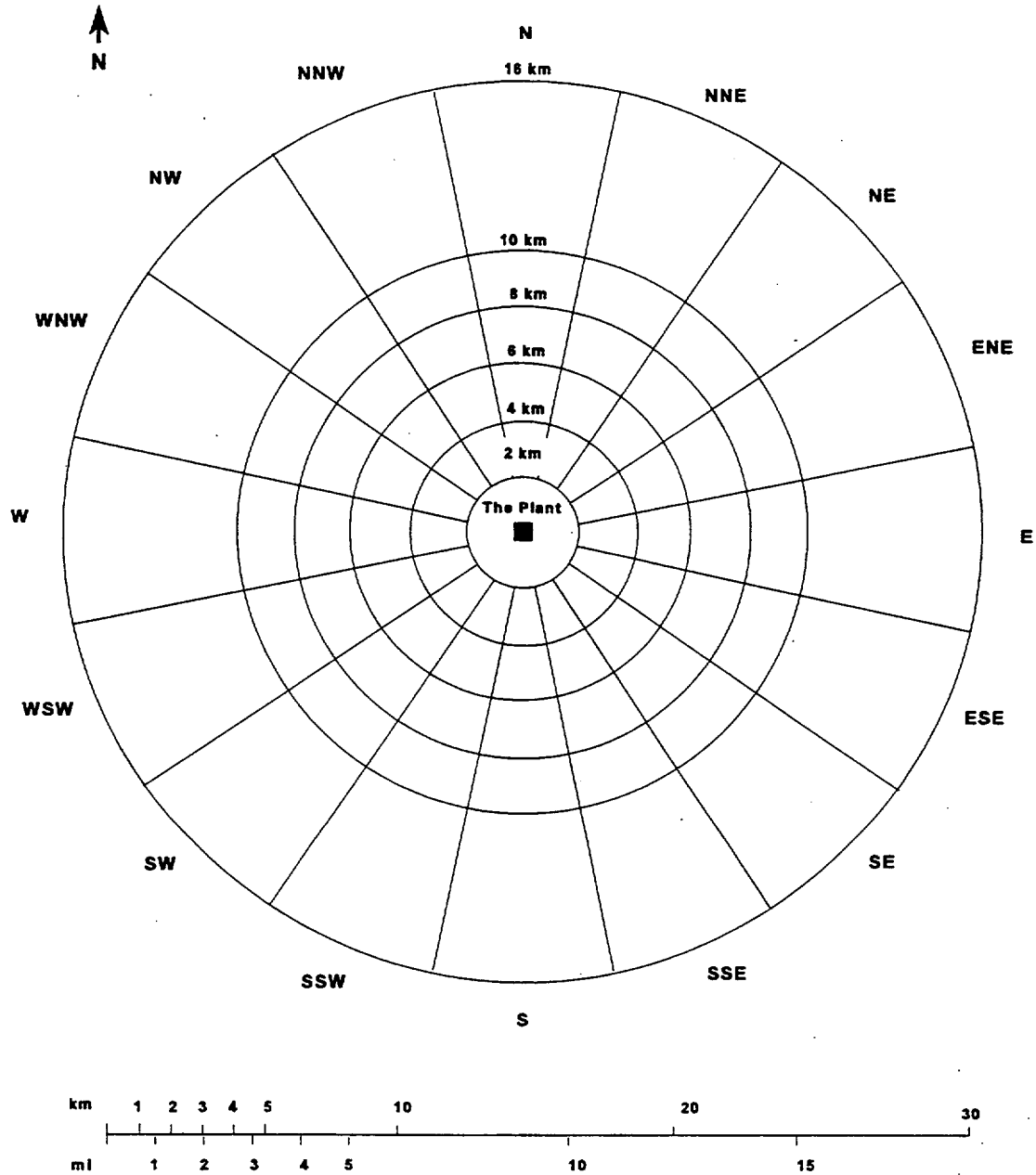


Figure 2.5.1-1. Example of 0-to-16-km Sector Chart to be Superimposed Over an Appropriate Vicinity Map

- a sector chart superimposed on a map extending to an 80-km (50-m) radius (see Figure 2.5.1-2)
- a table appropriately keyed to the above figures that provides the projected populations within each sector of the chart (see Table 2.5.1-1)

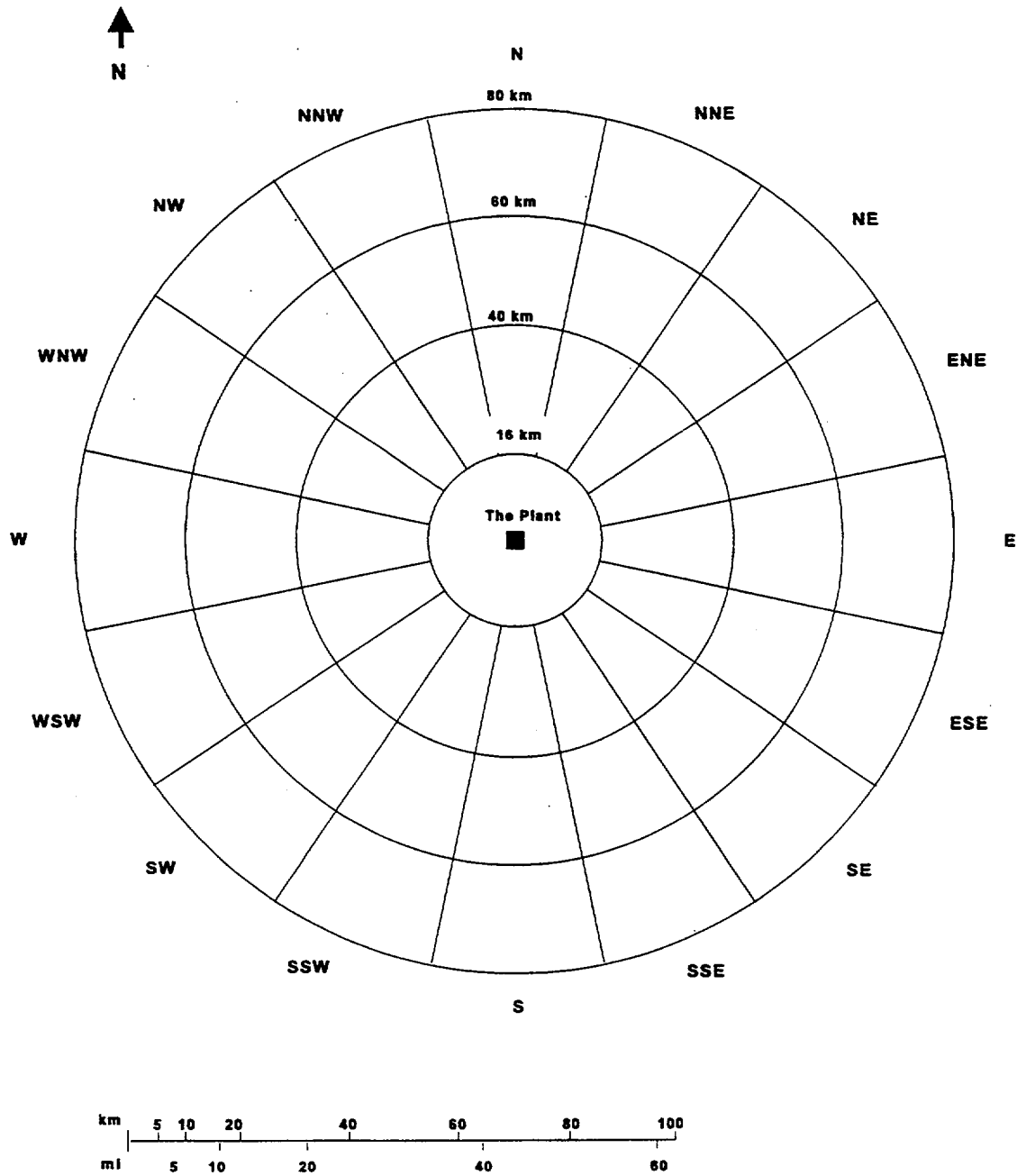


Figure 2.5.1-2. Example of 16-to-80-km Sector Chart to be Superimposed Over an Appropriate Vicinity Map

- a summary description of the staff's population-distribution review, including extrapolation techniques and descriptions of any unique population factors such as high transient population (daily or seasonal) or new communities.

Information submitted by the applicant should be adequate to meet the requirements of 10 CFR 100.10 and 10 CFR 50.34(a)(1). The population-distribution data should be complete and sufficient to assess the radiological impacts of station operation and to support the assessment of socioeconomic factors and impacts.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 50.34, "Contents of application; technical information."

10 CFR 51.45, "Environmental report."

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

10 CFR 52.18, "Standards for review of application, early site permits."

10 CFR 52.81, "Standards for review of application, combined licenses."

10 CFR 100.10, "Factors to be considered when evaluating sites."

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**

OFFICE OF NUCLEAR REACTOR REGULATION

2.5.2 COMMUNITY CHARACTERISTICS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification and description of community characteristics in the region^(a) of the site, including the site vicinity and other areas likely to be affected by the construction, maintenance, or operation of the proposed plant and related facilities. The review will provide input to other reviews dealing with evaluation of plant construction and operating impacts on the identified communities.

The scope of the review directed by this plan will be guided by the magnitude and nature of the expected impacts of construction, maintenance, or operation of the proposed project and by those site-specific community characteristics that can be expected to be affected by these impacts. These characteristics should be described in sufficient detail to permit a subsequent staff assessment and evaluation of the specific impacts.

-
- (a) For the purposes of this ESRP, the relevant region is limited to that area necessary to include social and economic base data for (1) the county in which the proposed plant would be located and (2) those specific portions of surrounding counties and urbanized areas (generally, up to 80 km [50 mi] from the station site) from which the construction/operations work force would be principally drawn, or that would receive stresses to community services by a change of residence of construction/operations workers. Other social and economic impacts can generally be presumed to fall within the same area covered by this definition of the region.

October 1999

2.5.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Review Interfaces

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

- ESRPs 2.2.1, 2.2.2, and 2.2.3. Obtain maps and descriptions of the area in the vicinity of the plant, transmission corridors, and surrounding region.
- ESRP 2.5.1. Obtain and refer to information associated with the relevant populations that could be impacted by the plant construction, maintenance, or operation in reviewing the description of community characteristics.
- ESRP 2.5.4. Provide descriptions of community characteristics for comparison with data obtained on minority and low-income populations.
- ESRPs 4.4.1 and 4.4.2. Provide descriptions of the community characteristics that could be impacted by plant construction activities.
- ESRP 5.8.2. Provide descriptions of the community characteristics that could be impacted by plant operation or maintenance.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- information related to the area's economic base, including
 - important regional industry by category, including employment (from the environmental report [ER] and consultation with cognizant State and local officials, such as local labor economists)
 - size and nature of the heavy construction industry and construction labor force within the region (from the ER and consultation with cognizant State and local officials)
 - total regional labor force (from the ER and consultation with cognizant State and local officials)
 - regional unemployment levels and future economic outlook (from consultation with cognizant State, local, and affected Native American tribal agencies)
 - characterization of incremental onsite labor, peak number of workers and duration of the peak, the number of workers expected to commute daily, the number of workers expected to require temporary and permanent housing, and the inventory of rental and of permanent housing within

80 km of the site (from the ER and cognizant State and local planning officials; see also *Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites. Profile Analysis of Worker Surveys*. [Malhotra and Manninen 1981]).

- information related to the area's political structure, including
 - regional political jurisdictions and tax districts identifying those tax districts that will be directly affected by plant construction or operation (from the ER and consultation with State and local agencies)
 - local and regional planning and administrative organizations (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies).
- demographic information, including population forecasts (from ESRP 2.5.1)
- social-structure information, including major community structures (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- housing information, including the sales and rental market in the region, number and types of units, turnover and vacancy rates, and trends in addition to housing stock, adequacy of structures, and location of existing and projected housing (from the ER and consultation with Federal, State, regional, local [including experts, such as realtors], and affected Native American tribal agencies)
- information about the local educational system (regional primary and secondary schools and higher education institutions), including capacity and present percentage of utilization (from the ER and consultation with cognizant Federal, State, regional, local, school, and affected Native American tribal agencies)
- public and private recreational facilities and opportunities, including present and projected capacity and percentage of utilization (from the ER and consultation with cognizant Federal, State, regional, local, and affected Native American tribal agencies)
- regional tax structure and distribution of the present revenues to each jurisdiction and district (from the ER and consultation with cognizant State and local agencies)
- local plans concerning land use and zoning that are relevant to population growth, housing, and changes in land-use patterns (from the ER and consultation with local developers and with cognizant Federal, State, regional, local, and affected Native American tribal agencies, especially those engaged in land-use planning)
- social services and public facilities, including

- present and projected water and sewer/sewage disposal facilities, including present capacity and projected percentage of utilization (from the ER and consultation with local agencies)
- present and projected police and fire capabilities, as well as emergency planning responsibilities (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- location of hospitals, number of medical doctors, and specialized health facilities, including present and projected capacity (from the ER and consultation with local agencies).
- information on highways and transportation systems, for example:
 - regional and local highway systems, including carrying capacity and condition of roads and highways (from the ER and consultation with State and local transportation planning bodies)
 - availability and type of public transportation (from the ER and consultation with local officials)
 - modifications that might affect traffic flow to and from the station site (from the ER and consultation with State and local transportation bodies).
- information about distinctive communities including the characteristics of the State, Native American tribes, and the local region that may identify them as distinctive communities, such as historic districts, tourist attractions, cultural resources, and visual resources (from the ER and consultation with State, regional, local, and affected Native American tribal agencies).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of community characteristics are based on the relevant requirements of the following:

- 10 CFR 51.45(c) with respect to analysis of socioeconomic data
- 10 CFR 51.45(d) and 51.71(d) with respect to the analyses required in the development of the ER and environmental impact statement (EIS). In accordance with 10 CFR 51.45(d), the applicant is required to submit in the ER information needed for evaluating these factors. Similar information is required to be present in the EIS pursuant to 10 CFR 51.71.
- 10 CFR 51.45 with respect to reviewing applications for early site permits
- 10 CFR 52.81 with respect to reviewing applications for combined licenses.

Technical Rationale

The technical rationale for evaluating the applicant's description of community characteristics is discussed in the following paragraph:

Information about the socioeconomic characteristics of the site in question is needed to assess potential social or economic impacts that may occur as a result of plant construction or operation. Data in the ER must be adequate to make these determinations.

III. REVIEW PROCEDURES

The reviewer's analysis of community characteristics should be closely linked with the impact assessment review described by the ESRP Chapters 4.0 and 5.0 to establish the site-specific community characteristics that are most likely to be affected (see *Generic Environmental Impact Statement of Nuclear Plants* [NRC 1996]). When analyzing the community characteristics, the reviewer should take the following steps:

- (1) Describe community characteristics for those communities within the region (see the footnote in Areas of Review in ESRP 2.5.2 for definition of "relevant region") that are expected to be impacted.
- (2) Conduct an initial screening of the community structure and characteristics within an approximate 80-km (50-mi) radius of the site to make a preliminary determination of the potentially affected subregions and communities.
 - Address the following factors in the screening process to identify population influx:
 - settlement patterns
 - labor force
 - transportation
 - housing availability
 - public services
 - economics.
 - Discuss the results of the initial screening with the reviewers of ESRP Chapters 4.0 and 5.0 to establish any other predicted construction or operating impacts that might affect results of the screening process.
- (3) Describe potentially impacted areas of the region and their associated communities in the following terms (the extent and detail of the descriptions should be in proportion to the magnitude of the impacts anticipated and only those terms necessary for subsequent impact evaluation should be used):
 - political structure

- social structure
- demography
- housing
- economic base
- social services and public facilities
- highways and transportation
- water and sewer facilities
- education
- public safety
- health
- recreation
- taxation
- land-use planning and zoning.

IV. EVALUATION FINDINGS

The reviewer should verify that sufficient information has been provided in accordance with the requirements of this ESRP to serve as a basis for assessment of the impacts on the local communities resulting from plant construction or operation.

The depth and extent of the input to the environmental statement should be governed by the characteristics of the region in which the station is to be located and the potential socioeconomic impacts of plant construction, maintenance, and operation. The following information should be included in the EIS:

- the procedures used to identify the selected regional and community characteristics
- a description of regional and community characteristics
- other factors listed in the analysis section of this plan consistent with the guidance provided in that section.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report."

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

10 CFR 52.81, "Standards for review of application, combined licenses."

Malhotra, S. and D. Manninen. 1981. *Migration and Residential Location of Workers at Nuclear Power Plant Construction Sites. Profile Analysis of Worker Surveys*. NUREG/CR-2002 Vol. 2, 282 pp. 8105180378, 08553:184. PNL-3757, prepared for the U.S. Nuclear Regulatory Commission by Pacific Northwest Laboratory, Richland, Washington.

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement of Nuclear Plants*. NUREG-1437, Sections on socioeconomics and Appendix G: Socioeconomics. Division of Safety Issue Resolution, Office of Nuclear Regulatory Research, Washington, D.C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.5.3 HISTORIC PROPERTIES

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification and description of historic, archaeological, and traditional cultural resources; the results of the surveys conducted; the location and significance of any properties that are listed in or eligible for inclusion in the *National Register of Historic Places (National Register)* as a historic place; and any additional information pertaining to the identification and description of historic properties that could be impacted by construction or operation of the proposed project. The descriptions to be provided by this review should be of sufficient detail to permit subsequent staff assessment and evaluation of specific impacts as provided in ESRPs 4.1.3 and 5.1.3.

Review Interfaces

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

- ESRPs 2.2.1 and 2.2.2. Obtain land-use data as needed to describe archaeological sites and natural landmarks.
- ESRPs 3.1, and 3.7. Obtain site description and layout.
- ESRP 4.1.3. Provide descriptions of those significant historic properties that could be impacted by proposed project construction activities.

October 1999

2.5.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 5.1.3. Provide descriptions of those significant historic properties that could be impacted by proposed project operation.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- a detailed description of any archaeological or historical surveys of the proposed site, transmission-line routes, or access corridors, including the following (from the environmental report [ER]):
 - the physical extent of the survey. If the entire site was not surveyed, the basis for selecting the area to be surveyed is needed.
 - a brief description of the survey techniques used and the reason for selecting the survey techniques used
 - the qualifications of the surveyors
 - the findings of the survey in sufficient detail to permit a subsequent independent assessment of the impact of the proposed project on archaeological and historic resources.

Note: Guidance for assessing the adequacy and completeness of previous archaeological or historical surveys can be found in U.S. Department of the Interior reports (NPS 1985; DOI 1983).

- the comments of any organizations contacted by the applicant to locate and assess archaeological and historic resources located on or near the proposed station site (from the ER)
- a description of properties within the proposed site or within proposed transmission line corridors, access corridors, and offsite areas that are in or eligible for inclusion in the *National Register* or are included in State or local registers or inventories of historic and archaeological resources (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- a description of historic properties within 16 km (10 mi) of the proposed site or within 2 km (1.2 mi) of proposed transmission line routes, access corridors, and offsite areas that are in or have been determined eligible for inclusion in the *National Register* or are included in State or local registers or inventories of historic and cultural resources (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the historic properties that could be impacted by proposed project construction or operation are based on the relevant requirements of the following:

- 36 CFR 800 defines the process by which a Federal agency meets the requirements under Sections 106 and 110 of the National Historic Preservation Act (NHPA) to ensure that agency-assisted or -licensed undertakings consider the effects of the undertaking on historic properties included in or eligible for the *National Register*. Under this regulation, the Federal agency is required to identify and evaluate all historic properties in the project area and take measures to mitigate adverse effects as being significant.
- 36 CFR 63 contains guidance by which historic properties are evaluated and determined eligible for listing on the *National Register*.

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

- Nuclear Reactor Regulation (NRR) Office Letter No. 906, Revision 1 (NRC 1996) contains guidance for complying with the requirements contained in the National Historic Preservation Act. NRR Office Letter No. 906 is revised periodically. Obtain a copy of the latest revision for current guidance.

Technical Rationale

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

Because of NEPA and Section 106 of NHPA, the NRC's actions are required to fall under 36 CFR 800, which provides regulatory guidance for identifying, evaluating, and protecting historic properties from potential adverse impacts resulting from Federal-agency undertakings. Information developed at this stage will contribute necessary data for ESRPs 4.1.3 and 5.1.3.

The construction and subsequent operation of a nuclear power facility could impact historic properties directly (e.g., destruction or alteration of the integrity of a property) or indirectly (e.g., prohibiting access or increasing the potential for vandalism). Elements of Section 110 of NHPA require Federal agencies to manage and protect identified, eligible historic properties located on lands under their jurisdiction.

III. REVIEW PROCEDURES

The reviewer's analysis of historic properties should be closely linked with the impact assessment review described by ESRPs 4.1.3 and 5.1.3 to establish the historical and archaeological characteristics that are most likely to be affected. The reviewer should take the following steps:

- (1) Contact the appropriate State Historic Preservation Officer (SHPO) to determine if there are any additional comments or information concerning the proposed station site.
 - Make initial contact by phone and invite the SHPO to participate in the site visit.
 - If the SHPO has comments or information that add to or amplify that which was provided by the applicant, request that the SHPO forward, by letter to the staff, these additional comments.
- (2) Contact the Archeology and Ethnography Program (AEP) of the National Park Service (NPS), U.S. Department of Interior. This office is a particularly useful source of expertise in the area of historic and cultural preservation and is staffed with professionals who can assist in the environmental review and in analyzing the results of the applicant's surveys and investigations.
- (3) In consultation with the SHPO, apply the *National Register* criteria outlined by the U.S. Department of the Interior (NPS 1990; 1991) to historic properties that are on the station site or that will be directly affected by plant construction. If a property appears to meet the criteria, or if it is questionable whether the criteria are met, the staff should request, in writing, an opinion from the U.S. Department of the Interior with respect to the property's eligibility for inclusion in the *National Register*. The request for determination of eligibility should be sent directly to the Keeper of the National Register of Historic Places, National Park Service, U.S. Department of the Interior, Washington, D.C. 20013-7127.
- (4) Have the NPS-AEP staff assist in
 - defining the requirements of additional surveys and investigations that the staff decides should be completed by the applicant
 - reviewing the results of these surveys.
- (5) Consult the *National Register* to verify the list of *National Register* properties provided by the applicant. Note: A proposed station can have a visual or noise impact on cultural and historic resources that are located some distance from the proposed station site. Therefore, *National Register* properties within 16 km (10 mi) of the proposed station site or within 2 km (1.2 mi) of transmission line routes, access corridors, and offsite areas should be identified.

- (6) Meet with the SHPO and, where appropriate, the State Archaeologist and State Historian, to discuss the information provided to the applicant by the SHPO. The SHPO can alert the staff to relevant State and local laws, orders, ordinances, or regulations aimed at the preservation of cultural resources within the applicant's State. Be sure to discuss the following:
- the data necessary for Items 1 through 4 above
 - a list of additional organizations or individuals that might be able to assist in identifying and locating archaeological and historic resources. Of particular importance are university and Native American tribal archaeological and historical staffs.
- (7) Contact the SHPO of each affected State for sites located on or near State boundaries, or where transmission line routes, access corridors, or offsite areas pass through more than one State.
- (8) Compare the information provided by the applicant with that obtained from the SHPO and the *National Register* and resolve any differences in identification and location of cultural and historic resources.

IV. EVALUATION FINDINGS

The reviewer should ensure that those significant historic properties that could be impacted by proposed project construction or operation have been identified, located, and described in sufficient detail to provide the basis for subsequent analysis and assessment of these impacts.

The depth and extent of the input to the environmental impact statement (EIS) will be governed by the extent and significance of the identified historic properties and by the nature and magnitude of the expected impacts of construction and operation. The following information should be included in this ESRP :

- a description of historic properties listed in or eligible for inclusion in the *National Register*. Any resource considered to be eligible for the *National Register* should have concurrence from the appropriate SHPO.
- a description of historic properties included in State or local registers or inventories
- a brief description of additional important cultural, traditional, or historic properties
- a summary of the efforts to locate and identify previously recorded archaeological and historic sites
- a list of organizations and individuals contacted by the applicant or the staff who provided significant information concerning the location of cultural and historic properties

- a brief description of the overall results and adequacy of any surveys (archival or field) that were conducted by the applicant.

V. IMPLEMENTATION

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

VI. REFERENCES

30 CFR 63, "National Register of Historic Places."

36 CFR 800, "Protection of Historic Properties."

National Historic Preservation Act, as amended, 16 USC 470 et seq.

U.S. Department of the Interior (DOI). 1983. "Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines," 48 *Federal Register*, 44716-44742.

U.S. National Park Service (NPS). 1985. "Guidelines for Local Surveys: A Basis for Preservation Planning." *National Register*, Bulletin 24, U.S. Department of the Interior, Washington, D.C.

U.S. National Park Service (NPS). 1990. "Guidelines for Evaluating and Documenting Traditional Cultural Properties." *National Register*, Bulletin No. 38, U.S. Department of the Interior, Washington, D.C.

U.S. National Park Service (NPS). 1991. "How to Apply the National Register Criteria for Evaluation." *National Register*, Bulletin No. 15, U.S. Department of the Interior, Washington, D.C.

U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (NRC/NRR). 1996. "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues." NRR Office Letter No. 906, Revision 1, Washington, D.C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.5.4 ENVIRONMENTAL JUSTICE

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification and description of low-income and minority populations that could be impacted by construction, maintenance, or operation of the proposed project to the extent that such information can serve as the basis of an environmental impact statement (EIS) section on environmental justice. This review should provide input to other reviews dealing with evaluation of construction and operational impacts to these populations.

The scope of the review directed by this plan should include consideration of the methods that are used to identify and locate minority and low-income populations, the location and significance of any populations that are particularly sensitive, and any additional information pertaining to minority and low-income populations that could be impacted by construction, maintenance, or operation of the proposed project. The descriptions to be provided by this review should be of sufficient detail to permit subsequent staff assessment and evaluation of specific impacts as provided in ESRPs 4.4.3 and 5.8.3.

Review Interfaces

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

- ESRPs 2.5.1 and 2.5.2. Obtain input on demography and community characteristics for comparison with data on minority and low-income populations.

October 1999

2.5.4-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 4.1.1 through 4.6, 5.1.1 through 5.6.3, 7.1, and 7.3. Obtain input from these plans to establish environmental pathways of importance for identifying minority and low-income populations of concern.
- ESRP 4.4.3. Provide descriptions of those minority and low-income populations that could be disproportionately impacted by proposed project construction activities and the mechanisms by which disproportionate harm could occur.
- ESRP 5.8.3. Provide descriptions of those minority and low-income populations that could be disproportionately impacted by proposed project operation and the mechanisms by which disproportionate harm could occur.

The following review interface should also be conducted:

- Interface with Environmental Project Manager (EPM). Provide a notification to the EPM of the existence of any unusual circumstances that warrant an environmental justice review.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. Because this plan is primarily for orientation and to provide a baseline, the information needed can usually be obtained from the applicant's environmental report. The following data or information should be obtained:

- the comments of any organizations contacted by the applicant that locate and assess uniquely vulnerable minority and low-income communities located on or near the proposed station site (from the environmental report [ER], and comments from organizations contacted as a result of the scoping meetings and other contacts with the public)
- a general description (with maps) of the location of all minority and low-income populations within the environmental impact area of each alternative site, including offsite areas that can expect significant environmental impact as a result of the proposed project construction or operation (from the ER, public contacts, and consultations with Federal, State, regional, local, and affected Native American tribal agencies). Demographic data would be available from Geographical, Environmental, & Siting Information System (GEn&SIS) or from the Bureau of the Census block data and TIGER files.
- a more specific description of any unique minority or low-income communities within each environmental-impact area that are likely to be disproportionately affected by the proposed project construction or operation (from the ER, public comments, and consultation with Federal, State, regional, local, and affected Native American tribal agencies).

II. ACCEPTANCE CRITERIA

The acceptance criteria for the review of environmental justice information are based on the relevant requirements of the following:

- 10 CFR 51.71(d) with respect to complying with environmental quality standards and requirements that have been imposed by Federal, State, regional, local, and affected Native American tribal agencies
- 10 CFR 52.18 with respect to reviewing applications for early site permits
- 10 CFR 52.81 with respect to reviewing applications for combined licenses
- Executive Order 12898 (59 FR 7629) with respect to impacts on minority and low-income populations
- 10 CFR 100.10 with respect to requirements that the site acceptance be based on the consideration of factors relating to the proposed reactor design and the characteristics peculiar to the site.

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

- Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (NRC 1998), notes that environmental justice is one of the considerations on which site acceptance is based and provides specific information for making the determinations required.
- The Council on Environmental Quality provides guidance for addressing environmental justice, "Environmental Justice: Guidance Under the National Environmental Policy Act," CEQ Guidance, December 10, 1997 (CEQ 1997).
- Guidelines for specific information requirements for environmental justice determinations are described in Attachment 4 to NRR Office Letter No. 906, Revision 1: "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues" (NRC 1996). NRR Office Letter No. 906 is revised periodically. Obtain the latest revision for current guidance on this subject.

Technical Rationale

The technical rationale for evaluating the applicant's description of minority and low-income populations is discussed in the following paragraphs:

In accordance with 10 CFR 51.45, the applicant is required to submit in the ER information needed for evaluating these factors. Guidelines for specific information requirements for environmental

justice determinations are described in Regulatory Guide 4.7 and Attachment 4 to the Nuclear Reactor Regulation (NRR) Office Letter No. 906. Information submitted by the applicant is adequate and meets the 10 CFR 51.45 and 10 CFR 51.71 requirements and interim NRR guidelines if it permits the identification of minority and low-income populations as addressed in most recent revision of the guidance.

As part of an environmental justice review, the reviewer should (1) alert the EPM of the existence of any unusual circumstances that warrant an environmental justice review in an EIS, (2) determine through comparative analysis whether a minority or low-income population exists that may be impacted (i.e., environmental impact site as outlined in NRR Office Letter No. 906), and (3) assess the degree to which each minority or low-income population would disproportionately experience adverse human health and environmental impacts and would disproportionately receive any benefits. Data in the ER should be adequate to make these determinations.

III. REVIEW PROCEDURES

The reviewer's analysis of minority and low-income populations should be closely linked with the impact-assessment review of environmental issues described by the ESRPs 4.1.1 through 4.6, 5.1.1 through 5.6, 7.1, and 7.3 to establish the environmental pathways by which minority and low-income households are most likely to be disproportionately affected, if any. In the course of this analysis, potential sources of relevant information may be available. For example, the reviewer should take the following steps:

- contact the lead staff responsible for reviews of these ESRPs
- contact local university departments of economics and sociology. These are particularly useful sources of expertise in the area of environmental justice, particularly those that are State repositories for Bureau of Census data. These offices are staffed with professionals who can assist the reviewer in analyzing the results of the applicant's surveys and investigations and can assist in the environmental review.
- contact the cognizant personnel in each affected State, for sites located on or near State boundaries, or where transmission line routes, access corridors, or offsite areas pass through more than one State.

IV. EVALUATION FINDINGS

The depth and extent of the input to the environmental statement will be governed by the extent and significance of the identified minority and low-income populations and by the nature and magnitude of the expected impacts of construction and operation. The following information should be included in the EIS:

- a general description of the location of minority and low-income populations within the region surrounding the site. This description should ordinarily be accompanied by two maps that highlight

the location of minority and low-income populations, respectively. These maps would ordinarily be based on the most recent Census of Population, supplemented by other information if available.

- a description of minority and low-income populations of particular interest or unusual circumstances, such as minority communities exceptionally dependent on subsistence resources or identifiable in compact locations, such as a Native American settlement
- a brief description of any additional important cultural or economic facts that may result in unusually high environmental (including socioeconomic) impacts
- a brief description of the overall results and adequacy of any surveys (archival or field) that were conducted by the applicant.

The reviewer should identify and provide the locations of minority and low-income populations for each environmental impact site. The reviewer should verify that the applicant's data are adequate and consider them adequate if the following statements are true:

- Data in the ER adequately describe the locations and distances of minority and low-income communities and population concentrations in the vicinity of the facility to determine the percentages of minority and low-income populations within the environmental impact site and larger geographic area, and are in agreement with data obtained from other sources, when available.
- When applicable, data in the ER adequately describe the unique lifestyle and practices of minority and low-income communities (for example, subsistence activities or dependence on specific water supplies) that could result in disproportionate impacts from plant construction and site operations.
- Descriptions of the nature and extent of activities conducted at the site and in its vicinity, including the products and materials likely to be processed, stored, used, or transported, are adequate to permit identification of possible disproportionate hazards to minority and low-income populations under either routine operations or accident scenarios.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report."

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

10 CFR 52.18, "Standards for review of applications."

10 CFR 52.81, "Standards for review of applications."

10 CFR 100.10, "Factors to be considered when evaluating sites."

Council on Environmental Quality (CEQ). 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act*. CEQ Guidance, December 10, 1997, Washington, D.C.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." *59 Federal Register*, 7629-7633.

U.S. Nuclear Regulatory Commission (NRC). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.

U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (NRC/NRR). 1996. "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues." NRR Office Letter No. 906, Revision 1, U.S. Nuclear Regulatory Commission, Washington, D.C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.6 GEOLOGY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the use (by reference) of the staff's safety evaluation report (SER) or site safety evaluation report (SSER) for all descriptions of site and vicinity geology. Reference to these documents should be made in the environmental impact statement (EIS), and no description of site and vicinity geology will be required.

Review Interfaces

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

- ESRPs 4.1, 5.1.1, and 5.1.2. Provide notification to the reviewers when there is any potential for geologic environmental impact.

Data and Information Needs

None.

II. ACCEPTANCE CRITERIA

None.

October 1999

2.6-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Technical Rationale

The potential for geological impacts is small and will be evaluated as part of the safety evaluation.

III. REVIEW PROCEDURES

The potential for geological environmental impacts (e.g., subsidence from cooling pond loading) is small, and the staff's experience has been that actual occurrence of such impacts is infrequent. Further, any such potential would be established and evaluated during the staff's safety evaluation and described in the staff's SER or SSER. On this basis, no environmental review of geology is required, but the reviewer's analysis should consist of the following two steps:

- (1) Consult with the staff's safety evaluation reviewers to determine if there is any potential for geological environmental impact.
- (2) When any such impacts can be predicted, notify the reviewers for ESRPs 4.1 and 5.1 to develop, in consultation with the safety reviewers, an analysis and evaluation of the potential impacts.

IV. EVALUATION FINDINGS

Evaluation findings are not required. The reviewer should provide the following statement for inclusion in the EIS:

The staff's description of site and vicinity geological features and the detailed analyses and evaluations of geological, seismological, and geotechnical data as required for an assessment of (1) site suitability for a plant of the general size and type proposed or (2) site-safety issues related to the specific proposed plant are, or will be, included in the staff's SSER and/or SER.

In addition, when any potential for geological environmental impact has been determined, the input should note that this determination has been made and identify the appropriate EIS section that contains an analysis and evaluation of the predicted impact.

V. IMPLEMENTATION

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

VI. REFERENCES

None.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

2.7 METEOROLOGY AND AIR QUALITY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the meteorology of the site and surrounding area and the characterization of atmospheric transport and diffusion processes (i.e., airflow trajectories, deposition characteristics) to a distance of 80 km (50 mi) from the station. This review should provide input to reviews dealing with evaluation of construction and operational impacts that involve meteorology.

The scope of the review directed by this plan includes (1) description of the regional climatological characteristics to be considered in the assessment of the design of the plant and its heat dissipation system; (2) description of the meteorological characteristics of the site and vicinity, using data from the onsite meteorological monitoring program, to be considered in the assessment of the impacts of the heat-dissipation system; (3) identification of the regional atmospheric transport and diffusion characteristics to be considered in the assessment of the population dose commitments likely to result from plant operation; (4) identification of the local atmospheric transport and diffusion characteristics to be considered in the assessment of the individual and population doses likely to result from plant operation; and (5) assessment of specific impacts on the atmospheric environment.

Review Interfaces

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

October 1999

2.7-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.1. Obtain a description of the plant location.
- ESRPs 3.4.1 and 3.4.2. Obtain descriptions of the cooling system and relevant components for use in determining potential impacts of heat dissipation on the atmosphere.
- ESRP 3.5. Obtain descriptions of potential release points for radioactive effluents for use in atmospheric transport and diffusion calculation.
- ESRP 3.6.3. Obtain descriptions of non-radiological emission to the atmosphere for evaluation of the impacts of plant construction and operation on air quality (include emissions from vehicles).
- ESRP 4.4.1. Provide estimates of the impact of construction activity on air quality.
- ESRP 5.1.1 and 5.8.1. Provide estimates of the impacts of plant operation on air quality.
- ESRP 5.3.2.1. Provide a description of the meteorology at the site of the proposed plant.
- ESRP 5.3.3.1. Provide meteorological data as required to analyze and evaluate heat dissipation system effects on the atmosphere.
- ESRPs 5.4.1 and 5.4.2. Obtain locations of the nearest receptors in each 22½° sector for atmospheric transport and diffusion calculations. Provide summaries of relative concentration and relative deposition values estimated or approved by the staff and a comparison of the values determined by the staff and the applicant, if they are substantially different from each other.
- ESRP 6.2. Provide an assessment of the adequacy of air-sampling locations and indicate additional air-sampling locations, if appropriate.
- ESRP 6.4. Provide an assessment of the adequacy of meteorological monitoring.
- ESRP 7.1 and 7.2. Provide meteorological data to analyze and evaluate the effects of plant accidents involving radioactive material.
- ESRP 9.4.1. Provide meteorological data to evaluate heat dissipation of alternative systems.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. Adequate characterization of atmospheric transport and diffusion processes within 80 km (50 mi) of the plant is necessary, and may include presentation of meteorological data from stations farther than 80 km (50 mi) when this information can provide additional clarification of the mesoscale atmospheric transport and diffusion processes. At least one annual cycle from the onsite meteorological program should be

used for atmospheric transport and diffusion calculations. Sources of meteorological information, in addition to the onsite meteorological program, should include National Weather Service (NWS) stations, other meteorological programs that are well maintained and well exposed (e.g., other nuclear facilities, university, and private meteorological programs), and supplementary meteorological facilities established by the applicant (or others) to characterize relevant conditions at critical onsite and offsite locations. All data used in calculations of atmospheric transport and diffusion estimates should be concurrent with the onsite data collection periods. Onsite data should be presented as hourly averages in the format described in Appendix A to this ESRP.

The site and regional meteorology data listed below should be fully documented and substantiated as to the validity of their representation of expected long-term conditions at and near the site. These data should be taken from onsite meteorological measurements and nearby representative stations, and for relevant stations within 80 km (50 mi) of the site. Regional climatological data, such as averages and extremes, should be based on a period of record that represents long-term conditions in the area and examination of available historical information. The following site and regional data or information should be obtained:

- a description of the general climate of the region with respect to types of air masses, synoptic features (high- and low-pressure systems and frontal systems, and principal storm tracks), general airflow patterns, temperature and humidity characteristics, precipitation, and relationships between synoptic and mesoscale (e.g., land-sea [lake] breeze regimes, atmospheric processes and local [site] meteorological conditions) (from the environmental report [ER])
- a description of regional air quality, including non-attainment or maintenance areas
- a description (including seasonal and annual frequencies) of the severe weather phenomena (e.g., tornadoes, hurricanes, thunderstorms, droughts) and adverse air quality conditions (e.g., SO_x, NO_x, particulates, salt) affecting the site and vicinity (from the ER)
- monthly and annual air temperature and dewpoint temperature summaries, including averages, measured extremes, and diurnal range (from the ER)
- monthly cumulative frequency distributions of wet-bulb temperature based on long-term data from representative NWS stations (except for plants with once-through cooling) (from the general literature)
- monthly and annual summaries of precipitation, including averages and measured extremes, number of hours with precipitation, hourly rainfall-rate distribution, and monthly precipitation wind roses with precipitation rate classes (from the ER)
- monthly and annual summaries, including natural variability, of occurrences of heavy fog (visibility less than .4 km [.25 mi]), and appropriate summaries of other parameters to support the description of impacts resulting from the operation of a closed cycle heat dissipation system (from the ER)

- estimated monthly mixing-height data, including frequency and duration (persistence) of inversion conditions and methods used to provide the estimates (from the ER)
- monthly and annual wind roses using the wind speed classes provided in Regulatory Guide 1.23, *Onsite Meteorological Programs* (NRC 1972), and wind direction persistence summaries at all height(s) at which data on wind characteristics are applicable (from the ER)
- monthly and annual summaries of atmospheric stability (from the ER)
- topographic data presentation should include the following:
 - a map showing the detailed topographic features (as modified by the plant) on a large scale within an 8-km (5-mi) radius^(a) of the station (from the ER)
 - a smaller-scale map showing topography within a 80-km (50-mi) radius of the station (from the ER)
 - a plot of maximum elevation versus distance from the center of the station in each of the sixteen 22½° sectors radiating from the station to a distance of 8 km (5 mi) (from the ER).
- hourly averages of wind speed and direction at all height(s) at which 8-km (5-mi) wind characteristics data are applicable and hourly averages of atmospheric stability (these data should be presented as hour-by-hour data [see Appendix A for an acceptable format] or monthly and annual joint-frequency distributions of wind speed and wind direction by atmospheric stability) (from the applicant upon request)
- detailed descriptions of the models and assumptions used to determine normalized concentration (χ/Q) and/or relative deposition (D/Q). The meteorological data used in these models should be identified. Guidance on acceptable models and necessary input data is provided in Regulatory Guide 1.111, *Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors* (NRC 1977) (from the ER).
- release-point characteristics and effluent characteristics (from ESRPs 3.5 and 3.6 through 3.6.3)
- receptor locations (from ESRP 5.4.1)
- χ/Q and/or D/Q at points of potential maximum concentration outside the site boundary, at points of maximum individual exposure, and at points within a radial grid of sixteen 22½° sectors (centered on true north, north-northeast, northeast, etc.) and extending to a distance of 80 km (50 mi) from the station. A set of data points should be located within each sector at increments of 0.4 km (0.25 mi)

(a) Exceptions to the 8-km (5-mi) site vicinity radius may be required when the land-use descriptions (ESRP 2.2.1) suggest that this is appropriate.

to a distance of 1.6 km (1 mi) from the plant, at increments of 0.8 km (0.5 mi) from a distance of 1.6 km (1 mi) to 8 km (5 mi), at increments of 4 km (2.5 mi) from a distance of 8 km (5 mi) to 16 km (10 mi), and at increments of 8 km (5 mi) thereafter to a distance of 80 km (50 mi). Estimates of χ/Q (undecayed and undepleted; depleted for radioiodines) and D/Q radioiodines and particulates should be provided at each of these grid points (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of site meteorology and air quality are based on the relevant requirements of the following:

- 10 CFR 50, Appendix I, with respect to calculation of air doses from gaseous emissions
- 10 CFR 51.70(b) with respect to the reliability of the meteorological and climatological information
- 10 CFR 51.71(d) with respect to compliance with environmental quality standards and requirements that have been imposed by Federal, State, regional, local, and affected Native American tribal agencies
- 10 CFR 52.18 with respect to reviewing applications for early site permits
- 10 CFR 52.81 with respect to reviewing applications for combined licenses
- 10 CFR 100.10(c) and 10 CFR 100.20(c) with respect to meteorological conditions at the site and in the surrounding area
- 40 CFR 50 with respect to definition of criteria pollutants and National Ambient Air Quality Standards
- 40 CFR 51, Subpart W, with respect to requirements related to determination that the proposed Federal action conforms to applicable implementation plans
- 40 CFR 51, Appendix W, with respect to air-quality models
- 40 CFR 81, Subpart C, with respect to attainment status designations approved by the EPA.

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

- The description of the general climate of the region, including severe weather, should be based on published climatological summaries from nearby representative sites with long periods of record (see references in this ESRP).

- At least one annual cycle from the onsite meteorological program should be used to relate local meteorological conditions to local and regional climatology. Regulatory Guide 1.23, *Onsite Meteorological Programs* (NRC 1972), provides guidance related to onsite meteorology programs. ESRP 6.4 sets forth the staff review plan for evaluation of the onsite meteorological program.
- Atmospheric dispersion models and assumptions described in Regulatory Guide 1.111, *Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors* (NRC 1977), should be used for estimating relative atmospheric concentrations and relative deposition used in calculating individual and population doses from routine releases of radioactive effluents to the atmosphere.
- Atmospheric dispersion models and assumptions described in Regulatory Guide 1.145, *Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants* (NRC 1983), should be used for estimating relative atmospheric concentrations and relative deposition used in calculating individual doses from accidental releases of radioactive effluents to the atmosphere.
- Atmospheric dispersion models and assumptions promulgated by the EPA should be used for air quality assessments.

Technical Rationale

The technical rationale for evaluating the applicant's description of meteorology and air quality is discussed in the following paragraphs:

10 CFR 100.10(c)(2), 10 CFR 100.20(c)(2), and 10 CFR 52.17(a)(1) cover the consideration of meteorological conditions at or near the site. Published climatological summaries for the region provide a basis for defining the general climate of the site and establishing an appropriate context for evaluation of onsite meteorological data.

Onsite meteorological data are needed to evaluate the potential environmental impacts of heat dissipation to the atmosphere and the routine and accidental releases of radiation to the atmosphere. Onsite data for at least one full annual cycle are needed to ensure that the data are representative of site conditions.

Evaluation of compliance with 10 CFR 50, Appendix I, involves staff estimates of the consequences of routine releases of radioactive effluents from the plant. The staff considered various methods of calculating these consequences and presented acceptable methods in Regulatory Guide 1.111.

Evaluation of the environmental consequences of design-basis accidents involves staff estimates of atmospheric dispersion in the vicinity of the plant. The staff considered various methods of calculating these consequences and presented acceptable methods in Regulatory Guide 1.145.

Atmospheric dispersion models and assumptions for assessing the air quality impact of nonradiological atmospheric emissions are described by the EPA. Use of EPA models for air quality calculations will ensure consistency with calculations performed by other agencies.

III. REVIEW PROCEDURES

The reviewer's analysis of meteorology should be closely linked with the impact assessment review described by ESRPs 5.3.3.1 and 5.4 to establish the meteorological characteristics that are most likely to be affected.

To evaluate the applicant's climatological descriptions and meteorological data, the reviewer should compare them with the climatological data available from the National Climatic Data Center (NCDC) and information in climatological references. These references include

- standard climatological references, such as *Weather and Climate* (Koeppel and DeLong 1958) and *Applied Climatology* (Griffiths 1963) that describe the relationship between climate and geography
- other climatological texts, such as *Boundary Layer Climates* (Oke 1978) and *The Climate Near the Ground* (Geiger, Aron, and Todhunter 1995), that describe local climate variability and climate modifications related to man's activities
- climate descriptions for specific regions in the United States that have been prepared by the U.S. Department of Commerce (1968), National Oceanic and Atmospheric Administration and that are found in publications such as *Climatic Atlas of the United States*, *Climates of the States*, and *Local Climatological Data Annual Summaries with Comparative Data*. These publications contain information on meteorological extremes as well as typical conditions.
- up-to-date climatological data and summaries that are available electronically from the NCDC through the Geographical Environmental & Siting Information System (GEN&SIS)
- severe-weather data related to extreme winds, hurricanes, and tornadoes that have been summarized by Cry (1965), Alaka (1968), Simpson and Lawrence (1971), Changery (1982a, b), Ramsdell and Andrews (1986), and Ramsdell et al. (1987)
- more recent severe weather statistics that are available through GEN&SIS and are updated monthly in *Storm Data* published by the NCDC.

To evaluate the applicant's atmospheric transport and dispersion modeling, the reviewer should compare it with the standard dispersion modeling techniques, such as

- atmospheric dispersion modeling techniques that are described in detail in texts including *Meteorology and Atomic Energy—1968* (Slade 1968), *Handbook on Atmospheric Diffusion* (Hanna,

Briggs, and Hosker Jr. 1982), *Atmospheric Science and Power Production* (Randerson 1984), and *Workbook of Atmospheric Dispersion Estimates: An Introduction to Dispersion Modeling* (Turner 1994)

- climatological data specifically related to air quality and atmospheric dispersion that are found in the summaries available from NCDC and in journal articles by Hosler (1961 and 1964) and Holzworth (1972).

Regional Climatological and Local Meteorological Characteristics

When analyzing regional and local meteorological characteristics, the reviewer should take the following steps:

- (1) Assess the general climatic description of the region for completeness and accuracy.
 - Evaluate climatic parameters such as air masses, general airflow, pressure patterns, frontal systems, and temperature and humidity conditions reported by the applicant by comparing them with standard references.
 - Verify the applicant's description of the role of synoptic scale and mesoscale atmospheric processes on local (site) meteorological conditions by comparing it with the descriptions provided in standard references and the reviewer's knowledge of the area.
- (2) Examine the regional meteorological averages and extremes, including severe weather phenomena and air quality conditions, to establish that the data represent site conditions by comparing
 - concurrent offsite and onsite data (e.g., monthly averages of wind speed, wind direction frequency, and precipitation, and monthly averages and diurnal variations of temperature and humidity)
 - offsite data for the concurrent period of onsite data with long-term (about 30 years) offsite data
 - the locations of the stations with respect to major topographic features and airflow patterns (e.g., valley flow, land-sea (lake) breeze circulations, principal storm tracks).
- (3) Evaluate the local (site) meteorological parameters and topographic descriptions of the site area to establish that the data represent conditions at the site and its immediate vicinity by examining the location of the onsite meteorological tower (and other local sources of meteorological data) with respect to local topographic characteristics that could impact local airflow patterns (e.g., local circulation conditions such as "drainage flow") and meteorological parameters such as temperature and humidity.

- (4) Determine if the regional and local meteorological data are appropriate as bases for the applicant's evaluation of potential changes in normal and extreme values, severe weather phenomena, and air quality conditions resulting from station construction and operation. (This information may be cross-referenced from Chapter 5.0 of the applicant's ER.)
- (5) Analyze the proposed terrain modifications (e.g., removal of trees, leveling of ground, installation of lakes and ponds) resulting from station construction and predict the potential effects of these modifications on local meteorological characteristics with respect to the adequacy of available data considering these modifications.
- (6) Determine the adequacy of data on regional climatological and local meteorological conditions and phenomena as bases for assessing the effects on design and siting of the station and heat dissipation system and as bases for assessing the impact on the atmospheric environment resulting from station construction and operation.
- (7) Review regional and local meteorological data for appropriateness as input to predictive models for assessing cooling system impacts on the atmospheric environment by considering the types and frequencies of available meteorological measurements, the elevations at which measurements are made, the selected cooling system design, and the height of effluent release to the atmosphere.

Meteorological Input to Individual Dose Assessment

When analyzing meteorological input to individual dose assessment, the reviewer should take the following steps:

- (1) Obtain the following information from the ESRP reviewers listed below:
 - ESRP 3.5—a description of release point characteristics (i.e., elevation above grade, inside vent or stack diameter, physical shape, flow rate, effluent temperature, exit velocity, release frequency, and duration and type of effluent) for each point of routine release of radioactive effluent to the atmosphere
 - ESRP 5.4.1—the locations of the nearest receptors (cow, goat, vegetable garden, residence, and site boundary) in each $22\frac{1}{2}^\circ$ sector.
- (2) Compare the atmospheric transport and diffusion models used by the applicant for calculations of χ/Q and D/Q to transport and diffusion modeling concepts (as described in Regulatory Guide 1.111) applicable to local topographic and meteorological characteristics and to the type and mode of release appropriate to the plant.
- (3) Examine atmospheric transport and diffusion parameters for applicability to local topographic and meteorological characteristics by considering the experimental bases for these parameters with respect to the local conditions.

(4) Compare the meteorological data provided by the applicant for use in the atmospheric transport and diffusion modes for compatibility with the models used and verify the completeness and adequacy of the description of local atmospheric transport and diffusion characteristics (as discussed in Regulatory Guides 1.23 and 1.111).

- Evaluate the meteorological data for appropriateness of heights of measurement of wind speed, wind direction, and atmospheric stability.
 - Winds measured at the 10-m level and temperature difference measurements (as an indicator of atmospheric stability) between the 10-m level and height of the building or vent are acceptable for consideration of ground-level releases.
 - For releases considered elevated, (1) winds reasonably representative of conditions at the height of release, and (2) temperature difference measurements reasonably representative of the atmospheric layer, into which the effluent will be released, are acceptable.
- Examine mixing height data for considerations of restrictions to the vertical spread of the effluent.
- Examine precipitation data for considerations of the effects of washout on estimates of atmospheric transport, diffusion, and deposition.

(5) Evaluate estimates of relative concentration (including consideration of radioactive decay during transport and depletion of radioiodines and particulates) and relative deposition (including the effects of wet deposition) used by the applicant for assessing the individual doses resulting from routine releases of radioactive effluent to the atmosphere to verify that these estimates are complete and appropriate to local conditions. Depending on the level of confidence in the applicant's model and considering the extent, applicability, and representative nature of the available meteorological data, the reviewer may make an independent analysis of relative concentration and relative deposition values at each receptor using the transport and dispersion models described in Regulatory Guide 1.111.

Meteorological Input to Population-Dose Assessment

When evaluating meteorological input to population dose assessment, the reviewer should take the following steps:

- (1) Verify that the release point characteristics are the same as those used for input to the individual dose assessments.

- (2) Compare the atmospheric transport and diffusion models used by the applicant for calculations of relative concentration and relative deposition with transport and diffusion modeling concepts (as described in Regulatory Guide 1.111) applicable to regional (i.e., out to a distance of 80 km from the site) modeling.
- Give special consideration to topographic and meteorological characteristics (narrow, deep valleys, land sea [lake] breeze regimes, restricted mixing heights, fumigation conditions, and low-level subsidence inversions of temperature) to ensure that they are applicable to the type and mode of releases from the plant.
 - Examine the atmospheric transport and diffusion parameters for applicability to regional topographic and meteorological characteristics by considering the experimental bases for these parameters with respect to regional conditions.
- (3) Compare the meteorological data provided by the applicant for use in the atmospheric transport and diffusion models for compatibility with the models used and verify the completeness and adequacy of the description of regional atmospheric transport and diffusion characteristics as discussed in Regulatory Guides 1.23 and 1.111.
- Evaluate meteorological data for appropriateness of heights of measurements of wind speed, wind direction, and atmospheric stability.
 - Winds measured at the 10-m level and temperature difference measurements to indicate atmospheric stability between the 10-m level and height of the building or vent are acceptable for consideration of ground-level releases.
 - For releases considered elevated, winds reasonably representative of conditions at the height of release and reasonable estimates of the temperature of the atmospheric layer into which the effluent will be released are acceptable.
 - Examine mixing height data for considerations of restrictions to the vertical spread of the effluent.
 - Examine precipitation data for considerations of the effects of washout on estimates of atmospheric transport and diffusion.
- (4) Evaluate estimates of relative concentration (including consideration of radioactive decay during transport and depletion of radioiodines and particulates) and relative deposition used by the applicant for an assessment of the population doses resulting from routine releases of radioactive effluent to the atmosphere to verify that these estimates are complete and appropriate to regional conditions. These estimates should encompass all individuals living within 80 km of the facility. Depending on the level of confidence in the applicant's model and considering the extent, applicability, and representativeness of the available meteorological data, the reviewer may independently analyze

relative concentration and relative deposition values for 16 directions in segments of 0.8-1.6 km (0.5-1 mi), 1.6-3.2 km (1-2 mi), 3.2-4.8 km (2-3 mi), 4.8-6.4 km (3-4 mi), 6.4-8.0 km (4-5 mi), 8.0-16 km (5-10 mi), 16-32 km (10-20 mi), 32-48 km (20-30 mi), 48-64 km (30-40 mi), and 64-80 km (40-50 mi) using the transport and diffusion models described in Regulatory Guide 1.111.

Meteorological Input to Plant-Accident Assessments

When analyzing meteorological input to plant accident assessments, the reviewer should take the following steps:

- (1) Compare the atmospheric transport and diffusion models used by the applicant for calculations of χ/Q and D/Q for accident consequence assessments to state-of-the-art transport and diffusion modeling concepts (as described in Regulatory Guide 1.145) applicable to local topographic and meteorological characteristics and to the type and mode of release appropriate to the plant. For environmental assessment purposes, nominal meteorological conditions are determined rather than the adverse conditions determined for safety assessments.
- (2) Examine atmospheric transport and diffusion parameters for applicability to local topographic and meteorological characteristics by considering the experimental bases for these parameters with respect to the local conditions. The release point characteristics should be the same as those used for input to the individual dose assessments.

Regional and Local Air Quality Characteristics

When analyzing regional and local air quality characteristics, the reviewer should take the following steps:

- (1) Assess the description of the existing regional air quality for completeness and accuracy.
- (2) Identify the air pollutants for which there are non-attainment or maintenance areas in the region.
- (3) Determine the emissions expected from plant construction or operation activities, as appropriate. Work force vehicular emissions should be estimated.
- (4) Evaluate the impact of emissions from plant construction and operation on existing air quality. If the site is within or near a non-attainment or maintenance area, a conformity analysis may be required (see 40 CFR 51, Subpart W).
- (5) Determine whether appropriate permits have been obtained.

Early Site Permit Reviews

When conducting a meteorological review of an early site permit (ESP) application, the reviewer should take the following steps:

- (1) Refer to 10 CFR 52, which specifies the requirements and procedures applicable to the Commission's issuance of early site permits for approval of a site or sites for one or more nuclear power facilities separate from the filing of an application for a construction permit (CP) or combined license (COL).
- (2) Note that application for an early site permit must include the
 - number
 - type and thermal power levels of the facilities for which the site may be used
 - boundaries of the site
 - proposed general location of each facility
 - maximum radiological and thermal effluents that each facility will produce
 - types of cooling systems that may be associated with each facility
 - meteorological characteristics of the proposed site.

The scope and level of detail needed for meteorological review of an ESP application are the same as for review of a CP application under 10 CFR 51, except that the focus of the review is on the effects of construction and operation of a reactor, or reactors, which have characteristics that fall within the postulated site parameters.

IV. EVALUATION FINDINGS

The depth and extent of the input to the environmental impact statement (EIS) will be governed by the environmental characteristics of meteorology that could be affected by plant construction and operation, and by the nature and magnitude of expected impacts to the atmospheric environment. The following information should be included in the EIS:

- a description of the general climate of the region, including types of air masses, synoptic features, general airflow patterns, and climatological normals of parameters, such as temperature and precipitation
- a discussion of the severe weather phenomena (e.g., tornadoes, hurricanes, thunderstorms, atmospheric stagnation episodes) experienced in the region with expected frequencies of occurrence and measured extremes of parameters, such as temperature and precipitation
- a description of the local airflow patterns and characteristics, using data collected from the onsite meteorological measurements program

- a description of the atmospheric transport and diffusion characteristics in the region (out to a distance of 80 km [50 mi] from the site) and at the site and vicinity, which should include references to the diffusion models used and identification of the input data considered.

For reviews related for CP, operating license (OL), COL, and ESP applications, the reviewer should verify that sufficient information has been provided and that NRC staff evaluation supports concluding statements of the following type to be included in the EIS:

- The staff reviewed the onsite meteorological data presented by the applicant. Based on this review, the staff concludes that the meteorological data provide an adequate basis for estimating atmospheric transport and diffusion for this environmental statement.

If the meteorological data are not adequate, an alternative statement similar to the following should be included followed by a list of the adjustments made:

- The staff reviewed the onsite meteorological data presented by the applicant. Based on this review, the staff concludes that the meteorological data do not provide an adequate basis for estimating atmospheric transport and diffusion for this EIS. Therefore, the staff have applied the following conservatisms to relative concentration and relative deposition estimates: ...

For COL applications pursuant to 10 CFR 52 Subpart C that reference an ESP, the staff review focuses on whether the design of the facility falls within the parameters specified in the ESP and any other significant environmental issues not covered in any proceeding on the site or design. In this case, the staff should include statements of the following type:

- The staff reviewed the meteorological and climatological parameters specified in the early site permit and the facility design. The staff concludes that the facility design falls within the site parameters.
- The staff reviewed the climatological and meteorological characteristics of the site, the facility design, and previous proceeding related to the site and design. On the basis of these reviews, the staff concludes that all significant issues related to the atmosphere have been considered in previous proceedings.

If the staff are unable to reach these conclusions, statements of the following type should be included followed by descriptions of the exceptions and conclusions regarding the exceptions:

- The staff reviewed the meteorological and climatological parameters specified in the early site permit and the facility design. The staff concludes that the facility design falls within the site parameters except....

- The staff reviewed the climatological and meteorological characteristics of the site, the facility design, and previous proceeding related to the site and design. On the basis of these reviews, the staff concludes that all significant issues related to the atmosphere have been considered in previous proceedings except....

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low As Is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents."

10 CFR 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

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

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

10 CFR 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."

10 CFR 52.17, "Contents of application."

10 CFR 52.18, "Standards for review of applications."

10 CFR 52.81, "Standards for review of applications."

10 CFR 100.10, "Factors to be considered when evaluating sites."

10 CFR 100.20, "Factors to be considered when evaluating sites."

40 CFR 50, "Primary and Secondary Ambient Air Quality Standards."

40 CFR 51, Subpart W, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans."

40 CFR 51, Appendix W, "Guidelines on Air Quality Models."

40 CFR 81, Subpart C, "Section 107 Attainment Status Designations."

Alaka, M. A. 1968. "Climatology of Atlantic Tropical Storms and Hurricanes," ESSA Technical Report WB-6, Techniques Development Laboratory, Silver Spring, Maryland.

Changery, M. J. 1982a. *Historical Extreme Winds for the United States—Atlantic and Gulf of Mexico Coastlines*. NUREG/CR-2839, U.S. Nuclear Regulatory Commission, Washington, D.C.

Changery, M. J. 1982b. *Historical Extreme Winds for the United States—Great Lakes and Adjacent Regions*. NUREG/CR-2890, U.S. Nuclear Regulatory Commission, Washington, D.C.

Cry, G. W. 1965. "Tropical Cyclones of the North Atlantic Ocean," Technical Paper No. 55, U.S. Department of Commerce, Weather Bureau, Washington, D.C.

Geiger, R., R. H. Aron, and P. Todhunter. 1995. *The Climate Near the Ground*. Vieweg Publishing, Wiesbaden.

Griffiths, J. F. 1963. *Applied Climatology*, Oxford University Press, New York.

Hanna, S. R., G. A. Briggs, and R. P. Hosker, Jr. 1982. *Handbook on Atmospheric Diffusion*. DOE/TIC-11223, U.S. Department of Energy, Washington, D.C.

Holzworth, G. C. 1972. "Mixing Heights, Wind Speed, and Potential for Urban Air Pollution Throughout the Contiguous United States," AP-101, U.S. Department of Health, Education and Welfare, Environmental Protection Agency, Washington, D.C.

Hosler, C. R. 1961. "Low Level Inversion Frequency in the Contiguous United States," *Monthly Weather Review* 89(9):319-339.

Hosler, C. R. 1964. "Climatological Estimates of Diffusion Conditions in the United States," *Nuclear Safety*, Vol. 5, pp. 184-192.

Koeppe, C. E., and G. C. Delong. 1958. *Weather and Climate*, McGraw-Hill Book Company, New York.

Oke, T. R. 1978. *Boundary Layer Climates*. Methuen & Co., New York.

Ramsdell, J. V., and G. L. Andrews. 1986. *Tornado Climatology of the Contiguous United States*. NUREG/CR-4461, U.S. Nuclear Regulatory Commission, Washington, D.C.

Ramsdell, J. V., J. M. Hubbe, D. L. Elliott, and C. G. Holladay. 1987. *Climatology of Extreme Winds in Southern California*. NUREG/CR-4801, U.S. Nuclear Regulatory Commission, Washington, D.C.

Randerson, D. 1984. *Atmospheric Science and Power Production*. DOE/TIC-27601, U.S. Department of Energy, Washington, D.C.

Simpson, R. H. and M. B. Lawrence. 1971. "Atlantic Hurricane Frequencies Along the U.S. Coastline," NOAA Technical Memorandum NWS SR-58, Southern Region, National Weather Service, Fort Worth, Texas.

Slade, D. (ed.). July 1968. "Meteorology and Atomic Energy - 1968," TID-24190. (Available from the National Technical Information Service, Springfield, Virginia.)

Turner, D. B. 1994. *Workbook of Atmospheric Dispersion Estimates: An Introduction to Dispersion Modeling*. CRC Press, Boca Raton, Florida.

U.S. Department of Commerce. 1968. *Climatic Atlas of the United States*, Environmental Data Service, Environmental Science Service Administration, Washington, D.C.

U.S. Department of Commerce. *Local Climatological Data, Annual Summary with Comparative Data*, Environmental Data Service, published annually.

U.S. Department of Commerce, *Storm Data*, Environmental Data Service, Asheville, North Carolina, published monthly.

U.S. Nuclear Regulatory Commission (NRC). 1972. *Onsite Meteorological Programs*. Regulatory Guide 1.23, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1977. *Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors*. Regulatory Guide 1.111, Rev. 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1983. *Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants*. Regulatory Guide 1.145, Rev 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1987. *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, Section 2.3.3. Appendix A, "Recommended Format for Hourly Meteorological Data to be Placed on Magnetic Tape"*. NUREG-0800, Washington, D.C.

APPENDIX A

STANDARD FORMAT FOR HOURLY METEOROLOGICAL DATA

When hourly meteorological data are submitted to the NRC, the data may be submitted on mutually-agreed-upon media. The data should be in files that are of a size that are convenient for use and storage. Annual data files are acceptable.

Data processing by the NRC staff will be facilitated if the data files are written as formatted, sequential access ASCII files with one hour of data per record. Data within a record should be right justified. Extraneous characters should not be included in the data format. For example, the decimal point should not be written unless there are numerical values. Similarly, blanks may be used to indicate missing data, but zeros should not be used because they are interpreted as real data.

A note (ReadMe file) that describes the files should be included with each submission to NRC. This note should describe how the files were created (type of machine, operating system, and programming language), list the contents of each file, and contain a brief description of the meteorological data. The meteorological data description should include the heights of the wind sensors. The description may also include a discussion of data processing that occurred before the data files were created.

Use a standard record format for hourly meteorological data. The standard data format is similar to the format described in Appendix A of Standard Review Plan 2.3.3 (NRC 1987). The only differences are in the first two fields of the data records. The second field has been increased to permit specification of the year using four digits rather than two, and the first field has been reduced from six bytes to four bytes and is now specified as a character string rather than an integer. The format for the remainder of the record is identical to the format in SRP 2.3.3.

At the beginning of each file, use the first five records to give a data description. Include plant name, location (latitude, longitude), dates of data, information explaining data contained in the "other" fields if they are used, height of measurements, and any additional information pertinent to identification of the tape. Make sure all five records are included, even if some are blank. Format for the first five records will be 160A1. Meteorological data format is (A4, I4, I3, I4, 25F5.1, F5.2, 3F5.1). Table 2.7-1 shows the size and content of each field in the meteorological data records in the standard format. In addition, it provides a form for recording supporting information about the meteorological instrumentation.

All data should be given to the tenth of a unit, except solar radiation, which should be given to a hundredth of a unit. This does not necessarily indicate the accuracy of the data (e.g., wind direction is usually given to the nearest degree). All nines in any field indicate a lost record (99999). All sevens in a wind-direction field indicate calm (77777). If there are only two levels of data, use the upper and lower levels. If there is only one level, use the upper level.

Table 2.7-1. Hourly Meteorological Data

LOCATION:

DATE OF DATA RECORD:

- A4 Identifier (can be anything)
- I4 Year
- I3 Julian Day
- I4 Hour (on 24-hour clock)

ACCURACY

- F5.1 Upper Measurements: Level = _____ meters _____
- F5.1 Wind Direction (degrees) _____
- F5.1 Wind Speed (meter/sec) _____
- F5.1 Sigma Theta (degrees) _____
- F5.1 Ambient Temperature (°C) _____
- F5.1 Moisture: _____
- F5.1 Other: _____

- F5.1 Intermediate Measurements: Level = _____ meters _____
- F5.1 Wind Direction (degrees) _____
- F5.1 Wind Speed (meter/sec) _____
- F5.1 Sigma Theta (degrees) _____
- F5.1 Ambient Temperature (°C) _____
- F5.1 Moisture: _____
- F5.1 Other: _____

- F5.1 Lower Measurements: Level = _____ meters _____
- F5.1 Wind Direction (degrees) _____
- F5.1 Wind Speed (meter/sec) _____
- F5.1 Sigma Theta (degrees) _____
- F5.1 Ambient Temperature (°C) _____
- F5.1 Moisture: _____
- F5.1 Other: _____

Table 2.7-1. (contd)

| | | |
|-------------|--|-------|
| <u>F5.1</u> | Temp. Diff. (Upper-Lower) (°C/100 meters) | _____ |
| <u>F5.1</u> | Temp. Diff. (Upper-Intermediate) (°C/100 meters) | _____ |
| <u>F5.1</u> | Temp. Diff. (Intermediate-Lower) (°C/100 meters) | _____ |
| <u>F5.1</u> | Precipitation (mm) | _____ |
| <u>F5.1</u> | Solar Radiation (cal/cm ² /min) | _____ |
| <u>F5.1</u> | Visibility (km) | _____ |
| <u>F5.1</u> | Other: _____ | _____ |
| <u>F5.1</u> | Other: _____ | _____ |



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

2.8 RELATED FEDERAL PROJECT ACTIVITIES

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) (1) directs the staff's identification, description, and environmental assessment of Federal activities that are related to the proposed project, and (2) identifies the possible need for another Federal agency to participate in the preparation of the environmental impact statement (EIS) as a cooperating agency.

The scope of the review directed by this plan will be limited to directly related Federal project activities that affect plant siting or transmission line routing, plant water supply, or the need for power. Actions related only to the granting of licenses, permits, or approvals by other Federal agencies should not be considered in this review because such activities typically have an independent environmental review. When relevant activities are identified, the results of this review will form the basis for an assessment of the interrelationship and cumulative environmental impacts of the proposed project and the related Federal activity and the potential need for another agency to participate in the EIS process as a cooperating agency.

Review Interfaces

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

- ESRPs 1.1 and 1.2. Provide information in the EIS that reflects possible cumulative impacts of related Federal projects.

October 1999

2.8-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP Chapters 4.0 and 5.0. Provide descriptive information in ESRP 2.8 in sufficient detail to support the impact assessments presented in ESRP Chapters 4.0 and 5.0. Determine which sections are appropriate on the basis of the identified Federal activities' actions that have significant project related impacts.
- ESRP Chapter 10.0. Provide the reviewers for ESRP Chapter 10.0 with information for their consideration regarding the impacts associated with the identified Federal activities.

The reviewer should also obtain information on cumulative environmental inputs of any related Federal projects. If there are related Federal projects, information from other ESRPs on the principal land-use, hydrology, water uses and quality, terrestrial and aquatic ecology, socioeconomics, geology, and meteorology features of the site and vicinity needs to be obtained in sufficient detail to allow for an evaluation of cumulative impacts resulting from related Federal projects.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail will be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- a description of Federal actions associated with acquisition and/or use of the proposed site and transmission corridors or of any other offsite property needed for the proposed project (from the environmental report [ER])
- a description of planned Federal projects that will be required either to provide an adequate source of plant cooling water or to ensure an adequate supply of cooling water over the operating lifetime of the plant (from the ER and also consultations with Federal, State, local, and affected Native American tribal agencies)
- descriptions of any other planned Federal projects or activities that must be completed as a condition of plant construction or operation (from the ER and consultations with appropriate Federal agencies)
- Federal agency plans or commitments that will result in significant new power purchases within the applicant's service area that have been used to justify a need for power (from the ER and consultation with appropriate Federal agencies)
- descriptions of planned Federal projects that are contingent on plant construction and operation (from the ER and consultation with appropriate Federal agencies).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of information on related Federal-project activities and the possible need for one or more cooperating agencies in preparation of the EIS are based on the relevant requirements of the following:

- 40 CFR 1508.25 and 10 CFR 51.14(b) with respect to the scope of an EIS and consideration of the cumulative impacts of connected, cumulative, and similar actions
- 40 CFR 1501.6, 10 CFR 51.10(b)(2), and 10 CFR 51.14 with respect to the possible need for cooperating agencies in the preparation of the EIS
- 10 CFR 51.29(a)(7) with respect to the possible need to identify cooperating agencies.

Data provided by the applicant will generally be adequate if future actions of other Federal agencies that are connected with, cumulative with, or similar to the NRC action are identified and described in sufficient detail to enable an assessment to be made.

Technical Rationale

The technical rationale for identifying related Federal-project activities is discussed in the following paragraph:

The bases for the need for the information called for in this ESRP are 40 CFR 1508.25 and 40 CFR 1501.6. The Council on Environmental Quality's (CEQ's) definition of the term "scope" at 40 CFR 1508.25 calls for Federal agencies to consider the cumulative impacts of related actions that are connected, cumulative, or similar when determining the appropriate scope for an EIS. The terms "connected," "cumulative," and "similar" are defined in 40 CFR 1508.25(a). NRC has indicated that it will follow CEQ's definition of scope (10 CFR 51.14[b]). In some cases, it may be necessary or desirable for another Federal agency to participate in preparation of the EIS when actions of the agency are related to those of NRC. The CEQ regulations provide (at 40 CFR 1501.6) for cooperating agencies in certain instances in the preparation of an EIS. NRC has indicated that it will follow (with certain exceptions) the provisions of 40 CFR 1501.6 (10 CFR 51.10[b][2]). NRC defines the term "cooperating agency" (in 10 CFR 51.14) as a Federal agency, other than the NRC, that has jurisdiction by law or special expertise for an environmental impact being considered by NRC in an environmental document for a proposed action that can significantly affect the quality of the human environment. The definition also provides that in appropriate cases, a State, local government entity, or Native American tribe may become a cooperating agency by agreement with the Commission. When reasonably significant impacts associated with actions of another agency are identified through the ER, the scoping process, or otherwise, and these impacts are significant enough to justify the participation of the agency(ies) in the NRC EIS process, NRC staff should identify such potential cooperating agency(ies) and determine appropriate writing assignments and schedules for preparation of the EIS (10 CFR 51.29[a][7]).

III. REVIEW PROCEDURES

When analyzing the related Federal-project activities, the reviewer should take the following steps:

- (1) Identify the planned activities of other Federal agencies that are directly related to the proposed project (i.e., that either would not be undertaken or would be of lesser scope if the project had not been proposed or is not approved). As noted in Section I (Areas of Review), above, activities of other Federal agencies related only to the granting of licenses, permits, or approvals will not be considered in this review.
 - When relevant Federal activities are identified, contact the EPA Office of Federal Activities for assistance and regional and local representatives of Federal agencies to obtain relevant information.
 - When no such Federal activities can be identified, terminate the review and state in ESRP 2.8 that the review identified no related Federal activities.
- (2) Determine the specific relationships of each identified activity with the proposed project by categorizing them as
 - activities that are requisites to project construction (e.g., sale or transfer of Federal land)
 - activities that justify some of the need for power (e.g., a planned Federal project that will depend on power to be supplied by the proposed project)
 - a planned Federal project that will not or cannot be accomplished unless the plant is constructed.
- (3) Determine the significance of any related Federal activity on the project by conducting a preliminary analysis of each identified Federal activity to determine in general terms the nature and extent of the environmental impacts that would be cumulative with those of the proposed project.
 - When the reviewer determines that these impacts are minor, no further consideration of the activity is required.
 - As a general rule, if the Federal agency responsible for the Federal activity has determined that preparation of an EIS is required, the staff may conclude that the impacts are of sufficient scope to merit further analysis of the activity to determine those impacts that would be cumulative with those of the proposed project.
- (4) Consider whether the Federal agency should be a cooperating agency on the NRC EIS.

(5) If the environmental impacts of the related Federal activity could be significant, conduct a further analysis of each such activity to the extent necessary to identify those probable environmental impacts (and potential benefits) that could be expected as a result of construction and operation of the proposed project.

- Limit the impacts and benefits to be considered to those having a direct relationship with the proposed project and those that will add to or subtract from an impact or benefit (e.g., land use, transmission corridor clearing, and/or aquatic impacts) predicted for the proposed project.
- Consider only those activities associated with the primary functions of the related activity (e.g., construction and operation of a Federal facility) and, except for unusual circumstances, do not address secondary effects (such as induced industrial/community growth).
- Provide this information to the appropriate ESRP Chapter 4.0 and 5.0 reviewers for their consideration in determining the cumulative impacts of the proposed project and the related Federal activity.

(6) Ensure that

- relevant Federal activities have been identified
- their interrelationships with the proposed project have been described
- all activities having potentially significant environmental impacts have been described in sufficient detail to permit a subsequent environmental impact analysis to determine the cumulative effects of these impacts with those of the proposed project. In particular, take the following steps:
 - Based on an overview of the proposed project activities, consultations with local and regional representatives of Federal agencies, and any input supplied by cooperating agencies, determine if relevant Federal activities have been identified and whether their interrelationships with the proposed project have been described.
 - Based on your experience and on consultation with the appropriate ESRP Chapter 4.0 and 5.0 reviewers, determine which of the identified Federal activities will have environmental impacts that would be cumulative with impacts of the proposed project and that are of sufficient magnitude to be considered in subsequent ESRP Chapter 4.0 and 5.0 assessments of cumulative impacts.
 - Ensure that the Federal activities selected for consideration have been described in sufficient detail to permit an environmental impact assessment to be made.

- make a preliminary determination as to whether any other Federal agency (or in some cases a State, regional, local, or affected Native American tribal agencies) should be contacted about their interest in becoming a cooperating agency on the NRC EIS.

IV. EVALUATION FINDINGS

The depth and extent of the input to the EIS will be governed by the nature of the related Federal activities and the extent to which the significant impacts of these activities (both beneficial and adverse) are cumulative with impacts of the proposed project. The following information should be included in the EIS:

- a list of related Federal activities and their interrelationships with the proposed project, using the categories described in Section III(2) of this ESRP
- identification of the activities that have no significant impacts and the staff's basis for this conclusion
- for those activities having potentially significant environmental impacts that would be cumulative with those of the proposed project, a brief description of the overall activity and a sufficiently detailed description of those portions of the activity related to the proposed project as needed to provide the necessary background information to support the assessments of cumulative impacts in ESRP Chapters 4.0 and 5.0.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.10, "Purpose and scope of subpart; application of regulations of Council on Environmental Quality."

10 CFR 51.14, "Definitions."

10 CFR 51.29, "Scoping—environmental impact statement."

40 CFR 1501.6, "NEPA and Agency Planning: Cooperating Agencies."

40 CFR 1508.25, "Terminology and Index: Scope."



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

3.0 PLANT DESCRIPTION

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the plant. The scope of the paragraph covered by this plan is to introduce the material to be presented in the EIS based on the reviews conducted under ESRPs 3.1 through 3.8.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

The introductory paragraph prepared under this ESRP should be consistent with the intent of the following regulation:

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

October 1999

3.0-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's plant description is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 3.1 through 3.8. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

3.1 EXTERNAL APPEARANCE AND PLANT LAYOUT

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the planning, layout, and appearance of the proposed plant and existing station structures and any related offsite structures. The scope of the review directed by this plan should include (1) the layout, landscaping, and architectural features of the proposed project and any other existing station structures and (2) the aesthetic concepts and visual concerns that have been considered in the planning and design of the proposed project. This should include related facilities such as station access roads and railroads. This review should provide input to other reviews dealing with evaluation of construction and operational impacts on land use and to other sections dealing with aesthetic considerations for plant alternatives. Sufficient detail should be included to permit reviewers to understand the significance of potential aesthetic and visual impacts and the aesthetic concepts used in the design to integrate the project into the surrounding environmental settings. The plant layout and other figures should be referenced in the environmental impact statement (EIS) sections when referring to the location of the plant or station structures.

Review Interfaces

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

- ESRPs 2.2.1 through 2.2.3. Provide the station description and its relation to the site and vicinity.
- ESRPs 2.5.3, 4.2.1, 4.2.2, 4.3.1, 4.3.2, and 6.5.1. Provide the plant description, the site layout, and planned transmission corridors.

October 1999

3.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 3.4.1. Provide descriptive information to support the cooling tower site descriptions, if any.
- ESRP 4.1.1 through 4.1.3. Provide descriptive information to support the land-use assessments.
- ESRP 4.4.1. Provide descriptive information to support the assessment of sociological impacts during construction.
- ESRP 5.1. Provide descriptive information to support the land-use assessment.
- ESRPs 5.3.1.1, 5.3.1.2, and 5.3.2.1. Provide a description of the plant layout, specifically with respect to the main water bodies and locations of intakes and discharges.
- ESRP 5.3.3.1. Provide descriptive information to support the assessment of visual impacts of the cooling tower plume (if applicable).
- ESRP 5.8.1. Provide descriptive information to support the socioeconomic assessment station operation.
- ESRP 9.4.1. Provide a description of the proposed plant's external appearance and layout for comparison of the aesthetic impacts and potential recreational benefits of each alternative system with those of the proposed system.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- topographic maps of the site and vicinity (refer to ESRP 2.2) showing plant and station layout, the exclusion area, site boundary, liquid and gaseous release points (and their elevations), meteorological towers, the construction zone, land to be cleared, waste disposal areas, and other buildings and structures (both temporary and permanent) associated with the project (from the environmental report [ER])
- a description of the station, including proposed plans to seclude and screen the facilities and to architecturally integrate the buildings and landscaping into the environs (from the ER)
- aesthetic principles and concepts used in the plant design and layout (from the ER)
- representative ground-level photographs of the site on which major station features are superimposed. These should be taken from among the following typical vantage points when a visual impact from that location can be expected (from the ER):

- residential
 - commercial
 - industrial
 - educational
 - transportation corridors (air, auto, rail, pedestrian)
 - cultural (recreational, historic, archaeological).
- a low, oblique aerial photograph of the site and vicinity on which major station features are superimposed (from the ER)
 - an architectural rendering of the proposed project to include landscaping and all major station features (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the external appearance and plant layout are based on the relevant requirements of the following:

- 10 CFR 51.45 with respect to requirements of a description of the affected environment.

Regulatory positions and specific criteria 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 location and orientation of the principal station structures.

Technical Rationale

The technical rationale for evaluating the applicant's external appearance and plant-layout description is discussed in the following paragraph:

A description of the overall appearance of the facility as proposed by the applicant is needed to clarify the physical scope of the proposed project and for assessing visual impacts in ESRP Chapters 4.0 and 5.0. The description of the external appearance of the plant and plant layout should be in sufficient detail to form an adequate basis for staff analysis of various land-use and socio-economic impacts of the plant.

III. REVIEW PROCEDURES

The reviewer should ensure that planning, layout, and external appearance information is adequate to serve as a basis for (1) assessing land-use impacts, (2) determining potential visual and aesthetic impacts to the surrounding environment, and (3) determining the extent to which aesthetics were considered in integrating the proposed project with the surrounding environment.

When analyzing the external appearance and plant layout, the reviewer should take the following steps:

- (1) Review plant and station layout and external appearance data to the extent needed to prepare a description of the plant and station. This includes visiting the site to ensure that the major features of the site and station have been recorded and that the descriptive material to be used in the environmental impact statement (EIS) is correct.
- (2) Determine the potential visibility of plant structures in relationship to locations of local facilities that might be affected in the site vicinity (e.g., large business establishments with a high degree of visitor use, recreation areas, other public-use facilities, residential areas, or any *National Register* properties).
 - Let the extent of this analysis be governed by the potential for visual (aesthetic) impact.
 - Consider seasonal effects (e.g., presence or absence of foliage) in determining potential visibility.
- (3) Determine the relationship of the plant design and layout to the surrounding environment, including any aesthetic amenities of the site and vicinity.

IV. EVALUATION FINDINGS

The depth and extent of the input to the EIS should be governed by aesthetic and land-use considerations that could be affected by station layout and by the nature and magnitude of the expected impacts. The following information should be included in the EIS:

- a summary description of the proposed project, including principal structures and other visible features (e.g., cooling towers, buildings, access roads, and intake and discharge structures) and a statement of the aesthetic concepts used to integrate these structures into the surrounding environment
- the site and station layout
- aerial photograph(s) of the site on which major project features are superimposed
- where there are significant local facilities in the site vicinity (i.e., large business establishments with a high degree of visitor use, recreation areas, other public-use facilities, or *National Register* properties), one or more ground-level photographs of the site taken from these facilities on which major plant features are superimposed. These photographs should be representative of potential visual impacts.
- an architectural rendering of the plant, including landscaping.

These characteristics should be described in sufficient detail so that a decision can be reached regarding aesthetic environmental impacts.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report—general requirements."

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**

OFFICE OF NUCLEAR REACTOR REGULATION

3.2 REACTOR POWER CONVERSION SYSTEM

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the reactor and electric generating equipment. The scope of the review directed by this plan includes the type(s) and size(s) of reactors and electrical generating equipment and their major performance parameters. This information should support subsequent environmental reviews that assess operational impacts and commitments of resources.

Review Interfaces

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

- ESRP 3.4.2. Provide information on the reactor and plant system description and performance parameters as they pertain to the cooling system.
- ESRP 3.8. Provide data on the basic reactor, fuel, and irradiation level that are required by paragraph (a) of 10 CFR 51.52.
- ESRP 5.3.2. Provide a description of cooling system materials that could be transported to the aquatic environment.
- ESRP 10.2. Provide input for the list of irreversibly committed materials to be used in the reactor-power conversion system.

October 1999

3.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- the number of units and description of each reactor, including type, e.g., boiling-water reactor (BWR), pressurized-water reactor (PWR), high-temperature gas-cooled reactor (HTGR), vendor, architect-engineer, contractor, fuel assembly description, total quantities of uranium, and percentage ^{235}U enrichment (from the environmental report [ER])
- engineered safety features
- the planned average irradiation level of spent fuel, in megawatt days/ton (from the ER)
- a description of the turbines and condensers. For the condensers, include tubing material and total heat transfer area (from the ER).
- the rated and design core thermal power, the rated and design gross electrical output, and the rated and design net electrical output (in megawatts). The rated power is defined as the power level at which each reactor will be operated if licensed, and the design power is defined as the highest power level that would be permitted by plant design. The gross electrical output is the power level measured at the output terminals of the generator and expressed in MWe. The net unit electrical output is equal to the gross electrical output minus the nominal service and auxiliary loads (from the ER).
- a simplified flow diagram for the reactor-power conversion system (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for evaluating the description of the reactor and plant system are based on the relevant requirements of the following:

- 10 CFR 52.17 with respect to the number of units, type, and thermal-power level associated with the proposed facility
- 10 CFR 51.52 with respect to the environmental effects that arise from the transportation of fuel and waste from the facility. Note: Evaluation of transportation issues per Table S-4 should make use of the design power levels and projected actual burn up rate rather than those identified in Table S-4.

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 inclusion of information concerning the reactor-power conversion system.
- Generic determinations have been made that the environmental effects of transportation of spent fuel are bounded by those in Table S-4 for enrichment up to 5% uranium-235 by weight and fuel irradiation to 62,000 megawatt days per ton, provided that the fuel is shipped more than 5 years after discharge from the reactor (NRC 1996, NRC 1999a, 64 FR 48496).

Technical Rationale

The technical rationale for evaluation of the applicant's reactor-power conversion system description is discussed in the following paragraph:

A description of the overall nuclear energy generating system being proposed is crucial background information to the evaluation of any associated environmental impacts resulting from the proposed project. The reactor type, number of units, thermal-power level, and other factors influence the size and the performance of the facility and are required to assess the environmental impacts of the plant operation, transportation of fuel and waste, and the irreversible and irretrievable commitment of materials.

III. REVIEW PROCEDURES

These review procedures are used for applications for early site permits, construction permits, and combined licenses. Because the material to be reviewed is informational in nature, no specific analysis of the data is required. Ensure that adequate information is available to meet the purpose and scope of this ESRP.

When reviewing the reactor-power conversion system, the reviewer should take the following steps:

- (1) Compare the proposed design parameters with those of similar operating plants and identify any features of the proposed system that represent a departure from previously reviewed plants.
- (2) Identify the reactor-power conversion and engineered safety feature systems and the basic design-performance data. As a rule, if the data listed under "Data and Information Needs" above are provided, this objective will be met.
- (3) Compare reactor design and performance data with the criteria of subparagraphs (1), (2), and (3) of paragraph (a) of 10 CFR 51.52 and notify the reviewer for ESRP 3.8 of any departures from these criteria.

IV. EVALUATION FINDINGS

The input to the environmental impact statement (EIS) should include a summary description of the reactor power conversion and engineered safety feature systems, a flow diagram, and a table of design and performance parameters. Appendix A to this ESRP is an example of a PWR-power conversion system description for ESRP 3.2.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.52, "Table S-4, Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor."

10 CFR 52.17, "Contents of application."

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.

U.S. Nuclear Regulatory Commission (NRC). 1999a. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report, Section 6.3—Transportation, Table 9.1 Summary of findings on NEPA issues for license renewal of nuclear power plants*. NUREG-1437 Vol. 1, Addendum 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999b. Changes to Requirements for Environmental Review for Renewal of Nuclear Power Plant Operating Licenses. *64 Federal Register* (September 3, 1999).

APPENDIX A

SAMPLE FORMAT FOR ESRP 3.2

The proposed plant will consist of _____ and auxiliaries. The power source will be a _____ reactor supplied by _____. The operation of the reactor is illustrated in Figure _____. In the primary loop, water under high pressure (so it cannot boil) is pumped through the reactor core where it is heated by contact with fuel rods containing uranium. The heated water passes through the steam generators where the heat is transferred to the secondary loop, and then returns to the core. In the steam generators, water in the secondary loop is heated to boiling. This steam drives a turbine-generator system, is liquefied in the condenser, and returns to the steam generators. The condenser is cooled by _____. Approximately _____ m² of _____ heat transfer surface is exposed to the cooling water. The reactor has _____ primary loops and _____ secondary loop(s). The turbine-generator system will be manufactured by _____. _____ is the architect-engineer.

At design conditions, the plant will generate _____ MWe net electrical power and will reject _____ MWt waste heat to the environment. More detailed operating parameters are listed below. The initial fuel loading will be _____ kg of enriched uranium dioxide pellets contained in _____ tubular fuel rods.

OPERATING PARAMETERS

Rated Conditions

Core thermal power, MWt
Gross electrical generation, MWe
Station service requirement, MWe
Net electrical output, MWe
Waste heat rejected, MWt
Efficiency, %

Design Conditions

Core thermal power, MWt
Gross electrical generation, MWe
Station service requirement, MWe
Net electrical output, MWe
Waste heat rejected, MWt
Efficiency, %

Fuel assemblies, number
Fuel rods per assembly, number
Initial enriched uranium loading, kg
Initial enrichment range, %
Condenser heat transfer area, m²



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

3.3 PLANT WATER USE

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the plant water use description portions of the environmental impact statement (EIS). The scope of the paragraph covered by this plan introduces the material to be presented from the reviews conducted under ESRPs 3.3.1 and 3.3.2.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

3.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's plant water use description is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 3.3.1 and 3.3.2. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

3.3.1 WATER CONSUMPTION

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of plant water use (e.g., circulating water system, sanitary waste system, radwaste and chemical waste systems, and service water systems).

The scope of the review directed by this plan includes descriptions of the quantity of water required for plant operation, the amount of water consumed by the plant water systems, and the amount of water discharged to a water body. Variations in water requirements and consumption on a temporal basis and as a function of plant operating modes should be included. Where water use for station operation is greater than plant water use, these uses should also be included. The review should be in sufficient detail to provide basic data for other reviews dealing with the evaluation of plant operational impacts.

Review Interfaces

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

- ESRP 3.3.2. Provide data on plant or station water requirements in sufficient detail to support the analysis in ESRP 3.3.2.
- ESRP 3.4.1. Obtain descriptions of the plant cooling system and operational modes.
- ESRPs 3.4.2, 3.5, 3.6, 4.2.1, and 4.2.2. Provide plant water use data.

October 1999

3.3.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 5.2.1, 5.2.2, 5.3, and 6.6. Provide plant or station water use data requirements in sufficient detail to support the assessments given in those sections.
- ESRP 9.4.1. Provide plant water consumption data as needed for analyses and evaluations of plant or component alternatives.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The data should be in sufficient detail to trace the flow of water from the water supply sources to the points of discharge, indicating quantities consumed at each point of consumption as a function of plant operating conditions. The following data and information should be obtained:

- a narrative description of the various plant water systems, their interconnections, and their operational interdependence and coordination (from the environmental report [ER])
- a water-use diagram for the plant (Rosaler 1994) showing flow rates to and from the various water systems (e.g., circulating water system, sanitary system, radwaste and chemical waste systems, service water systems), points of consumption, and source and discharge locations (from the ER)
- for the water-use diagram required (above), the data and narrative description for maximum water consumption, water consumption during periods of minimum water availability, and average operation by month and by plant operating status (from the ER)
- a description of other station water uses (i.e., all facilities not associated with the proposed plant) showing flow rates to and from the facility, average water consumption, and maximum water consumption (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of proposed plant water use are based on the relevant requirements of the following:

- 33 CFR 322 with respect to definition of activities requiring permits
- 33 CFR 330, Appendix A, with respect to conditions, limitations, and restrictions on construction activities
- 40 CFR 6, Appendix A, with respect to procedures on floodplain and wetlands protection
- 40 CFR 122 with respect to NPDES permit conditions for discharges including storm water discharges

- 40 CFR 149 with respect to possible supplemental restrictions on waste disposal and water use in or above a sole-source aquifer
- Federal, State, regional, local, and Native American tribal water laws and water rights.

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

- Compliance with environmental quality standards and requirements of the Federal Water pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of the environmental impacts in striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) will establish its own impact determination.
- Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In Jefferson County PUD #1 vs. Department of Ecology (U.S. Supreme Court Case), the States were granted additional authority to limit hydrological alterations beyond the State's role in regulating water rights.
- Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including hydrology, water use, and water-quality issues.

Technical Rationale

The technical rationale for evaluating the applicant's description of plant water use is discussed in the following paragraph:

A detailed and thorough description of the plant water consumption is essential for the evaluation of potential impacts to the environment that may result from plant, construction, or operation.

III. REVIEW PROCEDURES

ESRP 3.3.1 is intended to give a brief description of the water use in plant systems and the principal subsystems. The reviewer's analysis should be closely linked with the reviews listed in the Review Interfaces section of this ESRP to establish the plant water-use characteristics of concern to those reviews. Details of the principal subsystems are described in ESRPs 3.4.2, 3.5, and 3.6. Therefore, the reviewer of ESRP 3.3.1 should concentrate on the description of principal flow paths from the sources of

water through each subsystem to the receiving water bodies without detailed flow patterns within each subsystem. With this in mind, the reviewer should take the following steps:

- Analyze the flow diagrams of plant water systems by performing simple mass balance computations to ascertain whether the reported flow rates (water source withdrawals, different plant water system needs, and discharge flows) are consistent for each plant operating mode.
- Consider periods of maximum water consumption, minimum water availability, and average operation by month.
- Determine if there are other station facilities with water uses not associated with operation of the proposed plant and include these uses in the analysis.

IV. EVALUATION FINDINGS

The following information from this ESRP should be included in the EIS:

- a description of the flow path of water from the water sources through each major plant water system (e.g., heat-dissipation system, sanitary system, radwaste and chemical waste systems, service water systems) to the points of discharge, including consumption for each such path (e.g., cooling tower evaporation)
- a flow diagram to assist in tracing the flow path and the rates of flow for maximum water consumption, water consumption during periods of minimum water availability, and average operation by month. Details of seasonal and other operating variations may be provided in narrative and tabular forms.
- as appropriate, descriptions of other station water requirements.

V. IMPLEMENTATION

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

VI. REFERENCES

33 CFR 322, "Permits for Structures and Work in or Affecting Navigable Waters of the United States."

33 CFR 330, Appendix A, "Nationwide Permit and Conditions."

40 CFR 6, Appendix A, "Statement of Procedures on Floodplain Management and Wetlands Protection."

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 149, "Sole Source Aquifers."

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Jefferson County PUD #1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994).

Rosaler, R. (ed.) 1994. *Standard Handbook of Plant Engineering*, Second Edition, McGraw-Hill, New York.

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**

OFFICE OF NUCLEAR REACTOR REGULATION

3.3.2 WATER TREATMENT

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the treatment needed for the plant water streams identified in ESRP 3.3.1 using the water supplies described in ESRPs 2.3.1 and 2.3.3. The scope of the review directed by this plan includes a description of water treatment processes for potable, cooling and recirculating systems and identification and quantification of the chemicals used. The descriptions to be provided by this review should be of sufficient detail to permit subsequent assessment and evaluation of specific impacts of plant water treatment and provide a basis for ESRP 3.6.

Review Interfaces

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

- ESRPs 2.3.1 and 2.3.3. Obtain descriptions of the hydrology and the water quality of the water supplies to the plant.
- ESRP 3.3.1. Obtain descriptions of the water consumption in the plant water streams.
- ESRPs 3.6.1 and 3.6.2. Provide details of water treatment systems and treatment processes to support the descriptions of nonradioactive waste systems.

October 1999

3.3.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 4.2.2 and 5.2.2. Provide descriptions of water treatment systems and processes to be used to assess water-use impacts of construction and operation.
- ESRP 5.3.2.1. Obtain the descriptions of the cooling system discharge process.
- ESRP 9.4.2. Provide descriptions of water treatment systems that may be used in any comparison or evaluation of alternative water-treatment systems.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- a description and purpose of water treatment systems used in the plant (from the environmental report [ER])
- identification, quantities, and points of addition of chemicals and additives to be used by each system (from the ER)
- operating cycles for each water treatment system for normal modes of plant operation (e.g., full power operation, shutdown/refueling, and startup) (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of water treatment processes are based on the relevant requirements of the following:

- 40 CFR 122 with respect to National Pollutant Discharge Elimination System (NPDES) permit conditions for discharges, including storm water discharges
- 40 CFR 165 with respect to chemicals and biocides used for treating water
- 40 CFR 403 with respect to effluent limitations
- 40 CFR 423 with respect to effluent limitations on existing and new point sources
- State and Native American tribal water laws and water rights
- WASH 1355, *Nuclear Power Facility Performance Criteria for Making Environmental Impact Assessments* (NRC 1974).
- Safe Drinking Water Act

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

- Compliance with environmental quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of the environmental impacts in striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) will establish its own impact determination.
- Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In *Jefferson County PUD #1 vs. Department of Ecology* (U.S. Supreme Court Case), the States were granted additional authority to limit hydrological alterations beyond the State's role in regulating water rights.
- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including hydrology, water-use, and water-quality issues.

Technical Rationale

The technical rationale for evaluating the applicant's water treatment description is discussed in the following paragraph:

A detailed and thorough description of the plant water treatment system is essential for the evaluation of potential impacts to the environment that may result from plant, construction, or operation.

III. REVIEW PROCEDURES

The reviewer's analysis of water treatment should be closely linked with the impact assessment review of ESRPs 4.2 and 5.2 to establish which water-treatment systems and processes have a potential for environmental impact. With this in mind, the reviewer should take the following steps when analyzing the proposed water treatment systems, to the extent needed to prepare a description of the purpose and nature of each system:

Note: The principal types of treatment systems that should be described include those necessary to condition (1) the intake water for noncooling-system use within the plant and (2) water used in the plant cooling system and treatment systems required for providing potable water. Chemicals used in these systems should be described.

- (1) Include a brief description of treatment system operating procedures, including plant operational and seasonal variations (AWWA 1990).
- (2) Further define each treatment system in terms of the purpose of the proposed processes and the chemicals required.
- (3) Identify the proposed use of chemicals. Only the systems that result in a waste discharge need to be analyzed in detail, and the reviewer should emphasize the systems that have a potential for requiring an NPDES permit.
- (4) Verify that
 - All water streams identified in ESRP 3.3.1 have been considered.
 - All chemicals (identification and quantities) to be used have been considered or described.
 - The status of NPDES permits and consultations with NPDES administrative agencies have been discussed.
 - The proposed systems have been described in sufficient detail to permit assessment of environmental impacts resulting from their operation.
- (5) Ensure that the water treatment information is adequate to serve as a basis for assessing the impacts of station construction and operation on water use.

IV. EVALUATION FINDINGS

As input to the EIS, the reviewer should provide a concise description of the proposed water treatment systems that results in waste discharge and include a tabulation of chemicals to be added by quantity and frequency of addition. Proposed systems that do not result in waste discharges should be identified, but not described in detail. Unresolved differences between the staff's analysis and the applicant's proposed operation of any water-treatment systems should be noted.

V. IMPLEMENTATION

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

VI. REFERENCES

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 165, "Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers."

40 CFR 403, "General Pretreatment Regulations for Existing and New Sources of Pollution."

40 CFR 423, "Stream Electric Power Generating Point Source Category."

American Water Works Association (AWWA). 1990. *Water Quality and Treatment*, 4th Edition, McGraw-Hill Book Company, New York.

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Jefferson County PUD #1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994).

Safe Drinking Water Act Amendments of 1996. PL 104-182.

U.S. Nuclear Regulatory Commission (NRC). 1974. WASH 1355, *Nuclear Power Facility Performance Criteria for Making Environmental Impact Assessments*, Washington, D.C.

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**
 OFFICE OF NUCLEAR REACTOR REGULATION

3.4 COOLING SYSTEM

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the cooling system description portions of the environmental impact statement (EIS). The scope of the paragraph covered by this plan is to introduce the material to be presented from the reviews conducted under ESRPs 3.4.1 and 3.4.2.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

3.4-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's cooling system description is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 3.4.1 and 3.4.2. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

3.4.1 DESCRIPTION AND OPERATIONAL MODES

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of a description of the proposed plant cooling system and its operational modes. The scope of the review directed by this plan should include a general description of the proposed cooling system and a more detailed identification and description of the anticipated modes of operation of the cooling system.

The description to be provided by this review should be in sufficient detail to permit subsequent staff assessment and evaluation of specific impacts of the cooling system as a function of primary and alternative cooling system operational modes.

Reviewer Interfaces

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

- ESRP 1.2. Obtain the status of the National Pollutant Discharge Elimination System (NPDES) permit.
- ESRP 2.3.3. Obtain baseline water temperature information, including monthly variation and stratification for the body of water used for cooling intake and discharge.

October 1999

3.4.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.7. Provide descriptions of the cooling system and relevant components for use in determining potential impacts of heat dissipation.
- ESRP 3.3.1. Provide descriptions of the plant cooling system and operational modes.
- ESRP 3.4.2. Provide the characteristics of the various operational modes of the cooling system in sufficient detail to support the cooling system component description.
- ESRP 3.6.1. Obtain information on biocides or other chemicals anticipated to be used to control organisms in the cooling system.
- ESRP 4.2.2. Provide information regarding projected water needs of the cooling system.
- ESRP 5.1.1. Provide information specific to operational aspects of cooling system siting.
- ESRPs 5.2.1 and 5.2.2. Provide cooling system characteristics in sufficient detail to support the assessment of impacts to water use.
- ESRP 5.3.1.1, 5.3.1.2, and 5.3.2.1. Provide descriptions of the cooling system.
- ESRP 5.3.4. Provide a description of the cooling system and its operational modes and components, including estimated noise levels.
- ESRP 6.1. Provide thermal aspects of the cooling system of the proposed plant.
- ESRPs 6.5.1 and 6.5.2. Provide a description of the cooling system and its operation modes to support evaluation of monitoring programs.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- a system description (from the environmental report [ER])
- descriptions of anticipated operational modes and the estimated periods of time that the system will operate in each mode (from the ER)
- for each anticipated operational mode, quantities of heat generated, dissipated to the atmosphere, and released in liquid discharges (from the ER)

- for each operational mode, water source and quantities of water withdrawn, consumed, and discharged (from the ER)
- the status of the NPDES permit and any 316(a/b) demonstrations (from ESRP 1.2).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the cooling system for potential environmental impacts are based on the relevant requirements of the following:

- 10 CFR 52.17 (a)(1)(v) with respect to early site permits related to the type of cooling systems, intakes, and outflows that may be associated with the facility
- 10 CFR 50.34 with respect to a description and analysis of the structure, systems, and components of the facility.

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), addresses the inclusion of information about the reactor and power conversion system.

Technical Rationale

The technical rationale for evaluating the applicant's description of the proposed cooling system and its operational modes is discussed in the following paragraph:

The cooling system presents a major source of interaction with the environment and of possible impacts. The environmental impacts caused as a result of operation of the cooling system at a nuclear power plant depend largely on the type of cooling system and system alternatives, if such exist, to accommodate load changes or adverse conditions. A thorough description of the system and the proposed operational modes allows an objective examination of the potential impacts to the environment. This section is descriptive in nature. The description of the external appearance of the cooling system and its operational modes should be in sufficient detail to form an adequate base for staff analysis of the potential impacts of construction or operation.

III. REVIEW PROCEDURES

For the review of the cooling system description and operational modes, the reviewer should take the following steps:

- (1) Ensure that sufficient information on plant operational modes is available to define cooling system performance for each identified mode of operation.

(2) Verify that plant water consumption and flow-rate data are consistent with the water-use analysis prepared by the reviewer for ESRP 3.3.1.

(3) Analyze the overall cooling-system design for the following:

- compatibility with the water-use descriptions of ESRP 3.3.1
- consistency with good engineering design

(4) Identify and describe nonemergency modes of operation, including the following (as applicable):

- design normal, with estimated monthly maximum, average, and minimum values of the operating parameters
- heat treatment (thermal bio-control)
- de-icing
- reduced intake flow (pump outage)

(5) Consider the following operating parameters for each mode of operation:

- intake flow rates
- discharge flow rates
- circulating water (condenser) flow rates
- other major plant system flow rates
- temperature rise across the condenser
- temperature rise across heat exchangers in the service water systems
- heat dissipation system discharge temperatures
- chemical concentration factors for major cooling system components
- frequency and duration of operation for each mode.

IV. EVALUATION FINDINGS

The depth and extent of the input to the environmental impact statement (EIS) will be governed by the characteristics of the cooling system and plant primary and alternative operational modes and by the nature and magnitude of the expected impacts. The following information should be included in the EIS:

- narrative description of the cooling system
- description of anticipated operational modes. For each mode, provide the important characteristics analyzed (e.g., frequency and duration, discharge temperature, water consumption, and chemical concentration factor).
- cooling system status with respect to Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, certification and NPDES permits.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 50.34, "Contents of application; technical information."

10 CFR 52.17, "Contents of application."

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

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**

OFFICE OF NUCLEAR REACTOR REGULATION

3.4.2 COMPONENT DESCRIPTIONS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of descriptions of the proposed intake, discharge, and heat dissipation system design and performance characteristics. The scope of the review directed by this plan should include (1) intake, discharge, and heat dissipation system design data and (2) performance characteristics of these systems for the operational modes identified by the reviewer for ESRP 3.4.1.

This review should provide input to other reviews dealing with analysis and assessment of construction and operational impacts of cooling system components and to other sections that deal with design and operational alternatives and benefit-cost analysis.

Review Interfaces

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

- ESRP 2.3.1. Obtain a description of aquifers, rivers, cooling lakes or ponds, and site-specific water supply data.
- ESRP 2.7. Obtain site-specific meteorological data and provide a description of the cooling system.
- ESRP 3.2. Obtain the reactor and plant system description and performance parameters as they pertain to the cooling system.

October 1999

3.4.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 3.3.1. Obtain the projected water consumption of the cooling system.
- ESRP 3.4.1. Obtain a description of the heat dissipation system operational modes.
- ESRPs 4.1.1, 4.2.2, and 4.3.2. Provide the reviewers for cooling system design data to permit analysis and assessment of cooling system construction impacts.
- ESRPs 5.2, 5.3.3.2, and 5.8.1. Provide design and operating characteristics of the cooling system components for predicting and assessing environmental impacts of the proposed cooling system.
- ESRP 5.2.2, 5.3.1.1, and 5.3.2.1. Provide a description of the intake and discharge parameters of the cooling system.
- ESRP 5.3.4. Provide information on the cooling system components and operational modes, including the estimated noise levels.
- ESRPs 6.1 and 6.3. Provide a description of the cooling system of the proposed plant.
- ESRPs 9.4.1 and 9.4.2. Provide descriptive detail to serve as the basis for a comparison of alternative intake, discharge, and heat dissipation systems.

Data and Information Needs

The type of data and information required will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- For intake systems, include
 - a drawing of the intake structure showing the relationship of the structure to the water surface, bottom geometry, and shoreline (from the environmental report [ER])
 - a description of the cooling water pumping facility (from the ER)
 - a description of the trash racks, traveling screens, trash baskets, and fish return devices (from the ER)
 - performance characteristics (e.g., flow rates, intake velocities) for the operational modes identified by the reviewer for ESRP 3.4.1 (from the ER)
 - performance characteristics for specific intake-related functions, such as de-icing, trash rack clearing, screen washing, trash basket removal, or fish return system operation (from the ER)

- the location and description of components for the addition of chemicals (e.g., corrosion inhibitors, antifouling agents) to the intake system (from the ER).
- For discharge systems, include
 - drawings of the outfall structure, showing its location in the receiving water body, relationship to water surface, bottom geometry, and shoreline (from the ER)
 - a description of discharge canal or discharge lines (from the ER)
 - performance characteristics (e.g., discharge flow rates, discharge velocities, discharge temperatures, and temperature differentials) for the operational modes identified by the reviewer for ESRP 3.4.1 (from the ER)
 - descriptions of specific discharge related components (e.g., diffusers, fish barriers) (from the ER).
- For heat-dissipation systems, include
 - the location of heat dissipation system components relative to other site features (from the ER)
 - the design details of heat dissipation system components affecting system performance, including those listed in Table 3.4.2-1

Table 3.4.2-1. Design Details of Heat Dissipation System Components

| Component | Design Details |
|---|---|
| Cooling towers (from the ER) | Type Configuration Materials of construction Number and arrangement Rated heat-dissipation capacity |
| Cooling lakes and ponds (from ESRP 2.3.1) | Surface area Volume Bathymetry |
| Spray ponds or canals (from the ER) | Arrangement and configuration of spray modules Pond or canal geometry Surface area and water volume |
| Condenser (once-through systems) | Heat transfer area and materials of construction (from ESRP 3.2) Antifouling treatment (from the ER) |

- heat dissipation system performance characteristics for the operational modes identified by the reviewer for ESRP 3.4.1, including those listed in Table 3.4.2-2
- site-specific meteorological data (from ESRP 2.7)
- site-specific water supply data (from ESRP 2.3.1)
- heat dissipation system performance analyses based on the manufacturer's design data and site-specific meteorological and hydrological data (from the ER).

Table 3.4.2-2. Performance Characteristics of the Heat-Dissipation System

| Component | Design Details |
|--|--|
| Cooling towers (from the ER) | Input and discharge flow rates and temperatures for monthly average meteorological conditions Wet-bulb temperature, approach to wet-bulb, and range Performance curves (estimates if final design is not established) Air flow Power consumption Estimated noise levels Drift rate and drop size |
| Cooling lakes and ponds (from the ER) | Flow rates (through condenser) Flow-through times Flow pattern Monthly average water temperatures (mean for entire lake or pond, inlet [from condenser], outlet [to condenser]) Surface elevation (means, maximum, minimum) |
| Spray ponds or canals (from the ER) | Flow rates (through condenser) Flow-through times Flow pattern Monthly average water temperatures (inlet [from condenser], outlet [to condenser]) Surface elevation (mean, maximum, minimum) Spray-system operating parameters (e.g., power consumption, drop size) |
| Condenser (once-through systems) (from the ER) | Condenser flow rate Temperature differential across condenser Time-of-passage through system (including intake and discharge system passage times) Dissolution rate of metals in condenser tubes Frequency and magnitude of antifouling treatment |

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the cooling system components are based on the relevant requirements of the following:

- 10 CFR 50.34 with respect to the need for a description of the components of the facility.

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 Station* (NRC 1976), with respect to providing a description of the applicant's planned cooling system components.

Technical Rationale

The technical rationale for evaluating the applicant's description of the components of the proposed cooling system is discussed in the following paragraph:

Detailed drawings and descriptions of the characteristics of the cooling system should be available for analysis to review the applicant's cooling system component design and performance characteristics so that the environmental assessment of construction and operation may be evaluated.

III. REVIEW PROCEDURES

The reviewer's analysis of the intake, discharge, and heat dissipation system component descriptions should be closely linked with the assessment of construction and operational impacts directed by ESRP Chapters 4.0 and 5.0. The intent of this analysis is to identify and describe the design and performance characteristics of the proposed cooling components that can be expected to cause environmental impacts as a result of construction or operation. The characteristics generally considered are listed under "Data and Information Needs" in this ESRP. Each cooling system component should be analyzed, and the reviewer should prepare descriptions of the design and performance characteristics that are generally expected to result in environmental impacts (e.g., intake configuration, flow velocity through traveling screens, cooling tower drift). The review should be based on the cooling system components described in the applicant's ER and should consider component performance for the operational modes described by the reviewer for ESRP 3.4.1. With this in mind, the reviewer should take the following steps:

- (1) For all systems, evaluate intake and discharge temperatures and the temperature rise across the condenser.
- (2) For cooling towers, determine average discharge temperatures for each month of the year using cooling tower performance curves. The average discharge temperature will be calculated by using the average wet-bulb temperature for the month.

- (3) For spray systems, analyze the applicant's estimates of average monthly discharge temperatures. The depth and extent of this analysis should depend on the seriousness of the predicted impacts of the heated effluent on the receiving body of water and the level of confidence in the applicant's model.
- (4) In the cases where auxiliary systems are employed to further cool the blowdown discharged from the main cooling system, determine the final discharge temperature.
- (5) Consult with the appropriate ESRP Chapters 4.0 and 5.0 reviewers to determine additional cooling system component design or performance characteristics to be analyzed and described.
- (6) Compare the cooling system descriptions with those of similar operating plants and identify design or operating features of the proposed cooling system that represent a major departure from previously reviewed systems.
- (7) Determine if the cooling system component descriptions are consistent, accurate, and given in sufficient detail to serve the needs of the reviews of intake, discharge, and heat dissipation system impacts.
- (8) Ensure that
- Descriptions of the intake, heat dissipation, and discharge systems are sufficiently complete to serve the purposes of the evaluations described by the appropriate ESRP Chapters 4.0 and 5.0, including any special descriptive information needed to evaluate compliance with applicable regulations (e.g., noise, Federal Water Pollution Control Act [FWPCA], commonly Clean Water Act).
 - The predicted operational characteristics (e.g., flow rates and velocities) are consistent with system design.
 - The proposed systems are consistent with good engineering practice.
 - Unusual system designs are identified.
- (9) Verify all significant performance characteristics and, if necessary, conduct independent analyses to ensure that performance characteristics are accurately described. The following are examples of such analyses:
- intake system flow rates, flow velocities, and velocity distributions
 - cooling tower performance (e.g., approach to wet-bulb temperature, drift rate and droplet size, noise-level contours)

- cooling pond performance (e.g., capacity, mean temperature)
- spray system performance
- discharge system performance (e.g., flow velocity).

IV. EVALUATION FINDINGS

The depth and extent of the input to the environmental impact statement (EIS) will be governed by the characteristics of the intake, discharge, and heat dissipation systems, and by the nature and magnitude of the expected impacts in the site vicinity. The following information should be included in the EIS:

- narrative description of the intake, discharge, and heat dissipation systems
- sketches of intake, discharge, and heat dissipation components
- detailed drawings of important subsystems (e.g., perforated pipe assemblies)
- tables and graphs of important performance characteristics of the intake, discharge, and heat-dissipation systems when these parameters will be used (and referenced) by the appropriate ESRP Chapter 5.0 reviewers.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 50.34, "Contents of application, technical information."

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

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**

OFFICE OF NUCLEAR REACTOR REGULATION

3.5 RADIOACTIVE WASTE MANAGEMENT SYSTEM

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review, analysis, and evaluation of the applicant's design of radioactive waste management and effluent control systems. The scope of the review should include (1) a determination of the expected quantity of radioactive materials released annually in liquid and gaseous effluents (source terms) resulting from normal operation, including anticipated operational occurrences and (2) a determination of the capability of the proposed radioactive waste management systems to control and maintain such releases of radioactive materials in effluents to "as low as reasonably achievable" (ALARA) levels in accordance with the requirement of 10 CFR 50.34a.

Review Interfaces

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

- ESRP 2.7. Provide descriptions of potential release points for radioactive effluents for use in atmospheric transport and diffusion calculations.
- ESRP 3.3.1. Obtain plant water-use data.
- ESRP 5.4. Provide tables listing the calculated annual releases of radioactive material in liquid and gaseous effluents and a statement that the radioactive waste management and effluent control systems as proposed or as modified have the capability to control and maintain releases of

October 1999

3.5-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

radioactive materials in effluents to meet the design objectives of 10 CFR 50, Appendix I, and the requirements of 10 CFR 50.34a. Note: For applications for early site permits, the reviewer of ESRP 3.5 should provide the reviewer of ESRP 5.4 with tables listing the estimated annual releases of radioactive materials in liquid and gaseous effluents.

- ESRP 5.4.2. Obtain the calculated maximum individual and population doses for comparison with the design objective guidelines of 10 CFR 50, Appendix I.
- ESRP 5.5.2. Provide a list of potential sources of mixed waste from operations.
- ESRP 6.2. Provide the sites of expected radiological effluent emissions.
- Interface with Environmental Project Manager (EPM). Provide a notification to the EPM if it appears that the proposed radioactive waste management and effluent control systems will not meet the requirements of 10 CFR 50, Appendix I, so that a consultation with the applicant may be arranged to address this concern.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- a description of the liquid and gaseous radioactive waste management and effluent control systems (from the environmental report [ER])
- process and instrumentation diagrams and system process flow diagrams of the liquid and gaseous radioactive waste management and effluent control systems (upon request from the applicant)
- identification of sources of radioactive liquid and gaseous waste material within the plant (from the ER)
- identification of principal release points for radioactive materials to the environment (from the ER)
- identification of direct radiation sources stored onsite out-of-plant as solid waste (e.g., independent fuel storage)
- information requested in the following Appendices of Regulatory Guide 1.112, *Calculations of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors* (NRC 1977) (from the ER):
 - Appendix A: "Data Needed for Radioactive Source Term Calculations for Boiling-Water Reactors"

- Appendix B: "Data Needed for Radioactive Source Term Calculations for Pressurized-Water Reactors"

- calculated maximum individual and population doses (from the review of ESRP 5.4)
- obtained the components and the parameters considered in the benefit-cost balance along with the dollar/person sievert reduction (from the licensee). Note: This benefit-cost balance requirement may not apply to applicants whose construction permit application was tendered between January 2, 1971, and June 3, 1976.
- for early site permit reviews, additional information from the applicant to further define the radiological effluent information submitted pursuant to 10 CFR 52.17(a)(1)(iv). Information on specific radionuclides anticipated to be released is needed to allow the ESRP 5.4 reviewer to perform the necessary evaluations.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of radioactive waste management systems are based on the relevant requirements of the following:

- 10 CFR 20 with respect to requirements for waste disposal and doses to the public from those wastes
- 10 CFR 50 Appendix I, with respect to the guidelines for effluent releases based on maximum individual dose and population dose
- 10 CFR 50.34a with respect to effluent releases
- 10 CFR 20.1301(d), with respect to standards set to limit the release of radioactive materials from power reactors.

Regulatory positions and specific criteria necessary to meet the regulations identified above are provided in the following:

- Regulatory Guide 1.112, *Calculations of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors* (NRC 1977), with respect to determining the releases of radioactive effluents from power reactors
- NUREG-0016, *Calculations of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Boiling-water reactors* (NRC 1976a), with respect to determining the releases of radioactive effluents from a boiling-water reactor (BWR)

- NUREG-0017, *Calculations of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Pressurized-water reactors* (NRC 1976b), with respect to determining the releases of radioactive effluents from a pressurized-water reactor (PWR)
- Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976c), with respect to determining the benefit-cost of waste-management systems.

Technical Rationale

The technical rationale for evaluating the applicant's radioactive waste management system is discussed in the following paragraph:

All light-water-cooled reactors release small quantities of radioactive materials to the environment. The criteria for these releases are addressed in 10 CFR 50, Appendix I, and additional requirements are in 10 CFR 20, Subpart K, and the values are in 10 CFR 20, Appendix B, Table 2 or 3 (as appropriate). Radioactive waste management and effluent control systems are to be designed to minimize the radioactive material releases from reactors to be ALARA. Evaluation of the releases against the requirements in 10 CFR 50, Appendix I, and 10 CFR 20 provide validation that radioactive waste management systems are adequate to protect the environment and minimize the effects of radiation to the public.

III. REVIEW PROCEDURES

The detailed analysis and evaluation of the radioactive waste management and effluent control systems and the capability of these systems to meet the requirements of 10 CFR 20, Subparts D and K; 10 CFR 50, Appendix I; and 10 CFR 20.1301(d) should be presented in the staff's safety evaluation report (SER). The SER should be prepared before the environmental review, and the schedules for SER analysis, evaluation, and conclusions should be compatible with the environmental review schedules. No additional analysis should be needed, and the reviewer should proceed to the Evaluation Findings section of this ESRP.

When the environmental review precedes the SER, the following analysis should be performed to the level of detail necessary to support the staff input to the environmental impact statement (EIS). The reviewer should make full use of data available from any safety review activity relative to design and performance of the radioactive waste management and effluent control systems.

The reviewer should analyze the proposed radioactive waste management and effluent control systems, process and instrumentation diagrams, and system process flow diagrams to determine sources of waste, points of collection of waste, flow paths through the systems (including all bypasses), the treatment provided, and the points of release of effluents to the environment. Using this information, the reviewer should calculate the quantity of radioactive materials released annually in effluents (source term) during normal operation, including anticipated operational occurrences. The reviewer should use the parameters and calculational techniques described in NUREG-0016 or NUREG-0017, as appropriate, to make these

calculations. If the applicant has provided a source term that is consistent with these parameters and calculational techniques, the reviewer should accept it and should not perform a separate calculation. The results of this analysis should be provided to the reviewer for ESRP 5.4 for calculation of the maximum individual and population doses expected to result from these effluent quantities. The reviewer should evaluate the tabulated parameters and components considered in the benefit-cost balance, along with the dollar/person sievert reduction.

The reviewer should use the following evaluation procedure:

- (1) Initially, evaluate the proposed radioactive waste management and effluent control systems to ensure that they are adequately described and provide reasonable assurance of performing the function as specified.
- (2) Ensure that the source terms provided to the reviewer for ESRP 5.4 correctly identify the radioactive materials (and their release points) released annually in effluents during normal operation.
- (3) Compare the maximally exposed individual doses calculated by the reviewer for ESRP 5.4 with the design objectives described in 10 CFR 50, Appendix I, to determine if these objectives have been met. If it is determined that the proposed radioactive waste management and effluent control systems will not meet the requirements of 10 CFR 50, Appendix I, the reviewer should consult with the applicant to obtain the applicant's commitment to include additional treatment equipment and effluent control measures pursuant to Section 2.d of Appendix I that will provide reasonable assurance of conformance with the applicable regulations. This consultation should be through the EPM and reflect appropriate NRC management procedures.
- (4) If additional equipment or control measures are needed, repeat the analysis and evaluation procedures of this ESRP, and when necessary, request additional dose calculations from the reviewer for ESRP 5.4, until the reviewer concludes that the doses calculated from the source terms are consistent with the design objectives in 10 CFR 50, Appendix I. At this point, you may conclude that the proposed radioactive waste management and effluent control systems have the capability to control and maintain releases of radioactive materials in effluents to meet the design objectives of Appendix I to 10 CFR 50 and the requirements of 10 CFR 50.34a.

IV. EVALUATION FINDINGS

This evaluation applies to applications for construction permits and operating licenses. When the reviewer has concluded that the proposed radioactive waste management and effluent control systems meet the requirements of 10 CFR 50.34a, the following input to the EIS should be used:

To meet the requirements of 10 CFR 50.34a, an applicant for a nuclear power reactor construction permit is required to include a preliminary description of the design of equipment that will be installed to keep levels of radioactive material in effluents to unrestricted areas ALARA. That phrase takes into account the state of technology and the economics of improvement in relation to

benefits to the public health and safety and other societal and socioeconomic considerations and in relation to the use of nuclear energy in the public interest. Numerical guidance on design objectives for light-water-cooled nuclear power reactors is provided in 10 CFR 50, Appendix I, to meet the requirement that radioactive materials in effluents released to unrestricted areas be kept ALARA.

To meet the requirements of 10 CFR 50.34a, the staff found acceptable the preliminary designs of radwaste systems and effluent control measures provided by the applicant for keeping levels of radioactive materials in effluents to unrestricted areas ALARA within the requirements of 10 CFR 50, Appendix I. In addition, the staff reviewed and found reasonable the estimate provided by the applicant of the quantity of each principal radionuclide expected to be released annually to unrestricted areas in liquid and gaseous effluents produced from normal operation, including anticipated operational occurrences.

The staff's detailed evaluation of the radioactive waste management systems and the capability of these systems to meet the requirements of 10 CFR 50, Appendix I, are presented in Chapter 11 of the SER. The quantities of radioactive material calculated by the staff to be released annually from the plant in liquid and gaseous effluents are presented in this EIS (and are also presented in Chapter 11 of the SER), with the calculated maximum individual and population doses that are expected to result from these effluent quantities.

This evaluation applies to applications for construction permits, operating licenses, and early site permits. At the time of the operating license review, the applicant will be required to submit Technical Specifications that will establish release rates for radioactive material in liquid and gaseous effluents and that provide for the routine monitoring and measurement of all principal release points to ensure that the plant will operate in conformance with the requirements of 10 CFR 50, Appendix I, and other applicable Federal regulations.

The reviewer should provide appropriate references to the applicant's ER in the above input.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 20, "Standards for Protection Against Radiation."

10 CFR 20, Subpart D, "Radiation Dose Limits for Individual Members of the Public."

10 CFR 20, Subpart K, "Waste Disposal."

10 CFR 20, Appendix B, "Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage."

10 CFR 20.1301, "Dose limits for individual members of the public."

10 CFR 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low As Is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents."

10 CFR 50.34a, "Design objectives for equipment to control releases of radioactive material in effluents—nuclear power reactors."

10 CFR 52.17, "Contents of application."

U.S. Nuclear Regulatory Commission (NRC). 1976a. *Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Boiling-water reactors (BWR-GALE Code)*, NUREG-0016, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1976b. *Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Pressurized-water reactors (PWR-GALE Code)*, NUREG-0017, Washington, D.C.

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

U.S. Nuclear Regulatory Commission (NRC). 1977. *Calculations of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors*. Regulatory Guide 1.112, Washington, D. C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

3.6 NONRADIOACTIVE WASTE SYSTEMS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the nonradioactive waste system description portions of the environmental impact statement (EIS). The scope of the paragraph covered by this plan introduces the material to be presented from the reviews conducted under ESRPs 3.6.1, 3.6.2, and 3.6.3.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

The introductory paragraph prepared under this ESRP should be consistent with the intent of the following regulation:

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

October 1999

3.6-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's nonradioactive waste system is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 3.6.1, 3.6.2, and 3.6.3. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



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

3.6.1 EFFLUENTS CONTAINING CHEMICALS OR BIOCIDES

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the nonradioactive waste systems and the chemical and biocidal characteristics of each nonradioactive waste stream discharged from the plant. The scope of the review directed by this plan includes the identification and quantification of each chemical or biocide added to the receiving water by any discharge stream, as well as substances added by corrosion and erosion, and includes a comparison of the discharged quantities and concentrations with applicable effluent limitations and standards. Naturally occurring substances changed in form or concentrated by plant operations should also be described. The information developed in this review will be used in the staff's subsequent evaluation of environmental impacts and compliance with applicable water-quality standards.

Review Interfaces

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

- ESRP 2.3.3. Obtain descriptions of the baseline water quality of the water supplies to the proposed plant.
- ESRP 3.3.1 and 3.3.2. Obtain expected plant water use (i.e., water supplies, consumption, and treatment with process chemicals).

October 1999

3.6.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 3.4.1. Obtain descriptions of the cooling system of the proposed plant (including the concentration factor on a seasonal basis for evaporative cooling systems).
- ESRP 5.3.2. Provide a description of waste streams entering the cooling system discharge.
- ESRPs 3.6.3, 5.2.1, 5.2.2, 6.5.1, 6.5.2, and 6.6. Provide descriptive detail to support the descriptions and assessments in these ESRPs.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- descriptions of nonradioactive effluent treatment facilities except those covered in ESRPs 3.3.2, 3.6.2, and 3.6.3 (from the environmental report [ER])
- average, maximum, and seasonal variations of principal constituents of intake and receiving waters and any minor or trace materials that may be of environmental relevance (from ESRP 2.3.3)
- a list of chemicals processed through each system (e.g., corrosion inhibitors, antifouling agents) (from ESRP 3.3.2), and total amounts used per year, frequency of use, and concentrations of these chemicals or their products in each waste stream (from the ER)
- the concentration factor on a seasonal basis for evaporative cooling systems (from ESRP 3.4.2)
- the average and maximum concentration of natural materials in effluent streams (from ESRP 2.3.3)
- the operating cycles for each effluent treatment system for normal modes of plant operation (e.g., full power operation, shutdown/refueling, startup) (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for review of waste effluents are based on the relevant requirements of the following:

- 40 CFR 122 with respect to the National Pollutant Discharge Elimination System (NPDES) permit conditions for discharges, including storm water discharges
- 40 CFR 147 with respect to restrictions or waste disposal
- 40 CFR 165 with respect to liquid effluents
- 40 CFR 403 with respect to effluent standards

- 40 CFR 423 with respect to effluent limitations on existing and new point sources
- Federal, State, local, regional, and Native American tribal water laws and water rights.

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

- Compliance with environmental quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly known as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of the environmental impacts in striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) will establish its own impact determination.
- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including hydrology, water use, and water-quality issues.

The regulatory position necessary to meet this objective requires documentation of consultations with NPDES authority.

Technical Rationale

The technical rationale for evaluating the applicant's nonradioactive waste systems containing chemicals and biocides is as follows:

A detailed and thorough description of the chemical and biocide effluents is essential for evaluating potential impacts to the environment that may result from construction or operation.

II. REVIEW PROCEDURES

The reviewer's analysis of nonradioactive effluent systems containing chemicals or biocides should be closely linked with the impact assessment review for ESRPs 5.3.2 and 5.5 to establish the waste stream characteristics that are most likely to result in environmental impacts. With this in mind, the reviewer should take the following steps:

- (1) Establish that the information necessary for subsequent impact analyses is available.

- (2) Review each system effluent stream to determine that treatment processes, points of chemical additions or alterations, flow characteristics, maximum and average concentrations of added and ambient water constituents, and point of discharge are identified.
- (3) Review the applicant's calculations of concentrations in the effluent streams.
- (4) Consider any separate discharge system such as for sludge disposal.
- (5) Consider the concentrations and flow of the treated low-volume wastes (e.g., demineralizer wastes or boiler blowdowns) before dilution by high-volume streams.
- (6) Consider any waste system not described in ESRPs 3.3.2, 3.6.2, or 3.6.3 in this section (e.g., waste treatment/disposal ponds and clarifiers).
- (7) Consider site-related problems concerning water quality or special plant operating conditions (e.g., low oxygen levels, high concentration of nutrients, toxic materials, and high concentration factors within the plant), paying particular attention to the treatment of biocide residues.
- (8) Ensure that the effluent information is adequate to serve as a basis for assessing the impacts of plant operation resulting from the expected performance of the systems.
- (9) In evaluating the adequacy of this material, consult the applicable standards and guides for this environmental review (see Acceptance Criteria in this ESRP). Ensure that Federal, State, regional, local, and affected Native American tribal agencies appropriate to the objectives of this environmental review have been consulted and that the provisions of any applicable Memoranda of Understanding with the NRC have been considered. Also ensure that compliance with applicable Federal, State, regional, local, and affected Native American tribal standards have been determined. Note: For wastes discharged to surface waters, issuance of a NPDES permit provides determination of compliance.
- (10) Evaluate the descriptions of the treatment systems and their effluent streams to determine that
 - all identified waste streams have been considered
 - all discharged chemicals and biocides have been considered
 - unusual procedures or site-specific problems that could result in unusual environmental impacts are identified.

IV. EVALUATION FINDINGS

The discussion in the environmental impact statement (EIS) should be brief and make optimal use of tables and figures to describe the proposed effluent systems. The reviewer should include a description

of all effluent systems not covered in ESRPs 3.3.2, 3.6.2, or 3.6.3; the types of treatment; and the methods used for disposing of the effluents. The reviewer should make reference to the water-use diagram included in ESRP 3.3.1. The reviewer should identify the conveyance system carrying effluents to the receiving water bodies and should identify any points of discharge not identified in ESRP 3.3.2.

Average and maximum chemical concentrations in the plant effluent should be presented with average and maximum levels of these substances in the receiving waters. The reviewer should compare these levels with applicable effluent limitations and water-quality standards. The table should include annual quantities of chemicals to be discharged.

V. IMPLEMENTATION

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

VI. REFERENCES

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination Systems."

40 CFR 147, "State Underground Injection Control Programs."

40 CFR 165, "Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers."

40 CFR 403, "General Pretreatment Regulations for Existing and New Sources of Pollution."

40 CFR 423, "Steam Electric Power Generating Point Source Category."

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

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**
 OFFICE OF NUCLEAR REACTOR REGULATION

3.6.2 SANITARY SYSTEM EFFLUENTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's consideration of sanitary effluent systems to identify anticipated volumes generated during construction or operation and to describe the treatment systems to be employed. This information is needed to determine the impact of discharging these effluents to the environment.

The scope of the review directed by this plan includes consideration of the nature and quantity of sanitary waste contribution and treatment facilities.

Review Interfaces

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

- ESRP 3.3.1. Obtain expected plant water use and descriptions of the plant water-treatment processes.
- ESRP 3.6.3. Provide a list of effluents covered in this ESRP to ensure that those effluents are not discussed in ESRP 3.6.3.
- ESRPs 4.2.2 and 4.3.2. Provide descriptive material in sufficient detail to support the assessment of the impacts of sanitary system effluent discharges during plant construction.

October 1999

3.6.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 5.5.1 and 5.5.2. Provide material in sufficient detail to support the assessment of the impacts of sanitary system effluent discharges during plant operation.
- ESRP 6.6. Provide descriptive material to support the description of the effluent water-quality monitoring program.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- a description of the systems (both temporary and permanent) to be provided (from the environmental report [ER])
- anticipated quantity and characteristics of treated effluents
- the ultimate disposal of treated effluents (from the ER)
- standards for the proposed sanitary system effluents
- the NPDES permit (if available).

II. ACCEPTANCE CRITERIA

Acceptance criteria for review of sanitary system effluents are based on the relevant requirements of the following:

- 40 CFR 6, Appendix A, with respect to procedures on floodplain and wetlands protection
- 40 CFR 122 with respect to NPDES permit conditions for discharges, including storm-water discharges
- 40 CFR 133 with respect to sanitary effluents
- 40 CFR 403 with respect to sanitary wastes
- 40 CFR 423 with respect to effluent limitations on existing and new point sources
- Federal, State, local, regional, and Native American tribal water laws and water rights.

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

- Compliance with environmental quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of the environmental impacts in striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) will establish its own impact determination.
- Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In *Jefferson County PUD #1 vs. Department of Ecology* (U.S. Supreme Court Case), the States were granted additional authority to limit hydrological alterations beyond the State's role in regulating water rights.
- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including hydrology, water-use, and water-quality issues.

The regulatory position necessary to meet this objective requires documentation of consultations with NPDES authority.

Technical Rationale

The technical rationale for evaluating the applicant's waste systems for sanitary effluents is discussed in the following paragraph:

A detailed and thorough description of the sanitary system effluents is essential for evaluating potential impacts to the environment that may result from plant construction or operation.

III. REVIEW PROCEDURES

When reviewing sanitary effluent systems, the reviewer should take the following steps:

- (1) Describe the sanitary treatment/disposal system effluent characteristics and quantities, system capacity, unit loading factors, impact of storm water runoff, and predicted quality.
- (2) Determine the characteristics, including point of discharge or place of ultimate disposal of any separate discharge system such as sludge disposal.

- (3) Compare the pollutant release levels with applicable regulations and water-quality standards.
- (4) Ensure that the sanitary system effluent information is adequate to serve as a basis for assessing the impacts of plant construction and operation resulting from the expected performance of the system.
 - (a) In evaluating the adequacy of this material, consult the applicable standards and guides for this environmental review.
 - (b) Ensure that the requirements of Federal, State, regional, local, and affected Native American tribal agencies appropriate to the objectives of this environmental review have been considered and that the system as proposed is capable of meeting these requirements.
- (5) Ensure that the proposed systems are adequate and the proposed system operating procedures are consistent with good engineering practice and with the degree of waste treatment needed (AWWA 1990).

IV. EVALUATION FINDINGS

The input to the environmental impact statement (EIS) should consist of a brief description of the proposed sanitary waste treatment system and the method for ultimate disposal of treated wastes. A description of expected effluent quality from the treatment system should be provided.

The depth and extent of the input to the EIS will be governed by the purpose of the review. The following information should be included:

- brief description of the proposed sanitary effluent treatment system and the method for ultimate disposal of treated effluents
- a description of expected effluent quality from the treatment system
- a review of status of consultations with appropriate NPDES permitting agency.

V. IMPLEMENTATION

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

VI. REFERENCES

40 CFR 6, Appendix A, "Statement of Procedures on Floodplain Management and Wetlands Protection."

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 133, "Secondary Treatment Regulations."

40 CFR 403, "General Pretreatment Regulations for Existing and New Sources of Pollution."

40 CFR 423, "Steam Electric Power Generating Point Source Category."

American Water Works Association (AWWA). 1990. *Water Quality and Treatment*, 4th Edition, McGraw-Hill Book Company, New York.

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Jefferson County PUD #1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994)

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**
 OFFICE OF NUCLEAR REACTOR REGULATION

3.6.3. OTHER EFFLUENTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of miscellaneous gaseous, liquid, and solid effluents not included in ESRPs 3.6.1 and 3.6.2. The reviewer should include a description of these wastes and their proposed treatment and disposal methods. The scope of the review directed by this plan should include identification and quantification of these miscellaneous emissions and effluents in sufficient detail to permit subsequent staff analysis and assessments of potential environmental impacts.

Review Interfaces

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

- ESRP 2.7. Provide characterizations of release to the atmosphere.
- ESRPs 3.6.1 and 3.6.2. Obtain lists of wastes considered in those sections (i.e., nonradioactive wastes containing chemicals and biocides, and sanitary-system wastes).
- ESRPs 5.5.1 and 5.5.2. Provide descriptive material to support the assessment of the impacts of discharges from the waste systems for "other" wastes during plant operation.

October 1999

3.6.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Data and Information Needs

The type of data and information needed will be affected by site-and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- estimates of gaseous effluents (e.g., from diesel engines, gas turbines, heating plants, incinerators) released during plant operation, the location and elevation of release points, the frequency of their release and their treatment before release, and the total quantity of SO_x, NO_x, hydrocarbons, and suspended particulates to be discharged annually (from the environmental report [ER])
- applicable Federal, State, and tribal regional standards concerning atmospheric emissions from consultation with Federal, State, regional, local, and affected Native American tribal agencies
- information concerning nonradioactive wastes not considered in ESRPs 3.6.1 and 3.6.2. Examples include laboratory wastes, storm drainage, trash, hazardous wastes, and debris from bars or screens on the cooling water intake. The description should include estimates of the quantities of wastes, their pollutant concentrations at points of release as appropriate to the system, and other relevant data (from the ER).
- procedures for any offsite disposal of wastes (from the ER)
- procedures by which all effluents will be treated, controlled, and discharged to meet State and EPA effluent limitation guidelines and new source performance standards (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the effluents of the proposed plant sites are based on the relevant requirements of the following:

- 40 CFR 122 with respect to NPDES permit conditions for discharges, including storm water discharges
- 40 CFR 147 with respect to effluent-disposal limitation
- 40 CFR 227 with respect to criteria for evaluating environmental impacts
- 40 CFR 423 with respect to effluent limitations on existing and new point sources
- Relevant Federal, State, local, regional, and Native American tribal regulations.

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

- Regulatory Guide 4.2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including miscellaneous gaseous and liquid and solid effluents.

Technical Rationale

The technical rationale for evaluating the applicant's nonradioactive waste systems for miscellaneous gaseous, liquid, and solid effluents is as follows:

A detailed and thorough description of all effluents is essential for evaluating potential impacts to the environment that may result from plant construction or operation.

III. REVIEW PROCEDURES

The description of these miscellaneous sources of nonradioactive wastes should be closely linked with the impact assessment review for ESRPs 5.5.1 and 5.5.2 to establish the nonradioactive waste characteristics that are most likely to result in environmental impacts. With this in mind, the reviewer should take the following steps:

- (1) Establish that the information necessary for subsequent impact analysis and comparison with regulatory standards is available and consider the manner of proposed waste treatment and control.
- (2) Describe the procedures for effluent handling and disposal.
- (3) Compare the proposed effluent systems with standard designs to determine the adequacy of the system (e.g., equipment to remove oil from storm drainage).
- (4) Consider the handling of dangerous materials.
- (5) Compare atmospheric emissions with applicable Federal, State, regional, local, and affected Native American tribal standards.
- (6) Identify any unusual site-related conditions (e.g., air quality standards) that would affect treatment or release of miscellaneous nonradioactive wastes.
- (7) Ensure that the descriptions of miscellaneous effluents and treatment systems are adequate to serve as a basis for assessing the impacts of these discharges during plant construction and operation.
- (8) Ensure that the requirements of Federal, State, regional, local, and affected Native American tribal agencies appropriate to the objectives of this environmental review have been considered.

(9) Evaluate the descriptions of miscellaneous wastes and waste systems to determine that

- comparison of amounts and concentrations of waste discharges have been made with appropriate standards and criteria
- all waste streams and discharged wastes not considered in ESRPs 3.6.1 and 3.6.2 have been considered
- proposed procedures are consistent with good engineering practice and are consistent with the degree of waste treatment needed
- unusual procedures or site-specific problems that could result in unusual environmental impacts are identified.

IV. EVALUATION FINDINGS

Input from this ESRP to the environmental impact statement (EIS) should be limited to a brief discussion of the waste sources in this category, treatment systems for the waste sources, methods of disposal, and quantities or concentrations of pollutants disposed. Compliance with applicable standards should be noted.

The frequency and duration of operation of auxiliary boilers and diesel-powered generators should be noted. Atmospheric emissions from these sources may be presented in a table listing applicable standards of performance.

V. IMPLEMENTATION

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

VI. REFERENCES

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 147, "State Underground Injection Control Programs."

40 CFR 227, "Criteria for the Evaluation of Permit Applications for Ocean Dumping of Material."

40 CFR 423, "Steam Electric Power Generating Point Source Category."

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**

OFFICE OF NUCLEAR REACTOR REGULATION

3.7 POWER TRANSMISSION SYSTEM

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description of the design characteristics of the proposed power transmission system. The scope of the review directed by this plan should include the transmission system from the plant switchyard to its connections with existing systems, including lines, corridors,^(a) towers, access roads, substations, and communication stations. This review should provide input to other reviews dealing with evaluation of construction and operational impacts associated with land use and ecosystems and to other ESRPs that deal with consideration of alternatives.

Review Interfaces

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

- ESRP 1.2. Provide assurance that the applicant has requested Federal Aviation Authority (FAA) approval for construction of the transmission towers if the tower(s) extends more than 61 m (200 ft) above the ground.

-
- (a) For the purposes of these ESRPs, "corridors" are defined as transmission line routes of variable width, depending on the nature of the application. When an applicant has proposed precisely described and located rights-of-way, "corridor" and "right-of-way" are synonymous. When an applicant's rights-of-way are not precisely defined, corridors are more general routes of sufficient width to contain the eventual rights-of-way.

October 1999

3.7-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.2.2. Obtain land-use data as needed to support descriptions of transmission corridors and offsite areas.
- ESRP 2.5.3. Provide the locations of planned transmission corridors.
- ESRPs 4.1, 4.3.1, 4.3.2, 4.4.3, 5.1, 5.6, and 5.8.3. Provide descriptive information to support the assessments related to power transmission.
- ESRPs 4.2.1 and 4.2.2. Provide information on the power transmission corridor as it relates to construction activities.
- ESRP 4.4.1. Provide a detailed description of any power transmission system construction associated with the proposed plant that physically impacts the region, including visual aesthetics.
- ESRPs 5.6.2, 6.5.1, and 6.5.2. Provide the physical characteristics of the power-transmission system and maintenance procedures necessary for determining environmental impacts to the aquatic ecosystems and provide any additional information pertinent to ecological monitoring programs.
- ESRP 5.6.3. Provide information about the basic electrical design parameters, the basic structural parameters, and the maximum electric field gradient(s) and edge of right-of-way field gradients in kV/m.
- ESRP 9.2.1. Provide information on the power transmission system that is relevant to the evaluation of alternatives to the proposed action that do not require new generating capacity.
- ESRP 9.4.3. Provide background information on the proposed transmission system siting and design for the evaluation of power transmission system alternatives.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- basic electrical design parameters, including transmission design voltage or voltages, line capacity, conductor type and configuration, spacing between phases, minimum conductor clearances to ground, maximum predicted electric-field strength(s) at 1 m above ground, the predicted electric-field strength(s) at the edge of the right-of-way in kilovolts per meter (kV/m), and the design bases for these values (from the environmental report [ER])
- predicted noise levels resulting from transmission-system operation (from the ER)

- basic structural design parameters, including illustrations and descriptions of towers, conductors, and other structures, with dimensions, materials, color, and finish (from the ER)
- topographic maps (15-minute scale as a rule) or aerial photographs showing the proposed corridor or corridors and all existing major high voltage corridors in the region. The applicant should provide siting data for all potential corridors identified by the applicant.
- lengths, widths, and area of rights-of-way, including modification and/or use of existing rights-of-way and other facilities for the proposed project (from the ER)
- general methods of construction (e.g., tower foundations, stringing, location of access roads, span length, and clearing of rights-of-way) (from the ER)
- when available, tower and substation locations (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of power transmission line siting are based on the relevant requirements of the following:

- 40 CFR 6.203 with respect to descriptions of size, location, land requirements, and operation and maintenance requirements of auxiliary structures such as transmission lines
- 10 CFR 51.53(c)(3)(H) with respect to assessing impacts of transmission systems not meeting National Electric Safety Code (NESC).

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), in which the level of detailed description for the construction and maintenance of these structures and their rights-of-way are identified
- Institute of Electrical and Electronic Engineers, Inc. (IEEE 1997) with respect to electric shock hazards
- Applicable Federal, State, regional, local, and affected Native American tribal standards, guidelines, and requirements.

Technical Rationale

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

A description and characterization of the proposed transmission system is necessary to evaluate the environmental impacts associated with the system. Restrictions on property use in the proposed power transmission line corridor and sensitive habitats in its proposed path must be understood so that the impacts can be fully considered. Additionally, the design parameters of the system and the resulting field strengths and noise levels expected to be associated with power transmission provide useful information in addressing the significance of potential impacts.

III. REVIEW PROCEDURES

The reviewer's analysis of the proposed power transmission system should be closely linked with the impact assessment review described within ESRPs 4.1, 4.3.1, 4.3.2, 4.4.3, 5.1.3, 5.6, and 5.8.3 to establish the general power transmission system characteristics that are most likely to affect these reviews.

Because this plan is primarily for description, the information can usually be obtained from the ER or from responses to questions asked of the applicant. When an applicant has identified a specific corridor or corridors as the proposed transmission line route or routes, only those corridors need to be considered in this review. (Alternative corridors should be considered by the reviewer for ESRP 9.4.3 on Alternative Transmission Systems.) If no specific corridors are identified, the reviewer should consider in this review all potential corridors identified by the applicant.

IV. EVALUATION FINDINGS

Evaluating the adequacy of this material requires the reviewer to determine that (1) data on the power transmission system are sufficient to describe the systems and provide qualitative and quantitative information necessary to assess potential impacts to land use, terrestrial and aquatic ecosystems, and man and (2) Federal, State, regional, and local regulations, and affected Native American tribal requirements applicable to transmission system design, construction, or operation have been considered.

The following information should be included in the EIS:

- the route of the proposed power transmission system
- proposed tower types and range of dimensions (including those needed for unusual situations such as long water crossing), span lengths, rights-of-way lengths and widths, and areas of rights-of-way. Tower locations for sensitive (e.g., historic) areas should be included.
- the voltage, line capacity, conductor configuration, minimum conductor-to-ground clearance, maximum predicted electrical field strengths 1 m above ground and at the edge of the rights-of-way, and predicted noise levels at the edge of the rights-of-way
- the location of other facilities, such as substations.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.53, "Postconstruction to environmental reports."

40 CFR 6.203, "Body of EISs."

Institute of Electrical and Electronic Engineers, Inc. (IEEE). 1997. *National Electrical Safety Code (NESC)*, New York.

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**
 OFFICE OF NUCLEAR REACTOR REGULATION



3.8 TRANSPORTATION OF RADIOACTIVE MATERIALS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review and analysis of the proposed means of transporting radioactive materials. The scope of the review directed by this plan will be limited to those design and operational parameters specified in 10 CFR 51.52(a).

Review Interfaces

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

- ESRP 3.2. Obtain input on the reactor type and rated core thermal power, the fuel assembly description, and the average irradiation level of irradiated fuel.
- ESRP 5.4.2. Provide the reviewer for ESRP 5.4.2 with a description of the transportation of radioactive materials and an evaluation of transportation relative to the criteria associated with Table S-4 of 10 CFR 51.52(c). If an independent analysis of the impacts of transportation is required, ensure that sufficient information to support an independent analysis of these impacts is provided.

October 1999

3.8-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 7.4. Provide the reviewer for ESRP 7.4 with a description of postulated accidents associated with transportation of radioactive materials and an evaluation of the transport relative to the criteria associated with Table S-4 of 10 CFR 51.52(c). If an independent analysis of the impacts of transportation accidents is required, ensure that sufficient information to support an independent analysis of these impacts is provided.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- reactor type and rated core thermal power (from ESRP 3.2)
- fuel assembly description (from ESRP 3.2)
- average irradiation level of irradiated fuel (from ESRP 3.2)
- the capacity of the onsite storage facilities to store irradiated fuel and the minimum fuel storage time between removal from the reactor and transportation offsite (from the environmental report [ER])
- treatment and packaging procedures for radioactive wastes other than irradiated fuel (from the ER)
- transportation system to be used for fresh fuel other radioactive wastes, and if applicable, irradiated fuel
- estimated transportation distance from the plant to the facility to which irradiated fuel will most likely be sent, if applicable (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the description of the transportation of radioactive materials are based on the relevant requirements of the following:

- 10 CFR 51.52 with respect to the design and operational parameters related to the transportation of fuel and waste to and from the reactor.

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

- There are no regulatory positions specific to this ESRP.. Note, however, that the NRC has generically considered the environmental impacts of spent nuclear fuel with U-235 enrichment levels up to 5% and irradiation levels up to 62,000 megawatt-days per metric ton and found that the

environmental impacts of spent nuclear fuel transport are bounded by the impacts listed in Table S-4 provided that the more than 5 years has elapsed between removal of the fuel from the reactor and shipment of the fuel offsite (NRC 1996; NRC 1999a).

Technical Rationale

The technical rationale for evaluation of the applicant's proposed means for transporting radioactive materials is discussed in the following paragraph:

The proposed method for the transportation of fuel and radioactive wastes to and from the facility needs to be described so that impacts from transportation can be appropriately analyzed in other sections of the ESRP. The regulations in 10 CFR 51.52 give the environmental impacts that result, given a specific thermal power level in the reactor core, type of fuel, average irradiation of fuel, and specific parameters on packaging and shipping. If the description of the transportation falls within the specific parameters given in paragraph (a) of 10 CFR 51.52, then Table S-4 can be used to determine the environmental impact; otherwise, further analysis is required. Thus, a description of the parameters surrounding the transportation of fuel and radioactive wastes is necessary.

III. REVIEW PROCEDURES

The reviewer's analysis of the data and information is required to support the reviewer's evaluation for conformance with 10 CFR 51.52(a) (see Evaluation Findings in this ESRP). The analysis should consist of assembling the data listed in the procedures below and verifying their accuracy. The reviewer may consult with the reviewers for ESRPs 3.2 and 3.5 to verify the data.

The reviewer should take the following steps:

(1) Compare the verified data (listed under Data and Information Needs above) with the following criteria:

- reactor type – light-water cooled (LWR)
- rated core thermal power level – 3800 MW maximum (see ESRP 3.2 for a definition of “rated.”)
- fuel assemblies – zircaloy fuel rods, sintered low enrichment uranium dioxide (maximum 4% by weight of ²³⁵U) pellets (Use of 5% enriched fuel in conjunction with irradiation levels above 33,000 megawatt-days per metric ton has been considered generically.)
- average irradiation level of irradiated fuel – 33,000 megawatt-days per metric ton maximum for use of Table S-4 directly, irradiation between 33,000 megawatt-days per metric ton and 62,000 megawatt-days per metric ton maximum requires references to other environmental documents

- onsite storage of irradiated fuel – minimum of 90 days between removal from the reactor and shipment offsite (5 years, if the irradiation exceeds 33,000 megawatt-days per metric ton) (The reviewer should consider the proposed capacity of the facility to store fuel in evaluating this criterion.)
 - radioactive wastes other than fuel – packaged as solid waste prior to offsite shipment (The reviewer should consider the proposed solid waste treatment and packaging procedures in evaluating this criterion.)
 - new fuel shipment to the plant – by truck
 - irradiated fuel shipments offsite – by truck, rail, or barge
 - other radioactive-waste shipments offsite – by truck or rail.
- (2) When the above criteria are met, conclude that the environmental impacts of transportation of fuel and radioactive wastes are represented by the values given in 10 CFR 51.52(c), Table S-4, and instruct the reviewers for ESRPs 5.4.2 and 7.4 to adopt this table as representing the environmental impacts of radioactive materials transportation.
- (3) When the fuel is enriched greater than 4 percent by weight of ^{235}U (as given in 10 CFR 51.52(a)(2) to a maximum of 5 percent, and when the fuel irradiation is greater than 33,000 megawatt-days per metric ton (as given in 10 CFR 51.52(a)(3) to a maximum of 60,000 megawatt-days per metric ton, it has been shown that the environmental cost contributions are either unchanged or may in fact be reduced from those summarized in Table S-4 (Baker et al. 1988; 53 FR 30355 [NRC 1988]; NRC 1996). The impacts of transportation of fuel irradiated to 62,000 megawatt-days per metric ton have also been considered and found to be bounded by those summarized in Table S-4 (NRC 1999a, 64 FR 48496) The reviewer should instruct the reviewers for ESRPs 5.4.2 and 7.4 to adopt this table as representing the environmental impacts of radioactive materials transportation.
- (4) When any of the above criteria are not met, expand the analysis of the required data to the level necessary to provide sufficient data to support a subsequent impact analysis that would supplement the impact data of Table S-4. The reviewer should notify the reviewers for ESRPs 5.4.2 and 7.4 that Table S-4 cannot be used and that a supplemental impact assessment will be required.

IV. EVALUATION FINDINGS

When the reviewer determines that the environmental impacts of transportation can be met by use of Table S-4, a brief input to the environmental impact statement (EIS) should be prepared summarizing the data of Section III, Item (1) of this ESRP. The input should note that these data are within the scope of 10 CFR 51.52(a), and that ESRPs 5.4.2 and 7.4 will address the impacts of radioactive-material transportation by reference to Table S-4 of 10 CFR 51.52(c). When Table S-4 cannot be used, the reviewer should provide, as input to the EIS, a description of those proposed designs or procedures that do not

meet the criteria of Section III, Item (1) of this ESRP. This material should be provided in sufficient detail to support a subsequent impact assessment by the reviewers for ESRPs 5.4.2 and 7.4.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.52, "Environmental effects of transportation of fuel and waste."

10 CFR 51.52, Table S-4, "Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor."

Baker, D. A., W. J. Bailey, and C. E. Beyer. 1988. *Assessment of the Use of Extended Burnup Fuel in Lightwater Power Reactors*. NUREG/CR-5009, Pacific Northwest Laboratory, Richland, Washington.

U.S. Nuclear Regulatory Commission (NRC). 1988. Carolina Power & Light Co. Shearon Harris Nuclear Power Plant Utility; Environmental Assessment and Finding of No Significant Impact. *53 Federal Register* (August 11, 1988).

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

U.S. Nuclear Regulatory Commission (NRC). 1999a. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report, Section 6.3—Transportation, Table 9.1 Summary of findings on NEPA issues for license renewal of nuclear power plants*. NUREG-1437 Vol. 1, Addendum 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999b. Changes to Requirements for Environmental Review for Renewal of Nuclear Power Plant Operating Licenses. *64 Federal Register* (September 3, 1999).



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

4.0 ENVIRONMENTAL IMPACTS OF CONSTRUCTION

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the environmental impacts of construction. The scope of the paragraph covered by this plan introduces the material from the reviews conducted under ESRPs 4.1 through 4.6.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

4.0-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's description of the potential environmental impacts of construction is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 4.1 through 4.6. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.1 LAND-USE IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the land-use impacts of construction. The scope of the paragraph covered by this plan introduces the material from the reviews conducted under ESRPs 4.1.1 through 4.1.3.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

4.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's description of potential land-use impacts is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 4.1.1 through 4.1.3. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.1.1 THE SITE AND VICINITY

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's assessment of direct impacts of construction on land use of the site and vicinity.^(a) The scope of the review directed by this plan includes analysis and evaluation of construction activities in sufficient detail to determine the significance of potential land-use impacts and to recommend how these impacts should be treated in the licensing process (e.g., consideration of alternative designs or practices that would mitigate adverse environmental impacts). The scope of the review directed by this plan should be limited to consideration of potential land-use impacts on the site and in the site vicinity, and will not include transmission line and access corridor impacts. These are considered in ESRP 4.1.2.

Review Interfaces

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

- ESRPs 2.2.1, 2.3.1, 2.8, 3.1, and 4.2.2. Obtain input to aid the assessment of direct impacts of construction on land use of the site and vicinity.
- ESRP 4.1.3. Provide a list of construction impacts that could affect historic/archaeological sites.

(a) "Site" and "vicinity" are defined in ESRP 2.2.1.

October 1999

4.1.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 4.3 and 4.4. Provide information on land-use impacts at the site and its vicinity that should be considered for potential ecological or socioeconomic impacts.
- ESRP 4.6. Provide a list of applicant commitments and staff recommendations of practices to limit adverse environmental impacts of construction.
- ESRP 6.5.1. Provide a list of any construction activities that should be part of the applicant's monitoring program.
- ESRP 6.7. Provide a discussion of any deficiencies in the site preparation and construction monitoring program that should be corrected by additional monitoring provisions.
- ESRPs 9.3 and 9.4. Provide the reviewers for ESRPs 9.3 and 9.4 with information about proposed land-use changes if those changes are determined to be adverse and should be avoided. This would enable the reviewers to consider alternative plant designs or locations that would avoid the impacts.
- ESRP 10.1. Provide a summary of the unavoidable impacts that are predicted to occur as a result of changes in land use during construction.
- ESRP 10.2. Provide a summary of irreversible and irretrievable commitments of land-use resources that will occur during construction.
- ESRP 10.4. Provide a productivity assessment for such land, if the land committed for site construction meets the statutory definition of prime or unique, with a relative value rating that places it within the top half of land within the local government jurisdiction, or with a capability classification of I or II (see the "Review Procedures" in this ESRP).

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- maps showing land-use categories within the site boundary. Land-use categories should be consistent with those defined by the U.S. Geological Survey (USGS 1997) (from ESRP 2.2.1).
- land areas (hectares) devoted to major uses within the site boundary (from ESRP 2.2.1)
- maps showing major land uses in the site vicinity (from ESRP 2.2.1)
- land areas (hectares) devoted to major uses in the site vicinity (from ESRP 2.2.1)
- highways, railroads, and utility rights-of-way that cross the site and vicinity (from ESRP 2.2.1)

- special land uses, such as recreation, within the site and vicinity (from ESRP 2.2.1)
- mineral resources adjacent to or within the site boundary presently being exploited or of known commercial value (from ESRP 2.2.1)
- Federal, State, regional, local, and affected Native American tribal land-use plans for the site and vicinity (from ESRP 2.2.1)
- land-use impacts of any related Federal action that may have cumulatively significant impacts with the construction activities at the site and in the vicinity proposed by the applicant (from ESRP 2.8)
- area and location of land in the site and vicinity that will be disturbed by construction on either a long-term or short-term basis (from ESRP 3.1)
- construction activities to be located in a floodplain^(a) or on wetlands^(b) (from ESRPs 2.3.1 and 4.2.2)
- information from the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) on the relative value of the proposed site if it involves farmland
- in the case of a construction permit (CP), operating license (OL), early site permit, or combined license (COL) application withdrawal or termination request, a description of proposed site restoration and management actions. Some examples are recontouring or grading, permanent landscaping, revegetation of disturbed areas, restoration of stream flows, establishment of recreational areas, and other specific actions (from the environmental report [ER] and on request from the applicant).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of land-use impacts at the site of the nuclear power station and in its vicinity are based on the relevant requirements of the following:

- 10 CFR 51.71(d) with respect to analysis requirements to be included in draft environmental impact statements (EISs) prepared by NRC
- 10 CFR 51, Appendix A(7), with respect to discussion in EISs prepared by NRC of possible conflicts between alternatives and the objectives of applicable land-use plans
- guidance and requirements for particular land types shown in Table 4.1.1-1.

(a) The term "floodplain" is defined at 10 CFR 72.3.

(b) The term "wetland" is defined in Executive Order 11990.

Table 4.1.1-1. Federal Sources to be Consulted for Various Special Land Types

| Land Type | Sources to be Consulted |
|------------------------|---|
| Coastal Zones | <ol style="list-style-type: none"> 1. Coastal Zone Management Act (16 USC 1451-1464) 2. National Oceanic and Atmospheric Administration regulations implementing the Coastal Zone Management Act (15 CFR 923) |
| Farmland | <ol style="list-style-type: none"> 1. Farmland Protection Policy Act (7 USC 4201) 2. U.S. Department of Agriculture regulations implementing the Farmland Protection Policy Act (7 CFR 658) 3. Council on Environmental Quality (CEQ) memorandum on "Analysis of Impacts on Prime and Unique Agricultural Lands in Implementing the National Environmental Policy Act" (45 FR 59189) |
| Floodplains | <ol style="list-style-type: none"> 1. Executive Order 11988, "Floodplain Management" (42 FR 26951) 2. U.S. Water Resources Council, "Floodplain Management Guidelines" (40 FR 6030) |
| Wetlands | <ol style="list-style-type: none"> 1. Executive Order 11990, "Protection of Wetlands" (42 FR 26961) as amended by Executive Order 12608 (52 FR 34617) |
| Wild and Scenic Rivers | <ol style="list-style-type: none"> 1. Wild and Scenic Rivers Act (16 USC 1271-1287) 2. CEQ memorandum on "Procedures for Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory" (45 FR 59191-59192) |

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

- Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (NRC 1998), with respect to land-use considerations rendering a proposed site unsuitable for a nuclear power station.

Technical Rationale

The technical rationale for evaluating the applicant's description of potential land-use impacts to the site and vicinity is discussed in the following paragraphs:

The NRC's regulations implementing NEPA provide that NRC EISs are to include a section discussing the environmental consequences of alternatives (10 CFR 51, Appendix A[7]). The section is to include a discussion of "possible conflicts between the alternatives and the objectives of Federal, State, regional, and local (and in the case of a reservation, Native American tribal) land-use plans, policies and controls for the area concerned." In addition, the regulations provide that due consideration is to be given in an EIS to compliance with applicable zoning and land-use regulations [10 CFR 51.71(d)].

Guidance on (1) what constitutes a land-use plan or policy, and (2) how an agency should handle potential conflicts between a proposal and the objectives of land-use plans is provided by the CEQ in Question 23 of "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (CEQ 1981). With regard to what constitutes a land-use plan or policy, CEQ states on page 18033 that

the term "land-use plans" includes all types of formally adopted documents for land-use planning, zoning, and related regulatory requirements. Local general plans are included, even though they are subject to future change. Proposed plans should also be addressed if they have been formally proposed by the appropriate government body in a written form, and are being actively pursued by officials of the jurisdiction. Staged plans, which must go through phases of development ... should also be included even though they are incomplete.

With regard to how an agency should handle potential conflicts between a proposal and the objectives of land-use plans, CEQ states on page 18033 that

the agency should first inquire of other agencies whether there are any potential conflicts. If there would be immediate conflicts, or if conflicts could arise in the future when the plans are finished ... the EIS must acknowledge and describe the extent of those conflicts. If there are any possibilities of resolving the conflicts, these should be explained as well. The EIS should also evaluate the seriousness of the impact of the proposal on the land-use plans and policies, and whether, or how much, the proposal will impair the effectiveness of land-use control mechanisms for the area. Comments from officials of the affected area should be solicited early and should be carefully acknowledged and answered in the EIS.

Guidance in NRC's Regulatory Guide 4.7, Rev. 2 (1998) provides procedures for evaluating land-use impacts where

- there are either no conflicts between the applicant's proposed facility and the objectives of Federal, regional, State, and local (and in the case of proposed location on a reservation, Native American tribal) land-use plans and the Federal sources shown in Table 4.1.1-1 (plus comparable State sources), or
- if there are or are likely to be conflicts, the extent of the conflicts, the possibilities of resolving the conflicts, and the seriousness of the impact of the applicant's proposal on land-use plans and policies and the effectiveness of land-use control mechanisms for the area can be adequately evaluated and discussed in the EIS or other environmental document.

III. REVIEW PROCEDURES

Because limited portions of land-use impacts are covered in ESRP 4.1.3, "Historic/Archaeological Sites"; ESRP 4.3.1, "Terrestrial Ecosystems"; and ESRP 4.4, "Socioeconomic Impacts"; this ESRP will

be limited to those direct physical changes and restrictions on land use at the site and vicinity due to plant construction. For each of these, the impact analysis should include consideration of the potential changes in land use as a result of the siting decision and the direct physical impacts on the site and vicinity as a result of construction activities.

The reviewer should direct the analysis toward conclusions with respect to the following:

- long-term restrictions of land use resulting from the licensing action and long-term physical changes in land use of the site and vicinity
- short-term physical changes in land use of the site and vicinity and the applicant's plans for mitigation of adverse impacts
- construction impacts on the geologic environment.

The reviewer should take the following steps:

(1) Evaluating Long-Term Restrictions of Land Use Resulting from the Licensing Action and Long-Term Physical Changes in Land Use of the Site and Vicinity:

(a) Identify changes in land use that will occur as a consequence of the licensing action.

Consider land-use changes in the context of the amount and quality of land affected after proposed measures, if any, have been implemented.

- Review restrictions on the use of farm land, recreational areas, housing areas, and other similar areas.
 - Consider any restrictions or modifications of lands classified as floodplain, wetlands, or coastal zone.
- (b) If appropriate, analyze the degree of change and its acceptability by comparing specific cases with existing standards, guides, regulations, or legislation; or to Federal, State, regional, local, and affected Native American tribal land-use plans and zoning ordinances, consulting with these sources, and ensuring consistency with them where required or desirable.
- Refer to the Federal sources listed in Table 4.1.1-1 (and comparable State sources applicable to the applicant's proposed site) for particular types of land.
 - If there are no relevant standards, guides, regulations, legislation, or land-use plans, analyze the severity of the impact without these aids.

(c) Analyze the restriction on the use of land such as farmland or forests in the context of the amount and quality of the land in the vicinity of the plant.

- Removal of less than 2% of such land, or up to 500 hectares, generally has minor effects, particularly if the land is not unique or otherwise distinguished.
- When larger land areas are to be committed for a proposed nuclear station (e.g., greater than 500 hectares) or if the reviewer for ESRP 2.2.1 indicates that the proposed land areas are unique or otherwise distinguished, further analysis is needed to determine the quality of the land.

There are three indices of land quality that may be used for guidance. The first is the definitions of prime and unique farmland in the Farmland Protection Policy Act of 1981. The second is the land relative value rating prepared by the NRCS. The third and oldest index is the land capability classification system first published by the U.S. Department of Agriculture (Klingebiel and Montgomery 1961). The indices are further defined as follows:

- Prime and Unique Farmland. The terms "prime farmland" and "unique farmland" are defined in the Farmland Protection Policy Act of 1981. Prime farmland is defined to be

land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture. Prime farmland includes land that possesses the above characteristics but is being used currently to produce livestock and timber. It does not include land already in or committed to urban development or water storage.

Unique farmland is defined in the Act to be

land other than prime farmland that is used for production of specific high-value food and fiber crops, as determined by the Secretary of Agriculture. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables.

- Relative Value Rating. The NRCS will compute a relative value rating for a tract of land upon request from a Federal agency. Procedures are described at 7 CFR 658.4(a,b) and 658.5(a). The rating is based on a variety of data, including soil potential, productivity

ratings, and land capability classifications (see below). The reviewer of ESRP 4.1.1 should normally request that NRCS prepare a relative value rating for a proposed site involving farmland.

- Land Capability Classification. This classification places land in one of eight categories based on soil characteristics (Klingebiel and Montgomery 1961). The eight classifications are listed in Table 4.1.1-2. Land in capability Classes I and II is usually the most productive and, therefore, should be subject to the most detailed analysis when it is to be committed. Commitment of land in Classes III through VIII is less important.

Table 4.1.1-2. Land Capability Classes

| Land Capability Class | Description |
|------------------------------|---|
| I. | Soils have few limitations that restrict their use. |
| II. | Soils have some limitations that reduce the choice of plants or require moderate conservation practices. |
| III. | Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both. |
| IV. | Soils have very severe limitations that reduce the choice of plants, require very careful management, or both. |
| V. | Soils have little or no erosion hazards but have other limitations, impractical to remove, that limit their use largely to intensive pasture or range, woodland, or wildlife food or cover. Limitations can include wet soil, stones, or shallow bedrock. |
| VI. | Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food or cover. |
| VII. | Soils have very severe limitations that make them unsuitable for cultivation and limit their use largely to grazing, woodland, or wildlife. |
| VIII. | Soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, water supply, or to aesthetic purposes. |

- (d) If the land at the proposed site (1) meets the statutory definition of prime or unique, (2) has a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or (3) has a land capability classification of I or II, assess the productivity of the land to provide input to the benefit-cost balance in ESRP 10.4.

- Consider a State's published documents on agricultural statistics, including crop and animal production statistics and land areas by county.
- Consult with State and local agricultural, soil conservation, and cooperative extension agencies to complete this assessment.

(2) Analyzing the Short-Term Physical Changes in Land Use of the Site and Vicinity and the Applicant's Plans for Mitigation of Adverse Impacts:

- Consider mitigation measures for adverse impacts. Matters to be assessed include earth leveling, revegetation, landscaping, cleanup and disposal of debris, erosion control structures, land management practices, stabilization of spoil piles, and stabilization of dikes on cooling lakes.
- Consider staff practices for applications to withdraw or terminate a license or license application after site work has been conducted. It has been staff practice to follow the site redress procedures and practices used in the withdrawal applications for CP extension and for OLs submitted by Consumers Power Co. to NRC for its Midland Plant, Units 1 and 2 (Atomic Safety and Licensing Board 1986). These procedures included (1) preparation of and compliance with a site stabilization plan by the applicant, (2) an inspection and evaluation report prepared by NRC after the applicant's completion of site stabilization activities, and (3) preparation of an environmental assessment by NRC based on the inspection report.

(3) Analyzing the Construction Impacts on the Geologic Environment:

- Consult with the staff safety evaluation reviewers for geology (ESRP 2.6) for an evaluation of the impact of station construction on the geologic environment and for appropriate licensing conditions.
- Determine whether construction of the plant would prevent the exploitation at the proposed site or in the vicinity of mineral resources (e.g., sand and gravel, coal, oil, natural gas, or ores) of commercial value.
- Determine if any such mineral extraction is currently in process or is planned, and the extent to which plant construction will affect such operations.
- Consult with the staff's safety evaluation reviewers for geology for assistance in this review and for an analysis of any other impacts of plant construction on the geologic environment.

IV. EVALUATION FINDINGS

Evaluation of each identified impact results in one of the following three possible determinations, which should be addressed as indicated:

- *The impact is minor, and mitigation is not required.* When all impacts are of this nature, the reviewer should include a statement in the environmental impact statement of the following type:

The staff reviewed the available information on the land-use impacts of construction and refurbishment. Based on this review, the staff concludes that there are no significant environmental impacts.

- *The impact is adverse but can be mitigated by specific design or procedure modifications that the reviewer has identified and determined to be practical.* For these cases, the reviewer should consult with the Environmental Project Manager (EPM) and the reviewers for ESRP 9.4 for verification that the reviewer's conclusions are practical and will lead to an improvement in the benefit-cost balance. The reviewer should prepare a list of verified modifications and potential measures and controls to limit the corresponding impact. These lists should be provided to the reviewer for ESRP 4.6.
- *The impact is adverse, cannot be successfully mitigated, and is of such magnitude that it should be avoided.* When impacts of this nature are identified, the reviewer should inform the reviewers for ESRP 9.4 that an analysis and evaluation of alternative designs or procedures is required. The reviewer should participate in any such analysis and evaluation of alternatives that would avoid the impact and that could be considered practical. If no such alternatives can be identified, the reviewer should provide this information to the reviewer for ESRP 10.1.

The following general criteria should be considered by the reviewer.

- If a redress plan has not been approved in advance, in the case of a CP, OL, ESP, or COL application withdraw or termination request, the applicant should provide a plan for site redress and the mitigation of adverse impacts. The reviewer should assess this plan with the objective of determining either that it is adequate as proposed or that changes will be needed. The technical feasibility and the benefit-cost of any recommended changes should also be considered. Costly actions that would yield only minor environmental benefits should not be recommended.
- If the amount of land to be committed is on the order of 500 hectares or less and does not involve land that (1) meets the statutory definition of prime or unique, (2) has a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or (3) has a land capability classification of I or II, or has special resources that will be affected, then it may be concluded that the expected impacts of construction on land use are not of major significance and there are no land-use changes that would influence the decision on a construction permit.
- If the amount of land to be committed is on the order of 500 to 5000 hectares and does not involve land that (1) meets the statutory definition of prime or unique, (2) has a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or (3) has a land capability classification of I or II, it may be concluded that the expected land-use changes could be adverse, and alternative means to mitigate the impact should be considered. The reviewer should ensure that potential means to mitigate the impact have been considered, that any

recommended means have been verified by the project manager and the reviewers for ESRP 9.3, and that the verified recommendations have been provided to the reviewer for ESRP 4.6.

- If the amount of land to be committed is in excess of 5000 hectares, or if the land (1) meets the statutory definition of prime or unique, (2) has a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or (3) has a land capability classification of I or II, it may be concluded that the expected land-use changes are sufficiently adverse to require mitigation or the consideration of alternatives to avoid the impact. If this conclusion is reached, the reviewer should ensure that potential means to mitigate the impact have been considered, that any recommended means have been verified by the EPM and the reviewers for ESRP 9.3 and that the verified recommendations have been provided to the reviewer for ESRP 4.6. If mitigation is not practical, the reviewer should supply detailed supporting information to the reviewers of ESRP 9.4 and assist them in determining if appropriate alternatives to avoid the impact can be identified. When no alternatives that could be imposed as conditions to the construction permit can be identified, a detailed summary of the land-use changes and their impacts should be provided to the reviewer of ESRP 10.1.

The review performed under this ESRP should document the following objectives: (1) public disclosure of major direct land-use consequences of the proposed construction project activity, (2) presentation of the basis of staff analysis of the project, and (3) presentation of staff conclusions, recommendations, and conditions regarding land use.

Public disclosures may be accomplished by presenting a brief description of construction within the site and vicinity and a discussion of the land-use changes resulting from construction activities. This section should be understandable to a nontechnical reader. Extensive descriptive material may be incorporated by reference and need not be duplicated in the EIS.

The staff's analysis may be presented in a narrative summary by highlighting important aspects of the impacts resulting from potential land-use changes. The discussion should include identification of important effects and mitigating actions. Minor issues should receive minor treatment. Important or disputed issues should be discussed in detail.

The safety evaluation reviewers for geology should provide any necessary input to the EIS with regard to the impact of construction on the geologic environment.

V. IMPLEMENTATION

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

VI. REFERENCES

7 CFR 658, "U.S. Department of Agriculture Regulations Implementing the Farmland Protection Policy Act."

10 CFR 51, Appendix A(7), "Environmental Consequences and Mitigating Actions."

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

10 CFR 72.3, "Definitions."

15 CFR 923, "National Oceanic and Atmospheric Administration Regulations Implementing the Coastal Zone Management Act."

Atomic Safety and Licensing Board. 1986. "In the Matter of Consumers Power Co. (Midland Plant, Units 1 and 2)," 24 NRC 834.

Coastal Zone Management Act, as amended, 16 USC 1451-1464.

Council on Environmental Quality (CEQ) memorandum on "Analysis of Impacts on Prime and Unique Agricultural Lands in Implementing the National Environmental Policy Act," 45 *Federal Register* 59189 (1980).

Council on Environmental Quality (CEQ) memorandum on "Procedures for Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory," 45 *Federal Register* 59191-59192 (1980).

Council on Environmental Quality (CEQ). 1981. "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 *Federal Register* 18026-18037 (1981).

Executive Order 11988, "Floodplain Management," 42 *Federal Register* (1977).

Executive Order 11990, "Protection of Wetlands," 42 *Federal Register* 26951 (1977), as amended by Executive Order 12608, 52 *Federal Register* 34617 (1987).

Farmland Protection Policy Act, as amended, 7 USC 4201 et seq.

Klingebiel, A. A., and P. H. Montgomery. 1961. *Land Capability Classification*, U.S. Department of Agriculture Handbook 210, Washington, D.C.

U.S. Geological Survey (USGS). 1997. "USGS Land Use and Land Cover Data," USGS Survey Earth Resources Observation Data Center, Sioux Falls, South Dakota.

U.S. Nuclear Regulatory Commission (NRC). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.

U.S. Water Resources Council. "Floodplain Management Guidelines for Implementing E.O. 11988," 40 *Federal Register* 6030 (1978).

Wild and Scenic Rivers Act, 16 USC 1271 et seq.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.1.2 TRANSMISSION CORRIDORS AND OFFSITE AREAS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's assessment of direct impacts of construction on land use within the transmission line and access corridors and other offsite areas. The scope of the review directed by this plan should include analysis and evaluation of construction activities in sufficient detail to determine the significance of potential land-use impacts and to recommend how these impacts should be treated in the licensing process. All corridors, including those within the site and vicinity, and all offsite areas should be considered. Where necessary, the reviewer should recommend consideration of alternative routing, location, or construction practices that would mitigate adverse environmental impacts.

Review Interfaces

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

- ESRPs 2.2.2, 2.3, 2.4.1, 2.6, 2.8, and 4.2.2. Obtain information to aid the assessment of construction impacts on land use within the transmission line and access corridors and other offsite areas.
- ESRP 4.1.3. Provide a list of construction impacts that could affect historic/archeological sites.
- ESRP 4.3.1. Provide a list of construction impacts that could affect terrestrial ecosystems.

October 1999

4.1.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 4.3.2. Provide a list of construction impacts that could affect aquatic ecosystems.
- ESRP 4.4.1. Provide a list of construction impacts (e.g., noise, dust) having socioeconomic consequences that are physical in nature.
- ESRP 4.4.2. Provide information on land-use impacts within the transmission line and access corridors and other offsite areas that should be considered for potential social and economic impacts.
- ESRP 4.6. Provide a list of applicant commitments and practices to limit adverse environmental impacts of construction.
- ESRP 5.1.2. Provide a summary of land-use impacts of construction.
- ESRP 6.5.1. Provide a list of any construction activities that should be part of the applicant's monitoring program.
- ESRP 6.7. Provide a discussion of any deficiencies in the construction monitoring program that should be corrected by additional monitoring provisions.
- ESRP 9.4.3. Provide the reviewer for ESRP 9.4.3 with information about the proposed land-use changes if those changes are determined to be adverse and should be avoided. This will enable the reviewer to consider alternative transmission corridors and/or offsite areas that would avoid the impacts.
- ESRP 10.1. Provide the unavoidable impacts that are predicted to occur as a result of changes in land use during construction.
- ESRP 10.2. Provide a brief summary of irreversible and irretrievable commitments of land-use resources that will occur during construction.
- Interface with Environmental Project Manager (EPM). Consult with the EPM to verify any proposed modifications to transmission corridors and offsite areas are practical and will lead to an improvement in the benefit-cost balance.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- proposed routes for corridors, including access roads, that will be used for construction of transmission lines from the station site to an interconnecting point or points on the existing high voltage transmission systems (from ESRP 2.2.2)

- proposed routes of access corridors (e.g., roads and railroads) to serve the proposed project (from ESRP 2.2.2)
- land-use restrictions, if any, contained in any easements (from ESRP 2.2.2)
- corridor lengths, widths, and areas (from ESRP 2.2.2)
- land use within the corridors using U.S. Geological Survey categories (USGS 1997). Descriptions should be provided in terms of corridor segments having predominantly similar land-use types (from ESRP 2.2.2).
- if specific corridors have not been established and only bands are given, a description of the land use within the band using USGS categories (USGS 1997). Descriptions should be provided in terms of corridor segments having predominantly similar land-use types (from ESRP 2.2.2).
- identification of offsite areas by land use, size, and location (from ESRP 2.2.2)
- Federal, State, regional, local, and affected Native American tribal land-use plans (from ESRP 2.2.2)
- highways, railroads, and utility rights-of-way that will be crossed by transmission lines and access corridors (from the environmental report [ER] and site visit)
- a description of construction techniques and the associated impact on land use (from the ER)
- the area and location of land within the corridors and offsite areas that will be disturbed by construction on either a long-term or short-term basis (from the ER)
- planned control actions during construction that will restrict land use in the corridors and offsite areas (from the ER)
- land-use impacts of any related Federal action that may have cumulatively significant impacts with the applicant's proposed activities in the corridors and offsite areas (from ESRP 2.8)
- in the case of a construction permit (CP), operating license (OL), early site permit, or combined license (COL) application withdrawal or termination request, a description of proposed restoration and management actions within the corridors and offsite areas should be addressed in the redress plan. Some examples are recontouring or grading, permanent landscaping, revegetation of disturbed areas, and establishment of recreational areas (from the ER and on request from the applicant).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of land-use impacts at the site of transmission corridors and offsite areas are based on the relevant requirements of the following:

- 10 CFR 51.71(d) with respect to analysis requirements to be included in draft environmental impact statements (EISs) prepared by NRC
- 10 CFR 51, Appendix A(7), with respect to discussion in EISs prepared by NRC of possible conflicts between alternatives and the objectives of applicable land-use plans
- Guidance and requirements for particular land types shown in Table 4.1.2-1.

Regulatory positions and specific criteria to meet the regulations identified above are

- There are no conflicts between the applicant's proposed transmission corridors and offsite areas and the objectives of Federal, State, regional, and local (and in the case of proposed location on a reservation, Native American tribe) land-use plans and the Federal sources shown in Table 4.1.2-1 (plus comparable State sources).
- If there are or are likely to be conflicts, the extent of the conflicts, the possibilities of resolving the conflicts, and the seriousness of the impact of the applicant's proposal on land-use plans and policies and the effectiveness of land-use control mechanisms for the area can be adequately evaluated and discussed in the EIS or other environmental document.

Technical Rationale

The technical rationale for evaluating the applicant's potential impacts to the transmission corridors and offsite areas is discussed in the following paragraphs:

NRC's regulations implementing NEPA provide that NRC EISs are to include a section discussing the environmental consequences of alternatives (10 CFR 51, Appendix A(7)). The section is to include a discussion of "possible conflicts between the alternatives and the objectives of Federal, State, regional, and local (and in the case of a reservation, Native American tribe) land-use plans, policies, and controls for the area concerned." In addition, the regulations provide that due consideration is to be given in an EIS to compliance with applicable zoning and land-use regulations (10 CFR 51.71(d)).

Table 4.1.2-1. Federal Sources to be Consulted for Various Special Land Types

| Land Type | Sources to be Consulted |
|--|--|
| Coastal Zones | <ol style="list-style-type: none"> 1. Coastal Zone Management Act (16 USC 1451-1464) 2. National Oceanic and Atmospheric Administration regulations implementing the Coastal Zone Management Act (15 CFR 923) |
| Farmland | <ol style="list-style-type: none"> 1. Farmland Protection Policy Act (7 USC 4201) 2. U.S. Department of Agriculture regulations implementing the Farmland Protection Policy Act (7 CFR 658) 3. CEQ memorandum on "Analysis of Impacts on Prime and Unique Agricultural Lands in Implementing the National Environmental Policy Act" (45 FR 59189) (CEQ 1980a) |
| Floodplains ^(a) | <ol style="list-style-type: none"> 1. Executive Order 11988, "Floodplain Management" (42 FR 26951) 2. U.S. Water Resources Council, "Floodplain Management Guidelines" (40 FR 6030) |
| Wetlands ^(b) | <ol style="list-style-type: none"> 1. Executive Order 11990, "Protection of Wetlands" (42 FR 26961) as amended by Executive Order 12608 (52 FR 34617) |
| Wild and Scenic Rivers | <ol style="list-style-type: none"> 1. Wild and Scenic Rivers Act (16 USC 1271-1287) 2. CEQ memorandum on "Procedures for Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory" (45 FR 59191-59192) (CEQ 1980b) |
| <p>(a) The term "floodplain" is defined in 10 CFR 72.3.</p> <p>(b) The term "wetland" is defined in Executive Order 11990.</p> | |

Guidance on (1) what constitutes a land-use plan or policy and (2) how an agency should handle potential conflicts between a proposal and the objectives of land-use plans is provided by the Council on Environmental Quality (CEQ) in Question 23 of "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (CEQ 1981). With regard to what constitutes a land-use plan or policy, CEQ states on page 18033 that

the term "land-use plans" includes all types of formally adopted documents for land-use planning, zoning, and related regulatory requirements. Local general plans are included, even though they are subject to future change. Proposed plans should also be addressed if they have been formally proposed by the appropriate government body in a written form, and are being actively pursued by officials of the jurisdiction. Staged plans, which must go through phases of development ... should also be included even though they are incomplete.

With regard to how an agency should handle potential conflicts between a proposal and the objectives of land-use plans, CEQ states on page 18033 that

the agency should first inquire of other agencies whether there are any potential conflicts. If there would be immediate conflicts, or if conflicts could arise in the future when the plans are finished ... the EIS must acknowledge and describe the extent of those conflicts. If there are any possibilities of resolving the conflicts, these should be explained as well. The EIS should also evaluate the seriousness of the impact of the proposal on the land-use plans and policies, and whether, or how much, the proposal will impair the effectiveness of land-use control mechanisms for the area. Comments from officials of the affected area should be solicited early and should be carefully acknowledged and answered in the EIS.

III. REVIEW PROCEDURES

Limited portions of land-use impacts are covered in ESRPs 4.1.3, 4.3.1, and 4.4; therefore, this ESRP will be limited to direct physical changes and restriction on land use in the corridors and offsite areas due to construction. For each of these, the impact analysis should include consideration of the direct physical land-use impacts that occur in the corridors and offsite areas due to construction activities.

The reviewer should direct the analysis toward conclusions with respect to the following:

- long-term physical changes in land use of the corridors and offsite areas
- short-term changes in land use of the corridors and offsite areas and the applicant's plans for mitigation of adverse impacts.
- construction impacts on the geologic environment.

The reviewer should take the following steps:

(1) Evaluating Long-Term Physical Changes in Land Use of the Corridors and Offsite Areas:

- (a) Consider land-use changes in the context of the amount and quality of land affected after mitigating measures, if any, have been implemented.
 - Review restrictions imposed by the presence of transmission lines on use of farm land, recreational areas, housing areas, and other similar areas.
- (b) If appropriate, analyze the degree of change and its acceptability by comparing specific cases with existing standards, guides, regulations, or legislation or to Federal, State, regional, local, and affected Native American tribal land-use plans and zoning ordinances, consulting with these sources and ensuring consistency with them where required or desirable.

- Refer to the Federal sources listed in Table 4.1.2-1 (and comparable State sources applicable to the applicant's proposed transmission line corridors and offsite areas) for particular types of land.
 - If there are no relevant standards, guides, regulations, legislation, or land-use plans, analyze the severity of the impact without them.
- (c) Analyze the restrictions on use of land such as farm land or forests in the context of the amount and quality of the land generally available in the region as compared with that changed due to the corridors and offsite areas, recognizing that the use of some of the land of the corridors may not be changed from its current use. Modification of use for the amount of land usually used for transmission corridors and offsite areas generally has minor effects, if the land is not unique or otherwise distinguished.
- (d) If the land to be changed due to the corridors and offsite areas (1) meets the statutory definition of prime or unique, or (2) has a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or (3) has a land capability classification of I or II, (see "Land Capability Classifications" under "Review Procedures" in ESRP 4.1.1), assess the productivity of the land to determine the need for mitigation or avoidance of any predicted impact.
- (2) Analyzing the Short Term Changes in Land Use of the Corridors and Offsite Areas and the Applicant's Plans for Mitigation of Adverse Impacts:
- (a) Consider mitigation measures for adverse impacts. Matters to be reviewed include revegetation, landscaping, cleanup and disposal of debris, erosion control, land-management practices, and use of chemicals.
- (b) Consider staff practices for applications to withdraw or terminate a license or license application after site work has been conducted. It has been staff practice to follow the site redress procedures and practices used in the withdrawal applications for CP extension and for OLS submitted by Consumers Power Co. to NRC for its Midland Plant, Units 1 and 2 (Atomic Safety and Licensing Board 1986). These procedures include (1) preparation of and compliance with a site stabilization plan by the applicant, (2) an inspection and evaluation report prepared by NRC after the applicant's completion of site stabilization activities, and (3) preparation of an environmental assessment by NRC based on the inspection report.
- (3) Analyzing the Construction Impacts on the Geologic Environment:
- (a) Consult with the safety evaluation reviewers for geology for an analysis of the potential impacts of corridor and offsite area construction on the geologic environment.

IV. EVALUATION FINDINGS

Evaluation of each identified impact should result in one of the following three possible determinations:

- *The impact is minor, and mitigation is not required.* When all impacts are of this nature, the reviewer should include a statement in the environmental impact statement of the following type:

The staff reviewed the available information on the land-use impacts on transmission corridors and offsite areas from construction and refurbishment activities. Based on this review, the staff concludes that there are no significant environmental impacts.

- *The impact is adverse, but can be mitigated by specific design or procedure modifications that the reviewer has identified and determined to be practical.* For these cases, the reviewer should consult with the EPM and the reviewer for ESRP 9.4.3 for verification that the reviewer's identified modifications are practical and will lead to an improvement in the benefit-cost balance. The reviewer should prepare a list of verified modifications and measures and controls to limit the corresponding impact. These lists should be provided to the reviewer for ESRP 4.6.
- *The impact is adverse, cannot be successfully mitigated, and is of such magnitude that it should be avoided.* When impacts of this nature are identified, the reviewer should inform the reviewer for ESRP 9.4.3 that an analysis and evaluation of alternative designs or procedures is required. The reviewer should participate in any such analysis and evaluation of alternatives that would avoid the impact and that could be considered practical. If no such alternatives can be identified, the reviewer should provide this information to the reviewer for ESRP 10.1.

The following general criteria be considered by the reviewer:

- If a redress plan has not been approved in advance, in the case of a CP, OL, early site permit, or COL application withdrawal or termination request, the applicant should provide a plan for redress and the mitigation of adverse impacts. The reviewer should assess this plan with the objective of determining either that it is adequate as proposed or that changes will be needed. Technical feasibility and the benefit-cost of any identified changes should also be considered. Costly actions that would yield only minor environmental benefits should be avoided.
- If construction of the corridors or offsite areas will cause only small changes in the land use of publicly dedicated areas; urban development; land meeting the statutory definition of prime or unique, having a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or having a land capability classification of I or II, (see Section III of ESRP 4.1.1); or other specially significant land uses, it may be concluded that the expected impacts on land use are not of major significance and that there are no land-use considerations that would influence the decision on issuance of a construction permit.

- If certain segments (each on the order of 2 km [1.2 miles] or less) of the corridors are proposed to pass through publicly dedicated areas, urban development, land meeting the statutory definition of prime or unique, having a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or having a land capability classification of I or II (see "Review Procedures" in ESRP 4.1.1); or other specially significant areas, but the remainder of the corridor meets the specifications in the paragraph above, it may be concluded that these segments could have impacts that would suggest either actions to mitigate the impact or segment realignment to avoid the impact. If either of these conclusions is reached, the reviewer should prepare a full description of the problem areas and mitigating actions or alternative alignments that should be considered.
- If construction of a corridor as proposed would (1) require realignment (as in the paragraph above) in numerous locations (on the order of five or more), (2) traverse more than several kilometers of dedicated public lands or housing areas, or (3) cause more than a small change to land meeting the statutory definition of prime or unique, having a relative value rating placing it within the top half in terms of agricultural production in the local government jurisdiction, or having a land capability classification of I or II (see "Review Procedures" in ESRP 4.1.1); the expected impacts of construction of this corridor warrants consideration of an alternative corridor to avoid the impacts. This finding should be reported together with supporting technical information concerning the selection of alternative routes.

The review performed under this ESRP should also achieve the following objectives: (1) public disclosure of major direct land-use consequences of the proposed construction project, (2) presentation of the basis of staff analysis of the project, and (3) presentation of staff conclusions and conditions regarding land use.

Public disclosures may be accomplished by presenting a brief description of the proposed construction activities within transmission lines and access corridors and other offsite areas and a discussion of the land-use changes resulting from these activities. This section should be understandable to a nontechnical reader. Extensive descriptive material may be incorporated by reference and need not be duplicated in the EIS.

The staff's analysis may be presented in a narrative summary by highlighting important aspects of the impacts resulting from potential land-use changes. The discussion should include identification of important effects and mitigating actions. The relative importance of impacts is conveyed to the reader through the degree of emphasis chosen. Minor issues should receive minor treatment. Important or disputed issues should be discussed in detail.

The safety evaluation reviewer for geology should provide any necessary input to the EIS with regard to the impact of construction on the geologic environment.

V. IMPLEMENTATION

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

VI. REFERENCES

7 CFR 658, "U.S. Department of Agriculture Regulations Implementing the Farmland Protection Policy Act."

10 CFR 51, Appendix A to Subpart A, Item 7, "Environmental consequences and mitigating actions."

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

10 CFR 72.3, "Definitions."

15 CFR 923, "National Oceanic and Atmospheric Administration Regulations Implementing the Coastal Zone Management Act."

Atomic Safety and Licensing Board. 1986. "In the Matter of Consumers Power Co. (Midland Plant, Units 1 and 2)," 24 NRC 834.

Coastal Zone Management Act, as amended, 16 USC 1451 et seq.

Council on Environmental Quality (CEQ) memorandum on "Analysis of Impacts on Prime and Unique Agricultural Lands in Implementing the National Environmental Policy Act," 45 *Federal Register* 59189 (1980a).

Council on Environmental Quality (CEQ) memorandum on "Procedures for Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory," 45 *Federal Register* 59191-59192 (1980b).

Council on Environmental Quality (CEQ). 1981. "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 *Federal Register* 18026-18037.

Executive Order 11988, "Floodplain Management" 42 *Federal Register* 26951.

Executive Order 11990, "Protection of Wetlands" 42 *Federal Register* 26961.

Farmland Protection Policy Act, as amended, 7 USC 4201 et seq.

U.S. Geological Survey (USGS). 1997. "USGS Land Use and Land Cover Data," USGS Survey Earth Resources Observation Data Center, Sioux Falls, South Dakota.

U.S. Water Resources Council. "Floodplain Management Guidelines for Implementing E.O. 11988," 40 *Federal Register* 6030 (1978).

Wild and Scenic Rivers Act, 16 USC 1271 et seq.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.1.3 HISTORIC PROPERTIES

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's assessment of potential impacts of proposed project construction activities on historic properties in the site and vicinity, along transmission corridors, and offsite areas. Historic properties include districts, sites, buildings, structures, or objects of historical, archaeological, architectural, or traditional cultural significance (U.S. Department of the Interior 1990 a, b).

The scope of the review directed by this plan should include consideration of the impact of construction activities on historic properties and the adequacy of proposed methods to mitigate any adverse impacts on these resources.

The review should be of sufficient detail to enable the reviewer to predict and assess potential impacts and to determine how these impacts should be treated in the licensing process. Where necessary, the reviewer should consider alternative locations, designs, practices, or procedures that would mitigate predicted adverse impacts.

Review Interfaces

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

- ESRP 2.1, 2.2, 3.1, and 3.7. Obtain location and proposed site description.

October 1999

4.1.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 4.6. Provide a list of applicant commitments and staff evaluations of practices to limit adverse environmental impacts of construction, including any actions required to avoid or mitigate any adverse effects and procedures for recovery of data that the applicant must undertake.
- ESRP 5.1.3. Provide a list of the potential impacts on historic properties that will extend throughout the operating lifetime of the plant.
- ESRPs 9.3 and 9.4. If the proposed construction activities are predicted to result in adverse impacts to historic properties that should be avoided, then obtain input from the reviewers for ESRPs 9.3 and 9.4 to consider alternative plant designs, locations, or construction activities.
- ESRP 10.1. Provide a list of the unavoidable impacts that are predicted to occur as a result of the proposed construction activity.
- ESRP 10.2. Provide a brief summary of the irreversible and irretrievable commitments of historic and cultural resources that result from the proposed construction activity.

Data and Information Needed

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- a description and *National Register* evaluation of historic properties within the site boundary, transmission or access corridors, or offsite areas (from ESRP 2.5.3)
- a description and *National Register* evaluation of historic properties that are within 15 km (9 mi) of the proposed site or within 2 km (1.2 mi) of proposed transmission corridors, access corridors, and offsite areas (from ESRP 2.5.3)
- the State Historic Preservation Officer's (SHPO's) comments on the impact of the proposed project on important historic properties (from consultation with State agencies and Native American tribes)
- State Laws and Plans for Historic Preservation (from the environmental report [ER] and consultation with State and Native American tribal agencies)
- the applicant's procedures for identifying the potential for human remains to occur in the project area, and for complying with provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (43 CFR 10) in the event of an inadvertent discovery.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of historic properties that could be impacted by proposed construction are based on the relevant requirements of the following:

- 36 CFR 800 with respect to the process by which a Federal agency meets its requirements under Sections 106 and 110 of the National Historic Preservation Act (NHPA) to ensure that agency assisted or licensed undertakings consider the effects of the undertaking on historic properties that are evaluated and determined eligible for listing on the *National Register*
- 43 CFR 10 with respect to guidelines and procedures for Federal agencies to follow in the event of inadvertent discoveries of human remains, funerary objects, sacred objects, or objects of cultural patrimony during construction projects on Federal or Native American tribal lands.

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

- Nuclear Reactor Regulation (NRR) Office Letter No. 906, Revision 1, which includes guidance for complying with the requirements contained in the NHPA with respect to protection of historic properties during the construction phase and for handling inadvertent discoveries during construction (NRC 1996). NRR Office Letter No. 906 is revised periodically. Obtain a copy of the latest revision for current guidance.

The information is acceptable if it permits an evaluation of potential impacts and mitigation measures to historic properties.

Technical Rationale

The technical rationale for evaluating the applicant's potential impact of construction to historic properties is discussed in the following paragraphs:

Because of NEPA and Section 106 of NHPA, the NRC's actions are required to fall under 36 CFR 800, which provides regulatory guidance for evaluating and protecting historic properties from potential adverse impacts resulting from Federal agency undertakings.

The construction of a nuclear power facility could impact historic properties through direct impacts (e.g., destruction or alteration of the integrity of a property) or through indirect impacts (e.g., prohibiting access or increasing the potential for vandalism). Elements of Section 110 of NHPA require Federal agencies to manage and protect identified, eligible historic properties located on lands under their jurisdiction.

The potential for human remains to occur in the project areas should be evaluated. An inadvertent discovery of such items during construction may necessitate a work stoppage of up to 30 days and consultation under NAGPRA procedures.

III. REVIEW PROCEDURES

The reviewer's analysis of construction impacts on historic and cultural resources should be linked to the environmental review directed by ESRP 2.5.3 to ensure that the environmental factors most likely to be impacted by proposed construction activities are described in that section. An additional source of expertise in the area of historic and cultural preservation is the Archaeology and Ethnography Program (AEP) of the National Park Service, Department of Interior. With this in mind, the reviewer should take the following steps:

- (1) With the assistance of the AEP and in consultation with the SHPO, consider the historic properties that are listed in or are eligible for inclusion in the *National Register* and that may be affected by construction of the proposed project.
- (2) Use the output of appropriate environmental reviews describing proposed construction activity to identify the construction activities that could result in potential impacts.
- (3) When assessing the potential impacts on these resources, refer to 36 CFR 800, which describes in detail how to assess the impact of a proposed action on properties that are listed in or are eligible for inclusion in the *National Register*.
- (4) Recognize that there are generally two types of impacts on a resource: direct impacts (e.g., destruction during excavation) and indirect impacts (e.g., visual impact, denial of access); and consult with the reviewer for ESRPs 3.1 and 3.7 for assistance in analyzing indirect impacts.
- (5) Although historic properties that are neither listed in nor eligible for inclusion in the *National Register* are not protected by the provisions of the NHPA, as amended, or 36 CFR 800, consider the potential impacts on these resources and measures and controls to avoid adverse impacts.
- (6) For properties that are not eligible for inclusion in the *National Register*, get assistance from the SHPO, the Office of Archaeology and Historic Preservation, or other qualified individuals, as needed.
- (7) Consider alternatives to reduce the impact on the cultural and historic resources and make a determination of the cost of each alternative versus the benefit derived.
- (8) Include the cost of the recovery required by the Historical and Archaeological Preservation Act of 1974 in the consideration of alternatives.
- (9) When the evaluation does not justify preservation of the resource, request that the applicant recover archaeological, historic, architectural, and cultural data related to the resource.

- This recovery may include recording by photographs and measured drawings, archaeological excavations to uncover data and material, removal of structures or salvage of architectural features, and other steps that will ensure full knowledge of the lost resource.
- Salvaged artifacts and materials should be deposited where they are of public and educational benefit.

(10) Assess the operational impacts on historic properties concurrently with this review.

IV. EVALUATION FINDINGS

The ESRP review should accomplish the following objectives: (1) public disclosure of potential impacts, (2) presentation of the basis for the staff analysis, and (3) presentation of staff conclusions regarding impacts of the reviewed construction activities on historic properties. Normally this section should be divided into two subsections: 4.1.3.1, Site and Vicinity; and 4.1.3.2, Transmission Corridors and Offsite Areas. The following information should be included in the environmental impact statement (EIS):

- a positive statement of no effect for properties listed in or eligible for inclusion in the *National Register* that will not be affected
- potential impacts to the properties that are listed in or eligible for inclusion in the *National Register*. Discuss the steps that led to a determination of whether any effects are adverse.
- any adverse impacts on historic properties not eligible for inclusion in the *National Register*
- any measures and controls that are available to limit adverse impacts.

Evaluation of each identified impact results in one of the following determinations:

- *The impact is small, and mitigation is not required.* When all impacts are of this nature, the reviewer should include a statement in the environmental impact statement of the following type:

The staff reviewed the available information on the impacts on historic properties from construction activities. Based on this review, the staff concludes that there are no significant environmental impacts.

- *The impact is adverse, but can be mitigated by specific design or procedure modifications that the reviewer has identified and determined to be practical.* For these cases, the reviewer should consult with the Environmental Project Manager (EPM) and the reviewers for ESRP 9.4 for verification that the reviewer's evaluations are practical and will lead to an improvement in the benefit-cost balance. The reviewer should prepare lists of verified modifications and identified measures and controls to limit the corresponding impact. These lists will be provided to the reviewer for ESRP 4.6.2.

- *The impact is adverse, cannot be successfully mitigated, and is of such magnitude that it should be avoided.* When impacts of this nature are identified, the reviewer should inform the reviewers for ESRP 9.4 that an analysis and evaluation of alternative designs or procedures is required. The reviewer should participate in any such analysis and evaluation of alternatives that would avoid the impact and that could be considered practical. If no such alternatives can be identified, the reviewer should be responsible for providing this information to the reviewer for ESRP 10.1.

The reviewer should evaluate proposed construction activities to ensure that the applicant is committed to using currently acceptable practices to minimize impacts. In consultation with the SHPO, the reviewer should use 36 CFR 800 to evaluate the potential impacts on properties in or are eligible for inclusion in the *National Register*.

V. IMPLEMENTATION

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

VI. REFERENCES

36 CFR 800, "Protection of Historic Properties."

43 CFR 10, "Native American Graves Protection and Repatriation Regulations (NAGPRA)."

Historic and Archaeological Data-Preservation Act of 1974, 16 USC 469 et seq.

National Historic Preservation Act, as amended, 16 USC 470 et seq.

U.S. Department of the Interior. 1990a. "How to Apply the National Register Criteria for Evaluation," *National Register of Historic Places*, Bulletin No. 15 (revised 1991).

U.S. Department of the Interior. 1990b. "Guidelines for Evaluating and Documenting Traditional Cultural Properties," *National Register of Historic Places*, Bulletin No. 38.

U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (NRC/NRR). 1996. "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues." NRR Office Letter No. 906, Revision 1, Washington, D.C.



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

4.2 WATER-RELATED IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the hydrological alterations and water-use impacts from construction. The scope of the paragraph covered by this plan introduces the material from the reviews conducted under ESRPs 4.2.1 and 4.2.2.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

4.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluation of the applicant's potential water related impacts is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 4.2.1 and 4.2.2. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.2.1 HYDROLOGIC ALTERATIONS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification, analysis, and description of hydrologic alterations resulting from proposed project construction and construction activities.

The scope of the review directed by this plan should include (1) identification and description of proposed construction activities, including site preparation, plant construction, transmission corridor clearing and transmission line construction, and offsite construction that could result in hydrologic alterations, (2) description and analysis of the resulting hydrologic alterations and the physical effects of these alterations on other water users, (3) analysis of proposed practices to minimize hydrologic alterations having adverse impacts, and (4) analysis of compliance with applicable Federal, State, regional, local, and affected Native American tribal standards and regulations.

Review Interfaces

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

- ESRP 2.1. Obtain a description of the location of the proposed construction site and surrounding region.
- ESRP 2.3.1. Obtain descriptions of the hydrology of the region surrounding the proposed plant site.

October 1999

4.2.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.3.2. Obtain descriptions of the regional water uses (and users) for the area surrounding the proposed plant site.
- ESRP 2.8. Obtain input regarding any related Federal project activities that would affect or would be affected by the proposed plant construction.
- ESRP 3.1. Obtain descriptions of the external appearance of the proposed plant and the plant layout.
- ESRP 3.3. Obtain input regarding expected water use by the proposed plant.
- ESRP 3.4. Obtain input regarding the cooling system for the proposed plant.
- ESRP 3.7. Obtain input regarding power transmission systems for the proposed plant (including transmission-corridor clearing and transmission-line construction activities).
- ESRP 4.1.1. Provide a description of any construction activities located on a floodplain or wetland.
- ESRP 4.2.2. Provide a list of construction activities resulting in hydrologic alterations and their effects on other water users, and additional information to other ESRP Chapter 4.0 reviewers when the reviewer for ESRP 4.2.2 requests that such inputs be made.
- ESRPs 4.3.1 and 4.3.2. Provide a list of hydrologic alterations that will affect terrestrial or aquatic ecosystems.
- ESRP 4.6. Provide a list of applicant commitments and staff recommendations of practices to minimize hydrologic alterations.
- ESRPs 6.1 and 6.3. Provide a list of possible thermal and hydrologic alterations during construction that may require a monitoring program to obtain a National Pollutant Discharge Elimination System (NPDES) permit.
- Section 9.4.1. Provide assistance in identifying and evaluating alternative plant design and construction practices that would minimize or avoid hydrologic alterations that result in adverse environmental impacts.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data and information should be obtained:

- descriptions of the physical characteristics of the surface-water bodies and groundwater aquifers (from ESRP 2.3.1)

- identification and description of project related construction activities expected to result in hydrologic alterations at the site, transmission corridors, and offsite areas. Activities include construction of cofferdams and storm sewers; dredging operations; placement of fill material into the water; creation of shoreside facilities involving bulkheads, piers, jetties, basins, or other structures or activities with potential to alter existing shoreline processes; construction of intake and outfall structures; water channel modifications; construction of roads and bridges; operations affecting water levels (flooding); dewatering activities; and construction activities contributing to sediment runoff, e.g., road construction, clearing and grading, fill or spoil placement (from the environmental report [ER], the site visit, and consultation with Federal, State, regional, local, and affected Native American tribal agencies).
- identification of water sources used during construction and the average and maximum use rates of these waters (from the ER)
- identification of water bodies receiving construction effluents and the expected average and maximum flow rates and physical characteristics (temperature, sediment load, velocities) of these effluents (from the ER)
- identification of hydrologic alterations expected to result from the project related construction activities listed previously. Examples include changes in water drainage characteristics, the flood-handling capability of the floodplains flow and circulation patterns, subsidence resulting from groundwater withdrawal, and erosion and sediment transport (from the ER).
- identification and location of groundwater and surface-water users and areas that could be affected by project related hydrologic alterations (from ESRP 2.3.2, the ER, and the site visit)
- descriptions of proposed practices and measures to limit or minimize expected hydrologic alterations (from the ER)
- Federal, State, regional, local, and affected Native American tribal agencies' best management practices and regulations (from consultation with above agencies)
- descriptions of proposed means to ensure construction activity compliance with applicable hydrological standards and regulations (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the hydrological alterations at the proposed plant sites are based on the relevant requirements of the following:

- 33 CFR 322 with respect to definition of activities requiring permits

- 33 CFR 330, Appendix A, with respect to conditions, limitations, and restrictions on construction activities
- 40 CFR 6, Appendix A, with respect to procedures on floodplain and wetlands protection
- 40 CFR 122 with respect to NPDES permit conditions for discharges, including storm water discharges
- 40 CFR 149 with respect to possible supplemental restrictions on waste disposal and water use in or above a sole source aquifer
- 40 CFR 227 with respect to criteria for evaluating environmental impacts
- 40 CFR 423 with respect to effluent limitations on existing and new point sources
- Federal, State, local, regional, and Native American tribal water laws and water rights.

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

- Compliance with environmental quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of the environmental impacts of striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) will establish its own impact determination.
- Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In Jefferson County PUD #1 vs. Department of Ecology (U.S. Supreme Court Case), the U.S. Supreme Court granted the States additional authority to limit hydrological alterations beyond the States' role in regulating water rights.
- Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of including hydrology, water-use, and water-quality issues.

Technical Rationale

The technical rationale for evaluating the applicant's proposed hydrologic alterations is discussed in the following paragraphs:

A detailed and thorough description of the hydrological alterations occurring during construction activities is essential for the evaluation of potential impacts to the environment that may result from plant construction or operation.

III. REVIEW PROCEDURES

The reviewer should ensure that the construction activities that result in hydrologic alterations have been identified and seek confirmation that the alterations that result in environmental impacts have been described in sufficient detail to allow for the subsequent analysis and assessment of these impacts. The reviewer should take the following steps:

- (1) Identify alterations in water quantity in the various construction affected hydrologic systems under the existing and known future water rights and allocations.
- (2) Describe the physical effects of identified alterations in the quantity of water available on other consumptive water users.
- (3) Describe the physical effects of altered hydrologic geometry, flow and circulation patterns, and mixing processes on nonconsumptive water users and to terrestrial and aquatic ecology.
 - (a) Cooperate with the reviewers for ESRPs 4.1.1, 4.2.2, 4.3.1, and 4.3.2 in (1) determining the extent and magnitude of the resulting impacts and (2) evaluating means to mitigate or avoid these impacts.
 - (b) When project construction or construction activity within a floodplain or wetland has been proposed, evaluate the extent of compliance with applicable floodplain or wetland protection standards and give particular attention to the consideration of alternatives to avoid adverse effects.
 - (c) Assist the reviewer for ESRP 4.2.2 in evaluating the impacts of any construction or construction-related activity located in the floodplain or wetland.
 - (d) Assist the appropriate ESRP 9.4 reviewers in the identification and analysis of alternatives that would avoid construction or construction activity in the floodplain or wetlands.
- (4) Describe the physical effects of altered erosional, depositional, and sediment characteristics on other water users, on nearby property, and to aquatic ecology.

The reviewer should identify the alterations by associating the previously identified activities with changes in (1) water quantity and availability, (2) hydrological geometries (especially within the floodplain or wetland), flow and circulation patterns, and mixing processes, and (3) erosion, deposition, and sediment transport. The reviewer should take the following steps:

(1) Analyze the water quantity and availability by analyzing the construction activities that can alter the quantities of water physically available in nearby hydrologic systems and determine the alterations.

(a) Consider all water used during construction:

- the sources of the water
- points of discharge
- all water diversions that change the quantities of water in various parts of water systems (e.g., construction dewatering).

(b) For the hydrologic systems where alterations in water quantities due to construction have been identified, determine the physical effects (e.g., altered well yields, water levels relative to intake pipes) likely to have impacts on other water users.

(2) Analyze the hydrologic geometry, flow and circulation patterns, and mixing processes by evaluating the construction activities that can alter hydrologic geometries, flow and circulation patterns, and mixing processes, and determining the alterations.

(a) Consider all construction activities within water bodies and diversions of water during construction.

(b) Give particular attention to construction and related activities located in the floodplains or wetlands.

(c) Identify any Federal, State, regional, local, or Native American tribal floodplain or wetland protection standards and analyze proposed project construction and construction-related activities with respect to these standards.

(3) Analyze the erosion, deposition, and sediment transport by evaluating the construction activities that can alter erosional, depositional, and sediment transport characteristics and determine the alterations.

(a) Consider all construction activities within water bodies in relation to the natural processes occurring before construction.

- (b) For those areas where alterations in the natural erosional, depositional, and sediment transport processes have been identified, determine the physical effects (e.g., beach erosion, channel shoaling) likely to have impacts on other water users.
- (4) Be familiar with the provisions of standards, guides, and agreements pertinent to the hydrological aspects of plant construction.
 - (a) Determine compliance and the adequacy of commitments to comply with applicable regulations and guides.
 - (b) Consult with appropriate Federal, State, regional, local, and affected Native American tribal agencies to make this determination.

IV. EVALUATION FINDINGS

Input from the review of this ESRP to the environmental impact statement (EIS) should be directed toward accomplishing the following objectives: (1) public disclosure of hydrologic alterations resulting from the proposed project construction or refurbishment activities and (2) presentation of the basis for the staff's analysis of the effects of these alterations.

The following information should be included in the EIS:

- a description of plant design and construction activities that will result in hydrologic alterations, and a description of these alterations and their effects for each affected water body
- quantities of water diverted or used at the construction site, effluent discharge quantities and physical characteristics, and any resultant hydrologic alterations during various stages of construction, including under storm flow conditions
- magnitudes and time variations of hydrological alterations and a comparison with the natural time variations of the hydrological parameters
- compatibility of proposed construction activities with hydrological provisions of Federal, State, regional, local, or affected Native American tribal regulations and requirements, e.g., commitments to compliance with shoreline management regulations
- the compatibility of proposed construction water diversions with existing and known water rights and allocations
- construction practices and procedures to minimize hydrological alterations or for alternative project designs or construction practices that might avoid them.

V. IMPLEMENTATION

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

VI. REFERENCES

33 CFR 322, "Permits for Structures and Work in or Affecting Navigable Waters of the United States."

33 CFR 330, Appendix A, "Nationwide Permit and Conditions."

40 CFR 6, Appendix A, "Statement of Procedures on Floodplain Management and Wetlands Protection."

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 149, "Sole Source Aquifers."

40 CFR 227, "Criteria for the Evaluation of Permit Applications for Ocean Dumping of Material."

40 CFR 423, "Steam Electric Power Generating Point Source Category."

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Jefferson County PUD #1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994).

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**

OFFICE OF NUCLEAR REACTOR REGULATION

4.2.2 WATER-USE IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description, analysis, and assessment of proposed project construction activity impacts on water use.

The scope of the review directed by this plan should include (1) identification of the proposed construction activities or hydrologic alterations resulting from proposed construction activities that could have impacts on water use, (2) identification of changes in water quality resulting from hydrologic alterations or from construction activity effluents, (3) analysis and evaluation of impacts resulting from these alterations and activities, (4) analysis and evaluation of proposed practices to minimize adverse construction impacts on water use, and (5) evaluation of compliance with Federal, State, regional, local, and affected Native American tribal regulations applicable to water use and water quality. The review should include analysis and evaluation of impacts to water quality, water availability, and water use.

Review Interfaces

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

- ESRP 2.1. Obtain a description of the location of the proposed construction site and the surrounding region.
- ESRPs 2.2.1 through 2.2.3. Obtain descriptions of the regional land uses for the area surrounding the proposed plant site.

October 1999

4.2.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.3.1. Obtain descriptions of the hydrology of the region surrounding the proposed plant site.
- ESRP 2.3.2. Obtain descriptions of the regional water uses (and users) for the area surrounding the proposed plant site.
- ESRP 2.3.3. Obtain input regarding the baseline water quality of the water sources/bodies for the area surrounding the proposed plant site.
- ESRP 2.8. Obtain input regarding any related Federal project activities that would affect or be affected by the proposed plant construction.
- ESRP 3.1. Obtain descriptions of the external appearance of the proposed plant and the plant layout.
- ESRPs 3.3.1 and 3.3.2. Obtain input regarding expected water use by the proposed plant.
- ESRP 3.6.2. Obtain input regarding water use for sanitary system during construction.
- ESRP 3.7. Obtain input regarding power transmission systems for the proposed plant.
- ESRPs 4.1.1 through 4.1.3. Provide a list of construction activities (e.g., groundwater depletion) that may have land-use impacts and, when applicable, a description of altered flood patterns resulting from construction or construction activities in the floodplain.
- ESRPs 4.2.1 and 5.2.2. Obtain input regarding hydrological alterations that are expected to result from the construction water-use changes from operation of the proposed plant.
- ESRPs 4.3.1 and 4.3.2. Provide a list of construction activities (e.g., surface runoff and water-quality degradation) that may have adverse terrestrial and aquatic ecology impacts.
- ESRPs 4.4.1 through 4.4.3. Provide a list of construction activities that may have socioeconomic impacts.
- ESRP 4.6. Provide a list of applicant commitments and staff evaluations of practices to limit adverse water-use impacts.
- ESRP 6.3 and 6.6. Provide a list of possible impacts potentially requiring monitoring.
- ESRPs 9.4.1 and 9.4.2. Provide a list of adverse environmental impacts affecting water use that could be mitigated or avoided through alternative project designs or construction practices, and assist in determining appropriate alternatives.
- ESRP 10.1. Provide a list of the unavoidable water-use impacts that are predicted to occur during or as a result of project construction.

- ESRP 10.2. Provide a brief summary of the irreversible and irretrievable commitments of water resources that are predicted to occur during or as a result of project construction.
- Interface with Environmental Project Manager (EPM). Obtain input from the EPM to verify that proposed modifications to water use plans are practical and should lead to an improvement in the benefit-cost balance.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data and information should be obtained:

- descriptions of the site and vicinity water bodies and aquifers (including sole-source aquifers)
- descriptions of hydrologic alterations and their related construction activities
- the physical effects of hydrologic alterations
- comparisons of water quantity available to other water users with existing and known future water rights and allocations
- identification of water bodies receiving construction effluents (e.g., sanitary wastes, cleaning wastes, dust control, fuels and lubricants, chemical, herbicides, pesticides) and the expected average and maximum flow rates and composition of these effluents
- baseline water-quality data for surface-water and groundwater sources used during construction and impacted by construction activities
- potential changes to surface-water and groundwater quality (e.g., heavy metal contamination) resulting from substrate exposure during construction
- identification and locations of groundwater and surface-water users and areas that could be impacted by project related construction activities affecting water use (from ESRP 2.3.2, the site visit, and the environmental report [ER])
- predicted impacts on the water users identified in the previous item (from the ER)
- descriptions of any proposed practices and measures to control construction related water-use impacts. Factors to be considered include flooding, drainage, groundwater elevation, erosion, sedimentation, water quality, protection of natural drainage channels and water bodies, protection of

shorelines and beaches, restrictions on access to and use of surface water, protection against saltwater intrusion, and handling of fuels, lubricants, oily wastes, chemical wastes, sanitary wastes, herbicides, and pesticides (from the ER).

- consultations with Federal, State, regional, local, and affected Native American tribal regulators (from consultation with the above agencies)
- descriptions of proposed means to ensure construction activity compliance with water-quality and water-use standards and regulations
- water-quality requirements for key elements of aquatic ecosystem and domestic users.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of the water-use impact at the proposed plant sites are based on the relevant requirements of the following:

- 33 CFR 322 with respect to definition of activities requiring permits
- 33 CFR 330, Appendix A, with respect to conditions, limitations, and restrictions on construction activities
- 40 CFR 6, Appendix A, with respect to procedures on floodplain and wetlands protection
- 40 CFR 122 with respect to the National Pollutant Discharge Elimination System (NPDES) permit conditions for discharges, including storm water discharges
- 40 CFR 149 with respect to possible supplemental restrictions on waste disposal and water use in or above a sole-source aquifer
- Federal, State, regional, local, and Native American tribal water laws and water rights.

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

Compliance with environmental quality standards and requirements of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act, is not a substitute for and does not negate the requirement for NRC to weigh the environmental impacts of the proposed action, including any degradation of water quality, and to consider alternatives to the proposed action that are available for reducing the adverse impacts. If an environmental assessment of aquatic impacts is available from the permitting authority, the NRC will consider the assessment in its determination of

the magnitude of the environmental impacts of striking an overall benefit-cost balance. When no such assessment of aquatic impacts is available from the permitting authority, the NRC (possibly in conjunction with the permitting authority and other agencies having relevant expertise) will establish its own impact determination.

Because water quality and water supply are interdependent, changes in water quality must be considered simultaneously with changes in water supply. In *Jefferson County PUD #1 vs. Department of Ecology* (U.S. Supreme Court Case), the U.S. Supreme Court granted the States additional authority to limit hydrological alterations beyond the States' role in regulating water rights.

Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC 1976), contains guidance on the format and content of ERs, including hydrology, water-use, and water-quality issues.

Technical Rationale

The technical rationale for evaluating the applicant's potential water-use impacts is discussed in the following paragraphs:

A detailed and thorough description of the water use during construction activities is essential for the evaluation of potential impacts to the environment that may result from plant construction or operation. Water quality and water supply are linked. The authority to regulate water quality can be extended to regulate water supply if the domestic or environmental water needs are impacted by reduced water quality.

Where an assessment of the environmental impacts resulting from construction activities is available from a separate permitting authority (such as Corps, State, EPA, or NPDES permitting agency), NRC will consider the assessment in its determination of the magnitude of environmental impacts for striking an overall benefit-cost balance. Documentation of adequate consultation with the appropriate permitting authorities is required.

III. REVIEW PROCEDURES

The reviewer should take the following steps:

- (1) Evaluate water quantity and availability by identifying water users potentially impacted by alterations in water quantity and availability:
 - (a) Describe any impacts of reduced water quantity and availability.

- (b) Describe the possibility for inequalities between proposed construction water use and existing and known future water rights and allocations and the probable nature and extent of these inequalities.
- (2) Evaluate the construction activities and the hydrologic alterations identified in ESRP 4.2.1 with respect to their potential impacts to water users or water-use areas:
- (a) Compare the effects of these alterations (e.g., increased temperature, salinity, erosion, sedimentation) with pre-construction conditions to assess the magnitude of the impact.
- (b) Evaluate the impacts for individual water users and for water-use areas.
- (c) Identify and describe proposed construction or construction activities located on a floodplain or wetland as follows:
- Consult with appropriate Federal, State, regional, local, and Native American tribal agencies to determine the extent to which any such activities will conform with applicable floodplain and wetland standards.
 - Ensure that the analysis has considered short-term effects (e.g., floodplain alterations resulting from temporary construction structures or activities) as well as the long-term alteration caused by the completed plant.
 - Consult with the reviewer for ESRP 4.2.1 and the reviewers for ESRP 9.4.1 to analyze alternatives to any proposed activity located in the floodplain.

The intent of this instruction is to ensure that alternatives to avoid adverse effects and incompatible development in a floodplain or wetland have been considered.

- (d) Identify construction and construction activities that will alter or restrict shoreline access (e.g., beach closure) and surface oriented water uses (e.g., commercial and recreational fishing, navigation) including the following:
- Describe the effects of construction to water users.
 - If potential adverse impacts are predicted, identify alternative design, construction practices, or procedures that could mitigate or avoid the impacts.
- (3) Analyze water quality:
- (a) Identify hydrologic alterations and construction activities affecting water quality and describe their effects on water users or water-use areas.

- (b) Describe the time duration or time periods when the impact will be experienced, and the number of water users or extent of water-use areas affected. (When necessary, consult with Federal, State, regional, local, and affected Native American tribal agencies for assistance in evaluating the identified impacts.)
- (c) Review consultation with appropriate agencies regarding compliance with Federal, State, regional, local, and affected Native American tribal water-quality standards.

The reviewer's analysis of construction impacts on water use should be coordinated with the hydrologic alteration descriptions provided by the environmental review for ESRP 4.2.1. This coordination should ensure that the environmental factors most likely to be impacted by hydrologic alterations are described in sufficient detail to permit assessment of the predicted impacts. The reviewer should independently identify and analyze those construction activities expected to affect the quality of receiving water bodies. The reviewer should consult with the reviewers for ESRPs 2.3.2, 4.1, 4.3, and 4.4 to establish the location and nature of those water users potentially impacted by hydrologic alterations and water-quality changes.

The reviewer should take the following steps:

(1) Analyze reduced water availability:

- (a) Initiate this analysis if the reviewer for ESRP 4.2.1 determines that construction activities will result in decreased water availability.
- (b) When this is predicted to occur, identify the location of those water users likely to be affected and consult with the reviewer for ESRP 4.2.1 to determine the hydrologic effects at these locations.
- (c) Consider these effects (e.g., lowered groundwater table, reduced well yields, lowered surface-water levels at intake structures) and determine their impacts on individual water users or water-use areas.
- (d) Consider seasonal requirements for water and temporal variations in water availability.
- (e) Consider the potential for impacts when the reviewer for ESRP 4.2.1 predicts an incompatibility between water availability as affected by project construction activity and existing and known future water rights and allocations. For these cases, analyze the potential for future inequalities in water availability to determine their probable nature and extent.

(2) Analyze the construction activity and hydrologic alterations identified by the reviewer for ESRP 4.2.1 and compare them with present and predicted future water uses that could be affected:

- (a) Analyze in further detail any alterations that can be shown to represent a potential for water-use impacts.
 - (b) Consider both short-term impacts (e.g., from temporary channel diversions) that will occur only during the construction period, and long-term impacts (e.g., channel restriction by a breakwater) that will occur for the period of plant operation.
 - (c) Identify individual water users or water-use areas and predict impacts to these users or areas.
 - (d) Identify the proposed construction activities that will restrict non-consumptive water use or water access and identify the water users so affected, categorizing the impacts as either short- or long-term.
 - (e) Give special consideration to hydrologic alterations that affect floodplains. When such alterations are predicted, consult with the reviewer for ESRP 4.1.1 or 4.1.2 to complete the analysis of any resulting impacts.
- (3) Analyze water quality by considering the construction activities and hydrologic alterations expected to result in altered water quality and the water users or water-use areas that could be impacted by the water-quality alterations:
- (a) Consult with the reviewer for ESRP 4.2.1 to identify the affected receiving water bodies and the hydrologic alterations (e.g., erosion, sedimentation) that could affect water quality.
 - (b) Consult with the reviewer for ESRP 2.3.3 to determine the baseline water quality of the receiving water bodies and with the reviewer for ESRP 2.3.2 to identify potentially affected water users.
 - (c) Identify the water bodies receiving construction effluents, the flow rates and chemical composition of these effluents, and the potential for and nature of any contaminants that could be released to surface or groundwater as a result of substrate exposure during construction.
 - (d) Consider potential impacts to water users in terms of the intended usage (e.g., heavy metals as a contaminant affecting a municipal water supply, suspended solids affecting industrial use).
 - (e) Consult with nearby Federal, State, regional, local, and affected Native American tribal agencies in analyzing potential water-quality impacts.
 - (f) Finally, consult with the reviewer for ESRP 4.3.2 to coordinate the analysis of impacts to water quality and to avoid any duplication of effort in this analysis.

IV. EVALUATION FINDINGS

Input from this ESRP to the environmental impact statement (EIS) should accomplish the following objectives: (1) public disclosure of major direct water-use consequences of proposed project construction, (2) presentation of the basis for the staff analysis, and (3) presentation of staff conclusions and conditions regarding water use. The reviewer should coordinate this input with the reviewer for ESRP 4.2.1 to avoid duplication.

The following information should be included in the EIS:

- a description of plant design and construction activities that may cause adverse water-use impacts and a quantitative description of these impacts for each affected water body. For plant facilities and construction activities located on the floodplain, the description should include (1) staff conclusions as to the necessity of such location (e.g., intake structures) and a discussion of applicant commitments or staff recommendations for actions to minimize environmental harm to the floodplain, (2) reference to appropriate ESRP 9.4 discussion of alternatives to facility or activity location in the floodplain, and (3) discussion of the extent of conformance with applicable State or local floodplain protection standards.
- comparison of predicted effluent and receiving water quality with applicable effluent limitations and water-quality standards, and conclusions with respect to project compliance with these standards
- the physical impacts of consumptive water uses during construction (e.g., groundwater depletion) on other water users
- the compatibility of proposed construction water use with existing and known water rights and allocations
- adverse impacts on surface oriented water users (e.g., fishing, navigation) resulting from plant construction and construction activity
- construction practices and procedures to mitigate potential adverse water-use impacts or consider alternative project designs to avoid these impacts.

Evaluation of each identified impact should result in one of the following determinations:

- *The impact is minor, and mitigation is not required.*
- *The impact is adverse, but can be mitigated by specific design or procedure modifications that the reviewer has identified and determined to be practical.* For these cases, the reviewer should consult with the EPM and the appropriate ESRP 9.4 reviewer for verification that the reviewer's identified

modifications are practical and will lead to an improvement in the benefit-cost balance. The reviewer should prepare a list of verified modifications and identified measures and controls to limit the corresponding impact. These lists should be provided the reviewer for ESRP 4.6.

- *The impact is adverse, cannot be successfully mitigated, and is of such magnitude that it should be avoided.* When impacts of this nature are identified, the reviewer should inform the appropriate ESRP 9.4.1 reviewers that an analysis and evaluation of alternative designs or procedures is required. The reviewer should participate in any such analysis and evaluation of alternatives that would avoid the impact and that could be considered practical. If no such alternatives can be identified, the reviewer should be responsible for providing this information to the reviewer for ESRP 10.1.

V. IMPLEMENTATION

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

VI. REFERENCES

33 CFR 322, "Permits for Structures and Work in or Affecting Navigable Waters of the United States."

33 CFR 330, Appendix A, "Nationwide Permit and Conditions."

40 CFR 6, Appendix A, "Statement of Procedures on Floodplain Management and Wetlands Protection."

40 CFR 122, "EPA Administered Permit Programs: The NPDES Pollution Elimination System."

40 CFR 149, "Sole Source Aquifers."

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Jefferson County PUD#1 vs. Department of Ecology, 92-1911, Supreme Court of the United States, 510 U.S. 1037; 114 S. Ct. 677; 1994 U.S. LEXIS 795; 126 L. Ed. 2d 645; 62 U.S.L.W. 3450 (January 10, 1994).

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**

OFFICE OF NUCLEAR REACTOR REGULATION

4.3 ECOLOGICAL IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the ecological impacts of construction. The scope of the paragraph covered by this plan introduces the material from the reviews conducted under ESRPs 4.3.1 and 4.3.2.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

4.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

The technical rationale for evaluating the applicant's potential ecological impacts is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 4.3.1 and 4.3.2. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.3.1 TERRESTRIAL ECOSYSTEMS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description, quantification, and assessment of the impacts of construction on the terrestrial ecosystem. The scope of the review directed by this plan includes an assessment of both onsite and offsite construction, including transmission line and access corridor construction. The assessment should be in sufficient detail to (1) predict and evaluate the significance of potential impacts to "important" species and their habitats and (2) evaluate how these impacts should be considered in the licensing decision. If necessary, the reviewer should suggest consideration of alternative designs or construction practices, or licensee commitments to mitigate the intensity of environmental impacts.

Review Interfaces

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

- ESRP 2.4.1. Obtain descriptive material on the terrestrial ecology of the site and vicinity needed to support the analyses made in ESRP 4.3.1. The reviewer for ESRP 4.3.1 should also provide input on significant impacts of construction to the terrestrial environment.
- ESRP 3.1. Obtain information about the power plant's external appearance and layout in enough detail to support the analyses made in ESRP 4.3.1.

October 1999

4.3.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 3.4.2. Obtain information on cooling system in enough detail to support analysis of bird impacts with cooling towers.
- ESRP 3.7. Obtain information about the power transmission system in enough detail to support the analyses made in ESRP 4.3.1.
- ESRP 4.1.1. Obtain information regarding impacts of construction on land use onsite and in the vicinity of the plant to complete the description of construction impacts on the terrestrial ecosystem.
- ESRP 4.1.2. Obtain information regarding impacts to land use in transmission corridors and offsite areas to complete the description of construction impacts on the terrestrial ecosystem.
- ESRP 4.2.2. Obtain information regarding impacts on water use to complete the description of construction impacts on the terrestrial ecosystem.
- ESRP 4.4.2. Provide information regarding impacts to the terrestrial ecosystem from construction so that an evaluation of social and economic impacts from construction can be completed.
- ESRP 4.6. Provide a list of applicant commitments and staff evaluations of practices to limit adverse environmental impacts of construction.
- ESRP 6.5.1. Provide appropriate information on impacts to the terrestrial environment from construction activities in sufficient detail to allow for the evaluation of the applicant's proposed monitoring program.
- ESRP 9.4. If the reviewer determines that a proposed construction activity will result in an adverse environmental impact that cannot be mitigated by alternative construction practices and procedures, then provide the reviewer of ESRP 9.4 with a notification that alternative locations and plant or component designs should be considered.
- ESRP 10.1. Provide a brief summary of the unavoidable impacts predicted to occur during construction. For example, this should be limited to the more significant impacts, such as modification of habitat for "important" species.
- ESRP 10.2. Provide a brief summary of irreversible and irretrievable commitments of terrestrial resources predicted to occur during construction. For example, this would include permanent loss of terrestrial habitat or loss of wetlands.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of potential impacts. The following site and vicinity data or information (in addition to that listed in ESRP Section 2.4.1) should be obtained:

- a site map showing proposed buildings, the land to be cleared, waste disposal areas, the construction zone, and the site boundary (from the environmental report [ER] and ESRP 3.1)
- the proposed schedule of construction activities
- clearing methods; temporary and permanent erosion, runoff, and siltation control methods; dust suppression methods; and other construction practices for control or suppression specific to the site (from the ER)
- the total area of land to be disturbed (from the ER)
- the maximum area of soil to be exposed at any one time (from the ER)
- the area (hectares) of each plant community and habitat type to be cleared or disturbed (e.g., marshes, agricultural fields, and deciduous forests) and how much is being destroyed relative to the total amount present in the region (from the ER)
- the area to be covered by permanent station facilities, including new ponds and lakes (from the ER)
- the area to be used on a short term basis during construction, and plans for restoration of this land (from the ER)
- any proposed construction activity expected to impact "important" habitat (from the ER)
- documentation that the applicant has consulted with the appropriate Federal, State, regional, local, and affected Native American tribal agencies (e.g., as required by the U.S. Fish and Wildlife Coordination Act) (from the ER)
- identification of other Federal and State projects within the region that affect or could potentially affect the same threatened and endangered species (or their habitats) that occur on or near the site (from the ER)
- an estimate of the potential for bird collisions with cooling towers or other elevated construction equipment or plant structures (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)

Additional background information about the terrestrial ecology of the site and vicinity, necessary for this review of impacts on terrestrial resources from construction, is requested in ESRP Section 2.4.1 and can be found in the ER, general literature, and from consultation with Federal, State, regional, local, and affected Native American tribal agencies.

The following data and information about transmission corridors and offsite areas should be obtained:

- clearing methods, erosion, runoff and siltation control methods (both temporary and permanent), dust suppression methods, and other construction practices for impact control or minimization specific to the proposed transmission system (from the ER).
- potential for bird collisions with transmission towers or lines (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies).

Additional background information about the terrestrial ecology of transmission corridors and offsite areas, necessary for this review of impacts to terrestrial resources from construction, is requested in ESRP 2.4.1 and can be found in the ER, general literature, and from consultation with Federal, State, regional, local, and affected Native American tribal agencies.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of construction impacts on terrestrial ecology in the vicinity of the site and transmission corridors are based on the relevant requirements of the following:

- 10 CFR 51.71(d) with respect to including in the EIS information on impacts to the terrestrial environment due to construction
- Bald and Golden Eagle Protection Act with respect to the prohibition of taking, possessing, selling, transporting, importing, or exporting the bald or golden eagle, dead or alive, without a permit
- Coastal Zone Management Act with respect to natural resources, and land or water use of the coastal zone
- Endangered Species Act with respect to identifying impacts to threatened or endangered species and critical habitats by means of informal and/or formal consultations with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service
- Fish and Wildlife Coordination Act with respect to consideration of fish and wildlife resources and the planning of development projects that affect water resources
- Migratory Bird Treaty Act with respect to declaring that it is unlawful to take, import, export, possess, buy, sell, purchase, or barter any migratory bird. Feathers or other parts of nests or eggs,

and products made from migratory birds are also covered by the Act. "Take" is defined as pursuing, hunting, shooting, poisoning, wounding, killing, capturing, trapping, or collecting.

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

- Second Memorandum of Understanding and Policy Statement Regarding Implementation of Certain NRC and EPA Responsibilities, serves as the legal basis for NRC decisionmaking concerning licensing matters covered by NEPA and Section 511 of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act (CWA).
- Memorandum of Understanding between the Corps of Engineers, U.S. Army, and the NRC for the Regulation of Nuclear Power Plants, 40 FR 60115, provides guidance with respect to the NRC exercising the primary responsibility in conducting environmental reviews and in preparing EISs for nuclear power stations. However, the Corps of Engineers will participate with the NRC in the preparation of EISs by helping to draft material for sections covering (1) coastal erosion and other shoreline modifications, (2) siltation and sedimentation processes, (3) dredging activities and disposal of dredged materials, and (4) location of structures affecting navigable waters.
- Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (1998), contains guidance that the ecological systems and biota at potential sites and their environs should be sufficiently well known to allow reasonably certain predictions of impacts that there would be no unacceptable or unnecessary deleterious impacts on populations of important species or on ecological systems from the construction of a nuclear power station.
- Regulatory Guide 4.11, Rev. 1, *Terrestrial Environmental Studies for Nuclear Power Stations* (1977), contains technical information for the design and execution of terrestrial environmental studies, the results of which may be appropriate for inclusion in the applicant's ER. The reviewer should ensure that the appropriate results are included in the ER.

Technical Rationale

The technical rationale for evaluating the applicant's potential construction or refurbishment impacts on terrestrial ecosystems is discussed in the following paragraph:

Construction of a nuclear power facility will directly impact the terrestrial environment. This section of the ESRP reviews and evaluates the impacts that are anticipated from the construction process. This information can then be used in other ESRPs to balance the environmental effects of construction of the proposed facility and the alternatives available for reducing or avoiding adverse environmental effects, as well as the environmental benefits of the proposed action. The acceptance criteria listed above should be used to ensure that the environmental impacts of the proposed action are considered with respect to matters covered by such standards and requirements.

III. REVIEW PROCEDURES

When reviewing the impacts of station construction on the terrestrial ecology, the reviewer should take the following steps:

- (1) Review the general data and information necessary to determine the impacts on the terrestrial ecology from station construction:
 - (a) Identify the construction activities that impact "important" species and habitats of the site and vicinity, transmission corridors, and offsite areas (definition of "important" resources can be found in Table 2.4.1-1).
 - (b) Determine the areal extent and location of such potential impacts:
 - Prepare a map superimposing impact areas over resource areas.
 - During the site visit, inspect areas where construction activities will occur and inspect all other potentially impacted areas.
 - When necessary, supplement the data and information specified in the "Review Procedures" through consultations with Federal, State, regional, local, and affected Native American tribal agencies (e.g., the U.S. Fish and Wildlife Service and State wildlife agencies).
- (2) Review impacts of station construction on terrestrial ecology:
 - (a) Review and discuss the following impacts:
 - the number of hectares of plant community types preempted and the number of hectares modified by construction activities. Describe how construction activities will disturb the existing terrain and wildlife habitats.
 - Estimate the magnitude of the impact for important species that have commercial or recreational value. This may be expressed in terms of dollars, lost opportunity for recreational pursuits, percent reduction in harvest, percent loss of habitat, or other appropriate quantifiers.
 - Consult with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service under Section 7 of the Endangered Species Act, if threatened or endangered species or critical habitat are known to occur in the project area and the proposed project is predicted to add to their further endangerment.

- the impact of habitat modification (e.g., tree removal) on associated animal populations
 - an evaluation of the impacts of construction on “important” species relative to effects on the local population and the total population of the species
 - the effects of noise on “important” species
 - construction activities that create obstacles to the movements of vertebrates or result in increased dispersal of invertebrate species known to be important as disease vectors or pests
 - the potential for bird collisions with cooling towers, other elevated plant structures and construction equipment, transmission towers, and transmission lines
 - changes in terrestrial habitat resulting from establishment of cooling ponds or lakes including the following:
 - construction activities that will dewater any wetlands, ponds, or seepages or alter surface drainage patterns supporting terrestrial biota
 - the adequacy of proposed plans for preventing soil erosion runoff to surface waters and revegetating disturbed soil
 - disposal of construction wastes that will need landfill or special disposal
 - impacts to floodplains and wetlands on the power line right-of-way.
- (b) Become familiar with the provisions of standards, guides, and agreements that are pertinent to the construction of nuclear power stations:
- Refer to the “Acceptance Criteria” section of this ESRP for a list of those that are applicable to this environmental review.
 - Consult with appropriate agencies, when necessary (e.g., the U.S. Fish and Wildlife Service and the State wildlife agency) to ensure compliance with the applicable regulations.
 - Analyze construction activities in light of recognized “good practice.” The term “good practice” as used here will refer to those construction activities that tend to mitigate adverse environmental impacts.

IV. EVALUATION FINDINGS

Input to the EIS should include (1) a list of adverse impacts of construction to terrestrial ecosystems, (2) a list of the impacts for which there are measures or controls to limit adverse impacts and the

associated measures and controls, (3) the applicant's commitments to limit these impacts, and (4) the staff's evaluation of the adequacy of the applicant's measures and controls to limit adverse impacts. This information should be summarized and provided to the reviewer of ESRP Section 4.6.

Any construction activity that should receive mitigative action should be described by the staff. Where mitigation is an option, the reviewer should evaluate appropriate measures, which could include alternative placement of structures, alternative schedules, or alternative construction practices. The reviewer should also evaluate alternatives for any proposed construction activity that is predicted to result in an adverse impact that cannot be mitigated. Practices proposed by the applicant for the protection of the environment should be described if the reviewer determines that they are necessary.

The depth and extent of the input to the EIS should be governed by the attributes of the terrestrial ecological resources that could be affected by plant construction and operation, and by the nature and magnitude of the expected impacts to those resources. However, the following should be evaluated for inclusion by the reviewer in the EIS:

- loss of habitat for endangered or threatened species in the context of guidelines under the Endangered Species Act of 1973. Where loss of habitat for commercially or recreationally important species occurs, the reviewer should consider the effects on the harvestable crop. It should generally be concluded that loss of up to 5 percent of such habitat in the site vicinity will have negligible impact on the crop and need no further analysis. Where losses exceed 5 percent, the reviewer should consider the loss in relation to regional abundance of these species.
- construction practices to minimize soil erosion and the number of hectares disturbed
- the clearing of vegetation from stream banks, making certain that it is limited to that necessary for placement of structures
- the CWA amendments of 1972, the Coastal Zone Management Act of 1972, and the Marine Protection, Research, and Sanctuaries Act of 1972. Guidelines under the Acts should be followed in evaluating the significance of dewatering wetlands. Because of the importance of wetlands, any unavoidable impact to this habitat must be considered in the overall benefit-cost balancing.
- the intrusion on or destruction of terrestrial plant communities that are regarded as representative of natural, undisturbed, or remnant communities or that show unusual ecological or geographical distributions, and the loss of fragile or sensitive habitat
- the proposed procedures for compliance with EPA guidelines for drainage from dredge spoil. Filling of biologically productive wetlands is generally to be avoided. Plans for dumping of dredge spoils must be approved by the EPA and the District Office of the Corps of Engineers.

- where cooling reservoirs are to be constructed, the potential beneficial impacts (e.g., provision of water for irrigation, livestock watering, or the creation of riparian habitat) and adverse impacts (e.g., the shortstopping of migratory waterfowl) should be considered and balanced against the ecological losses associated with inundation of the land area by the reservoir.
- the applicant's commitment to the use of good construction practices
- secondary impacts on wildlife, such as altered behavior resulting from construction noise, in addition to direct impacts on animals, such as loss of habitat and road kills
- the reviewer should screen each predicted impact using criteria appropriate to the impacted segment of the ecosystem. For example, loss of more than a few percent of the habitat available in the region for an "important" species could be considered of sufficient importance to consider mitigating action.

If the reviewer verifies that sufficient information has been provided in accordance with the requirements of this ESRP section, then the evaluation supports the following type of concluding statement to be included in the EIS:

The staff reviewed the available information relative to impacts to the terrestrial environment on or in the vicinity of the site. The staff concludes that the list and description of impacts is adequate to comply with 10 CFR 51.45.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report."

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

Bald and Golden Eagle Protection Act of 1940, as amended, 16 USC 668 et. seq.

Coastal Zone Management Act, as amended, 16 USC 1451 et seq.

Endangered Species Act, as amended, 16 USC 1531 et seq.

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Fish and Wildlife Coordination Act Amendment, 16 USC 661 et seq.

Marine Protection, Research, and Sanctuaries Act, as amended, 33 USC 1401 et seq.

“Memorandum of Understanding between the Corps of Engineers, U.S. Army, and the U.S. Nuclear Regulatory Commission for the Regulation of Nuclear Power Plants.” 40 *Federal Register* 60115, August 25, 1975.

Migratory Bird Treaty Act, as amended, 16 USC 703 et seq.

“Second Memorandum of Understanding and Policy Statement Regarding Implementation of Certain NRC and EPA Responsibilities,” 40 *Federal Register* 60115, December 31, 1975.

U.S. Nuclear Regulatory Commission (NRC). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1977. *Terrestrial Environmental Studies for Nuclear Power Stations*. Regulatory Guide 4.11, Rev. 1, Washington, D.C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.3.2 AQUATIC ECOSYSTEMS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's description, quantification, and assessment of the impacts of construction of the proposed facilities on the aquatic ecosystem. The scope of the review directed by this plan will include an assessment of both onsite and offsite construction activities, including transmission line and access corridor construction. The assessment should be in sufficient detail to (1) predict and evaluate the significance of potential impacts to "important" species and their habitats and (2) evaluate how these impacts should be considered in the licensing decision. If necessary, the reviewer should consider alternative designs or construction practices to mitigate the intensity of environmental impacts.

Review Interfaces

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

- ESRP 2.3.1. Obtain information regarding the hydrology of the site.
- ESRP 2.3.2. Obtain a description of surface-water and groundwater uses so that the description of impacts to the aquatic ecosystem from construction or refurbishment can be completed.

October 1999

4.3.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.3.3. Obtain information about the water-quality conditions at the site in enough detail to determine impacts to the aquatic environment from construction.
- ESRP 2.4.2. Obtain descriptions of the aquatic ecology of the site and vicinity. Provide input on the significant impacts of construction on the aquatic environment to guide the reviewer of ESRP 2.4.2 in preparing a more detailed description of the part(s) of the environment that will be significantly affected.
- ESRP 3.1. Obtain information about the power plant's external appearance and layout in enough detail to support the analyses made in ESRP 4.3.2.
- ESRP 3.4.2. Obtain a description of the intake, discharge, and heat dissipation system design and performance characteristics so that a description of impacts on the aquatic ecosystem from construction can be completed.
- ESRP 3.6.2. Obtain a description of sanitary system effluents and their treatment so that a description of impacts on the aquatic ecosystem from construction can be completed.
- ESRP 3.7. Obtain information about the power transmission system in enough detail to support the analyses made in ESRP 4.3.2.
- ESRP 4.1.1. Obtain an evaluation of impacts of construction on land use of the site and vicinity so that a description of impacts on the aquatic ecosystem from construction can be completed.
- ESRP 4.1.2. Obtain an evaluation of impacts of construction on land use within the transmission line and access corridors and other offsite areas so that a description of impacts on the aquatic ecosystem from construction can be completed.
- ESRP 4.2.1. Obtain information about hydrological alterations and potential water-use impacts on the aquatic environment during construction.
- ESRP 4.2.2. Obtain an evaluation of the impacts on water use so that a description of impacts on the aquatic ecosystem from construction can be completed.
- ESRP 4.4.2. Provide information regarding impacts on the aquatic ecosystem from construction so that an evaluation of social and economic impacts from construction can be completed.
- ESRP 4.6. Provide a list of applicant commitments and staff evaluations of practices to limit adverse environmental impacts of construction.
- ESRP 6.3. Provide information on impacts on the aquatic ecosystem from construction so that an evaluation of the hydrological monitoring programs can be completed.

- ESRP 6.5.2. Provide information on impacts on the aquatic environment from construction in sufficient detail to permit evaluation of the applicant's proposed monitoring program.
- ESRP 6.6. Provide information on impacts on the aquatic ecosystem from construction so that a description and evaluation of the water-quality monitoring programs can be completed.
- ESRPs 9.3 and 9.4. Provide a notification to the reviewers of ESRPs 9.3 and 9.4 that alternative locations and plant or component designs should be considered if the reviewer determines that a proposed construction activity will result in an adverse environmental impact that cannot be mitigated by alternative construction practices and procedures.
- ESRP 10.1. Provide a brief summary of the unavoidable impacts that are expected to occur during construction. This should be limited to the more significant impacts (e.g., temporary loss of habitat for "important" species).
- ESRP 10.2. Provide a brief summary of irreversible and irretrievable commitments of aquatic resources that are expected to occur during construction. For example, this would include any permanent loss of aquatic habitat or loss of wetlands.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following site and vicinity data or information should be obtained:

- a map of the site and vicinity delineating areas of construction, particularly those where habitat of "important" species (see definition in Table 2.4.2-1) is expected to be altered, such as areas to be cleared along stream banks and areas proposed for the disposal of dredged material (from the environmental report [ER] and ESRP Section 3.1)
- the proposed schedule of construction activities
- the clearing methods, temporary and permanent erosion, runoff, and siltation control methods, dust suppression methods, and other construction practices for control or suppression specific to the site (from the ER)
- the area of disturbance for each habitat type listed in the top two items above and the total aquatic area to be disturbed, and an estimate of the amount of these habitats that will be destroyed relative to the total amount present in the region (from the ER)
- the aquatic areas to be covered by permanent station facilities (from the ER)

- any proposed construction or refurbishment activity expected to impact "important" species and habitats (from the ER)
- tolerances and/or susceptibilities of "important" biota to physical and chemical pollutants of construction origin (from the ER and the general literature).

Additional background information about the aquatic ecology, hydrology, water quality, and the impacts of hydrological alterations and water use, that is necessary for this review of impacts on aquatic resources from construction, should be obtained from the reviewers of ESRPs 2.3.1, 2.3.2, 2.3.3, 2.4.2, and 4.2, the ER, and from consultation with Federal, State, regional, local, and affected Native American tribal agencies.

The following data and information about transmission corridors and offsite areas should also be obtained:

- the clearing methods, erosion, runoff and siltation control methods (both temporary and permanent), dust-suppression methods, and other construction practices for impact control or minimization that are specific to the proposed transmission system (from the ER).
- the water bodies and wetlands crossed or spanned that are expected to have tower foundations located within them (from the ER)
- the location and areal limits of construction activities having impacts on aquatic environs (from the ER and ESRP 4.2)
- a description of the magnitude and schedule of construction activities that are expected to impact "important" aquatic species and their habitats (from the ER and ESRP 4.2).

Additional background information about the aquatic ecology along the transmission corridors and offsite areas, necessary for this review of impacts on aquatic resources from construction, should be obtained from the reviewer of ESRP 2.4.2 and can be found in the ER, general literature, and from consultation with Federal, State, regional, local, and affected Native American tribal agencies.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the review of construction impacts on aquatic ecology in the vicinity of the site and transmission corridors are based on the relevant requirements of the following:

- Coastal Zone Management Act of 1972 with respect to natural resources and land or water use in the coastal zone

- Endangered Species Act of 1973 with respect to identifying impacts on threatened or endangered species and critical habitats by means of informal and/or formal consultations with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service
- Federal Water Pollution Control Act (FWPCA), commonly referred to as the Clean Water Act (CWA), of 1948 with respect to activities associated with the discharge of dredge or fill materials into waters of the United States
- FWPCA Amendments of 1972 with respect to restoration and maintenance of the chemical, physical, and biological integrity of water resources
- Fish and Wildlife Coordination Act of 1958 with respect to consideration of fish and wildlife resources in planning development projects that affect water resources
- Marine Mammal Protection Act of 1972 with respect to the protection of marine mammals
- Marine Protection, Research, and Sanctuaries Act of 1972 with respect to the dumping of dredged material into the ocean
- Rivers and Harbors Appropriations Act of 1899 with respect to construction of any bridge, causeway, dam, or dike over or in any port, roadstead, haven, harbor, canal, navigable river, or any other navigable water of the United States.

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

- Regulatory Guide 4.7, Rev. 2, *General Site Suitability for Nuclear Power Stations* (NRC 1998), contains guidance that the ecological systems and biota at potential sites and their environs should be sufficiently well known to allow reasonably certain predictions of impacts and that there would be no unacceptable or unnecessary deleterious impacts on populations of important species or on ecological systems from the construction of a nuclear power station.
- Memorandum of Understanding between the Corps of Engineers, U.S. Army, and the NRC for the Regulation of Nuclear Power Plants, 1975, provides guidance with respect to the NRC exercising the primary responsibility in conducting environmental reviews and in preparing environmental impact statements (EISs) for nuclear power stations. However, the Corps of Engineers will participate with the NRC in the preparation of EISs by helping to draft material for sections covering (1) coastal erosion and other shoreline modifications, (2) siltation and sedimentation processes, (3) dredging activities and disposal of dredged materials, and (4) location of structures affecting navigable waters.

- Second Memorandum of Understanding and Policy Statement Regarding Implementation of Certain NRC and EPA Responsibilities, serves as the legal basis for NRC decisionmaking concerning licensing matters covered by NEPA and Section 511 of the Federal Water Pollution Control Act (FWPCA), commonly referred to as the CWA.

Technical Rationale

The technical rationale for evaluating the applicant's construction impacts on aquatic ecosystems is discussed in the following paragraph:

The EIS needs to include an analysis that considers the environmental and other effects of construction on the aquatic environment and the alternatives available for reducing or avoiding adverse environmental and other effects, as well as the environmental benefits of the proposed action. Following the acceptance criteria listed above will help ensure that the environmental impact of the proposed action is considered with respect to matters covered by such standards and requirements.

III. REVIEW PROCEDURES

When reviewing the impacts of station construction on aquatic ecology, the reviewer should take the following steps:

- (1) Review the general data and information necessary to determine the impacts of station construction on aquatic ecology:
 - (a) Identify the construction activities that impact "important" aquatic species and habitats of the site and vicinity, transmission corridors, and offsite areas.
 - (b) Determine the areal extent and location of such potential impacts.
 - Prepare a map superimposing impact areas over resource areas.
 - During the site visit, inspect areas where construction activities will occur, and inspect all other potentially impacted areas.
 - When necessary, supplement the data and information specified in this part through consultations with Federal, State, regional, local, and affected Native American tribal agencies (e.g., the U.S. Fish and Wildlife Service and State fish and wildlife agencies).

- (2) Review impacts of construction on aquatic ecology:

Review and discuss the following impacts:

- (a) Determine how construction activities will impact "important" species and their habitats (e.g., those resulting from scouring and siltation, dredging and soil disposal, and interference with shoreline processes), and estimate the magnitude and duration of such impacts.
- (b) Determine the impacts of construction on threatened or endangered species, evaluating these impacts relative to the local population and the total estimated population over the entire range of the species as noted in the literature.
- (c) Identify water bodies receiving construction effluents and the expected average and maximum flow rates, composition, and physical characteristics of these effluents (from ESRP 4.2).
- (d) Describe proposed construction management practices for the amelioration of impacts (from the ER). For example,
- avoid narrow reaches of water bodies and important habitats as sites for locating intake or discharge structures
 - provide a zone of passage that permits normal movement of "important" species populations and maintenance of the harvestable crop of economically important populations.
- (e) For important species having commercial or recreational value, estimate the magnitude of the impact. This may be expressed in terms of dollars, lost opportunity for recreational pursuits, percent reduction in harvest, percent loss of habitat, or other appropriate quantifiers. In absence of more sophisticated population models, these determinations can usually be based on percent of habitat type lost.
- (f) If threatened or endangered species are known to occur in the project area, and the proposed project is predicted to add to their further endangerment, consult with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service under Section 7 of the Endangered Species Act.
- (g) Identify potential disturbances of benthic areas by
- placement of intake and discharge structures
 - channel modifications for navigation or flow control
 - placement and removal of cofferdams
 - construction of bulkheads, piers, jetties, basins, and storm sewers
 - direct dredging, including the area that may be affected by resulting siltation and turbidity.
- (h) Analyze the importance of these disturbed benthic areas to "important" species, taking into account the relationship between the area disturbed and the remaining comparable undisturbed area in the region available for the continued maintenance of impacted biota.

- (i) Relate the critical life history and habitat needs of "important" fish and shellfish (e.g., seasonal requirements, migration routes, spawning areas, nursery grounds, and feeding and wintering areas) to the plant construction schedule and consider whether impacts are likely to be of short duration or otherwise reversible.
- (j) In analyzing such impacts, consider
- percent of the water body cross section that might be obstructed by construction activity at any time
 - time and duration of such obstruction
 - potential changes to water quality caused by exposure of substrate to contaminants during construction (e.g., dredging for intake channels, cofferdam construction)
 - coordinating this review with the District Office of the Corps of Engineers.
- (k) Identify sediments, petroleum products, pesticides, fertilizers, heavy metals, and other potential pollutants entering affected water bodies.
- Consider both the points of entry of site drainage into surface-water bodies and the areal extent of impact by suspended materials and siltation.
 - Determine the potential for reversibility of impacts following completion of construction.
 - Assess plans for maintenance of siltation ponds or catchment basins.
- (l) Identify potential clearing along reaches of streams, rivers, and other water bodies.
- Identify water bodies where such habitat alterations will occur and indicate the extent of such changes.
 - Compare this with the extent of remaining similar habitats in the region.
- (m) Identify potential dewatering effects on groundwater supply, wetlands (protected under Executive Order 11990 as amended by Executive Order 12608), and other aquatic habitats.
- Consider the location and areal extent of any wetlands that will be drained.
 - Determine the relative extent of comparable wetlands in the region and, as in item (g) above, address the relative importance to the ecosystem of the impacted wetlands in comparison with the regional wetlands.

- Examine the potential for reversibility of impacts and environmental improvement following construction.
- (n) Identify disposal plans for dredged material and placement of fill material.
- Identify the areal extent of any water bodies or wetlands that would receive dredge spoils during construction.
 - Consider the relative extent of similar water bodies and wetlands in the region, and in this context, analyze the importance of the impacted wetlands and water bodies to the ecosystem.
 - Coordinate this review with the District Office of the Corps of Engineers.
- (o) Ensure that aquatic species expected to become established in cooling ponds are identified.
- Ensure that the applicant has described in the ER the aquatic species that are expected to become established in cooling ponds.
 - Consider how these colonizations may impact aquatic species in adjacent water bodies and wetlands in the site and vicinity.
- (p) In addition to the above analyses (items a-p), consider any other site-specific construction impacts to aquatic ecosystems that can be predicted on the basis of construction and the local aquatic ecosystem, consulting with the reviewers for ESRPs 2.3, 2.4.2, 3.6, and 4.2 to identify such additional impacts.
- (q) Ensure that initial evaluation of environmental impacts has been submitted by the applicant if the applicant wishes to accelerate the start of construction.
- Ensure that an applicant wishing to accelerate the start of construction by early submittal of the ER has submitted in the ER an initial evaluation of environmental impacts based on an analysis of at least 6 months of field data related to the proposed facility and suitable projections of the remaining seasonal periods if information has already been provided on the critical life stages and biologically significant activities (e.g., spawning, migration) that increase the vulnerability of the potentially affected biota at the proposed site.
 - If this has been done, the reviewer should ensure that the applicant makes a commitment to furnish, within 6 months of the time of filing, a final evaluation based on a full year of field data.
- (r) Become familiar with the provisions of standards, guides, and agreements pertinent to the construction of nuclear power stations:

- Refer to the "Acceptance Criteria" section of this ESRP for a list of the standards that are applicable to this environmental review.
- Where required by these provisions, consult with the reviewers of ESRP 2.3 and with appropriate agencies (e.g., the U.S. Fish and Wildlife Service and the State wildlife agency) to ensure compliance with the applicable regulations.
- Analyze construction activities in light of recognized best management practices.

IV. EVALUATION FINDINGS

Input to the EIS should include (1) a list of adverse impacts of construction to aquatic ecosystems, (2) a list of the impacts for which there are measures or controls to limit adverse impacts and the associated measures and controls, (3) the applicant's commitments to limit these impacts, and (4) the staff's evaluation of the adequacy of the applicant's measures and controls to limit adverse impacts. This information should be summarized by the reviewer of ESRP Section 4.6.

For all construction activities, the commitment of aquatic resources should be indicated. The reviewer should also evaluate the proposed construction activities to ensure that the applicant is planning to use generally acceptable practices that should result in minimizing impacts associated with such practices (see 40 CFR 423.40). Practices and commitments proposed by the applicant for the protection of the environment should be described.

Any construction activity that should receive mitigative action should be described by the staff. Where mitigation of a predicted impact is an option, the reviewer should evaluate appropriate measures, which could include alternative placement of structures, alternative schedules, or alternative construction practices. The reviewer should evaluate alternatives for any proposed construction activity that is predicted to result in an adverse impact that cannot be mitigated.

The depth and extent of the input to the EIS will be governed by the attributes of the aquatic ecological resources that could be affected by plant construction and operation, and by the nature and magnitude of the expected impacts to these resources. The reviewer should screen each predicted impact using criteria appropriate to the impacted segment of the ecosystem. The following should be evaluated by the reviewer for inclusion in the EIS:

- loss of habitat for endangered or threatened species in the context of guidelines under the Endangered Species Act of 1973. If loss of habitat for commercially or recreationally important species occurs, the reviewer should consider the effects on the harvestable crop. It should generally be concluded that loss of up to 5% of such habitat in the site vicinity will have negligible impact on the crop and need no further analysis. Where losses exceed 5%, the reviewers should consider the loss in relation to regional abundance of these species.
- construction practices to minimize soil erosion and the number of hectares disturbed

- the clearing of vegetation from stream banks, making certain that it is limited to that necessary for placement of structures
- the applicant's commitment to the use of best management practices
- alternatives to mitigate such impacts, such as using a fish hatchery and habitat restoration to increase natural fish production, if the applicant's ER reveals a potential significant impact on fish populations
- lost "important" aquatic species and habitats from the viewpoints of their uniqueness within the region under consideration, relative impacts, and long term net effects
 - The assessments of relative impacts should include statements expressed in percentage terms in which the amount of expected resource loss is related to the total resource in the immediate region and in which the total resource in the immediate region is related to that in the surrounding regions.
 - The assessments of long term net effects should include statements about whether impacts represent long-term net losses, long-term net gains, or something in between. For example, short term impacts to individuals in the local impact area may be severe while long-term impacts to the local population may represent no net losses.
- disturbance of benthic areas. All dredged areas or areas affected by dredging may be considered as temporarily lost habitat; therefore dredging should be limited, if possible.
- surface runoff. Good construction practices will generally control surface runoff. Where drainage courses represent an especially important resource, attention should be given to measures for their protection during construction or refurbishment. The reviewer should (1) determine if construction activities affecting water quality (e.g., runoff, turbidity) will comply with Federal, State, regional, and local water-quality standards, and (2) reach a conclusion as to whether controls proposed by the applicant will ensure satisfactory protection of surface waters.
- dewatering on wetlands. Guidelines under the CWA Amendments of 1972, the Coastal Zone Management Act of 1972, and the Marine Sanctuaries Act of 1972 should be followed in evaluating the significance of dewatering on wetlands. Generally, dewatering of biologically productive wetlands may be considered an adverse impact that should be avoided. The percentage loss of such wetlands in the region should be considered to place the loss in perspective for the licensing decision. Because of the importance of wetlands, alternatives to avoid any loss of this habitat should always be considered.
- dredge spoils and placement of fill. Drainage from dredge spoil areas should comply with existing EPA guidelines. The reviewer should reach a conclusion about whether adequate practices have

been provided for management of this stage of construction. Filling of biologically productive wetlands should generally be avoided. Dumping of dredge spoils should be performed under the cognizance of the EPA and the District Office of the Corps of Engineers.

If the reviewer verifies that sufficient information has been provided in accordance with the requirements of this ESRP section, then the evaluation supports the following types of concluding statements to be included in the EIS:

The staff reviewed the available information relative to impacts to the aquatic environment on or in the vicinity of the site. The staff concludes that the list and description of impacts is adequate to comply with 10 CFR 51.45.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report."

40 CFR 423, "Steam Electric Power Generating Point Source Category."

Executive Order 11990, "Protection of Wetlands."

Executive Order 12608, 52 *Federal Register* 34617, September 9, 1987.

Coastal Zone Management Act, as amended, 16 USC 1451 et seq.

Endangered Species Act, as amended, 16 USC 1531 et seq.

Federal Water Pollution Control Act (FWPCA), as amended, 33 USC 1251 et seq. (also known as Clean Water Act).

Fish and Wildlife Coordination Act Amendment, 16 USC 661 et seq.

Marine Mammal Protection Act of 1972, as amended, 16 USC 1361 et seq.

Marine Protection, Research, and Sanctuaries Act, as amended, 33 USC 1401 et seq.

“Memorandum of Understanding between the Corps of Engineers, U.S. Army, and the U.S. Nuclear Regulatory Commission for the Regulation of Nuclear Power Plants.” 40 *Federal Register* 37110, August 25, 1975.

Rivers and Harbors Appropriations Act of 1899, 33 USC, 403 et seq.

“Second Memorandum of Understanding and Policy Statement Regarding Implementation of Certain NRC and EPA Responsibilities,” 40 *Federal Register* 60115, December 31, 1975.

U.S. Nuclear Regulatory Commission (NRC). 1998. *General Site Suitability for Nuclear Power Stations*. Regulatory Guide 4.7, Rev. 2, Washington, D.C.



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.4 SOCIOECONOMIC IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's preparation of an introductory paragraph for the portion of the environmental impact statement (EIS) that describes the socioeconomic impacts of construction. The scope of the paragraph covered by this plan introduces the material from the reviews conducted under ESRPs 4.4.1 through 4.4.3.

Review Interfaces

None.

Data and Information Needs

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

II. ACCEPTANCE CRITERIA

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

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

October 1999

4.4-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

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

- There are no regulatory positions specific to this ESRP.

Technical Rationale

Technical rationale for evaluating the applicant's potential socioeconomic impacts is discussed in the following paragraph:

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

III. REVIEW PROCEDURES

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

IV. EVALUATION FINDINGS

The reviewer of information covered by this ESRP should prepare at least one introductory paragraph for the EIS. The paragraph(s) should introduce the nature of the material to be presented by the reviewers of information covered by ESRPs 4.4.1 through 4.4.3. The paragraph(s) should list the types of information to be presented and describe their relationships to information presented earlier and to be presented later in the EIS.

V. IMPLEMENTATION

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

VI. REFERENCE

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



U.S. NUCLEAR REGULATORY COMMISSION
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.4.1 PHYSICAL IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's identification and assessment of the direct physical impacts of construction-related activities^(a) to the community. Among these are the construction disturbances of noise, odors, vehicle exhaust, dust, vibration, and shock from blasting.

The scope of the review directed by this plan should include consideration of impacts resulting from plant construction, transmission corridors and access roads, other offsite facilities, and project-related transportation of goods and materials. The review should be of sufficient detail to predict and assess potential impacts and to show how these impacts should be treated in the licensing process. Where necessary, the reviewer should identify alternative locations, designs, practices, and procedures that would mitigate predicted adverse impacts.

Review Interfaces

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

- ESRPs 2.1 and 2.2. Obtain a detailed description of the plant location and of the surrounding region affected by the plant construction.

(a) Construction-related activities are those that occur solely as a result of plant construction.

October 1999

4.4.1-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 2.3.2. Obtain descriptions of bodies of water likely to be affected by noise, odor, transportation, or construction or whose aesthetics would be affected.
- ESRPs 2.5.1 and 2.5.2. Obtain the socioeconomic features such as population and community characteristics of the site environs that potentially may be subject to physical impacts from construction.
- ESRP 2.7. Obtain estimates of the impacts of non-radiological emissions related to plant construction on air quality.
- ESRP 3.1. Obtain any aspects of the plant's appearance that may cause physical impacts in the region, including visual aesthetics.
- ESRP 3.7. Provide a detailed description of any power transmission system construction associated with the plant that may physically impact the region, including visual aesthetics.
- ESRPs 4.1.1 through 4.1.2. Obtain data on land uses likely to be affected physically or aesthetically by construction noise, odors, dust, etc. at the plant and along transmission and access corridors. Of special concern are nearby recreation areas.
- ESRP 4.2.2. Obtain data on construction activities that may have adverse impacts on noise, odors, dust, shock, vibration, or aesthetics in the vicinity of the plant and transmission and access corridors.
- ESRP 4.6. Provide a list of the applicant's commitments and the practices that the staff identified to limit adverse environmental impacts of construction.
- ESRP 5.8.1. Provide the features of plant construction expected to result in operational impacts.
- ESRPs 9.3 and 9.4. Provide a request to the reviewers for ESRPs 9.3 and 9.4 to consider alternative plant designs, locations, or construction practices that would avoid the impacts if the reviewer determines that there are physical impacts of construction that are adverse and should be avoided.
- ESRP 10.1. Provide a list of the unavoidable physical impacts that are predicted to occur as a result of the proposed construction activity.
- Interface with Environmental Project Manager (EPM). Consult with the EPM on practicality and cost effectiveness of any proposed modifications to mitigate physical socioeconomic impacts of construction.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following information should be obtained:

- the distribution of people, buildings, roads, and recreational facilities vulnerable to impact from construction-related activities (from the environmental report [ER] and consultation with Federal, State, regional, local, and affected Native American tribal agencies).
- applicable standards for levels of noise, dust, and gaseous pollutants (from consultation with Federal, State, regional, local, and affected Native American tribal agencies)
- predicted noise levels at sensitive areas identified in the first item listed above (from the ER)
- predicted air pollutant levels at sensitive areas identified in the first item listed above (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria are based on meeting the relevant requirements for noise, dust, air pollution, and visual aesthetics of the following regulations:

- Clean Air Act of 1970, as amended, with respect to air quality during construction activities.
- 40 CFR 50-90 as related to National Primary and Secondary Air Quality Standards.
- Noise Control Act of 1972, as amended, with respect to noise from construction.
- 10 CFR 51.71 and 10 CFR 51.45 with respect to describing the significance or potential significance of physical impacts of plant-construction activities on nearby communities.

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 economic and social impact of siting and construction activities.

Technical Rationale

The technical rationale for evaluating the applicant's potential physical impacts is discussed in the following paragraphs:

In accordance with 10 CFR 51.45(d), the applicant is required to submit in the ER information needed for evaluating socioeconomic impacts of construction. Similar information is required to be present in the EIS pursuant to 10 CFR 51.71.

Reasonably detailed information about the potential for physical socioeconomic impacts such as noise or dust at the site in question is required to assess any potential social or economic impacts that might occur as a result of plant construction or operation. Data in the ER must be adequate to make these determinations.

III. REVIEW PROCEDURES

The reviewer's analysis of construction impacts on the community should be linked to the environmental reviews directed by ESRPs 2.1, 2.2, 2.5.1, 2.5.2, 3.1 and 3.7 to ensure that the environmental factors most likely to be impacted by the proposed construction are adequately described. The reviewer should ensure that information presented in the applicant's ER is complete and accurate. The reviewer should recognize that physical impacts to a community from construction of a nuclear plant are not markedly different from any other large heavy construction project. With this in mind, the reviewer should take the following steps:

- (1) For any particular construction related activity, first consider the distribution of residents and transients who could be affected, including determination of sensitive use patterns (e.g., hospitals, residences, recreational areas) and the allowable limits of impacts.
- (2) Identify the potential impacts on the community and predict their extent and magnitude, including impacts from dust, noise, shock from blasting, and polluting gases and particles.
 - Consider impacts in qualitative terms where the effect on the community is expected to be minor.
 - Where adverse impacts (i.e., impacts that should be mitigated or avoided) can be predicted, conduct a more detailed analysis and where practical, make quantitative estimates of the magnitude of the impacts.
- (3) Identify the applicant's commitments to mitigate the physical impacts. These include
 - wetting down roadways and construction sites
 - scheduling noisy operations during daytime hours
 - suppressing blast and shock effects by using mats.
- (4) Consider the major physical impacts of plant construction. The specific impacts should include the impact of construction on transportation and the aesthetic characteristics of the region.

- (5) Become familiar with the provisions of standards, guides, and agreements pertinent to the construction of nuclear power plants.
- (6) Refer to the "Acceptance Criteria" section of this ESRP for a list of those generally pertinent to this environmental review.
- (7) Consult with appropriate Federal, State, regional, local, and affected Native American tribal agencies to verify that current, applicable regulations and guides are available. This should include, for example, consultation with the EPA and State and local agencies for current ambient air quality standards and air pollutant levels and Occupational Safety and Health Administration guidelines and standards applicable to facility construction.
- (8) Verify that the applicant has made commitments to comply with these applicable regulations and guides.
- (9) Become familiar with general references on construction practices and impacts.
- (10) Examine proposed construction activities in light of recognized "good practice." The term "good practice" as used here refers to those activities that tend to mitigate noise levels and adverse construction impacts on the community.

IV. EVALUATION FINDINGS

The review conducted under this plan should be directed toward accomplishing the following objectives: (1) public disclosure of physical impacts resulting from construction related activities, (2) presentation of the basis for the staff analysis, and (3) presentation of staff conclusions regarding physical impacts of construction related activities to the community.

If the site is remote from a community and the applicant is committed to meeting applicable guides and standards and to following good construction practices, these facts should be stated with only a very brief discussion noting that under these conditions, physical socioeconomic impacts should be minor. Where this is not the case, each of the areas identified in the analysis section should be addressed briefly with conclusions regarding the significance of the impact on the community. The reviewer should discuss the applicant's commitments to meet applicable Federal, State, regional, local, and affected Native American tribal standards and should describe mitigating actions that should be taken by the applicant during construction. If there are some unique impacts resulting from unusual methods, materials, or other construction related activities, these impacts should be addressed in detail.

If the reviewer determines that the applicant is committed to complying with all applicable standards and that the applicant's proposed construction related activities represent good construction practices, the reviewer may conclude that the impacts resulting from these activities will be acceptable.

Where predicted impacts are adverse, the reviewer should consider mitigative measures, including alternative placement of structures, alternative schedules, alternative construction practices, or other conditions to be imposed by the construction permit.

Evaluation of each identified impact should result in one of the following determinations:

- *The impact is minor, and mitigation is not required.* When all impacts are of this nature, the reviewer should include a statement in the EIS of the following type:

The staff reviewed the available information on the physical impacts of construction. Based on this review, the staff concludes that there are no significant physical socioeconomic environmental impacts as a result of construction.

- *The impact is adverse, but can be mitigated by specific design or procedure modifications that the reviewer has identified and determined to be practical.* For these cases, the reviewer should consult with the EPM and the reviewers for ESRPs 9.3 and 9.4 for verification that the mitigation measures are practical and will lead to an improvement in the benefit-cost balance. The reviewer should prepare lists of verified modifications for the reviewer for ESRP 4.6.

A statement similar to the following should be included in the EIS:

The staff reviewed the information on physical impacts of construction. Based on this review, the staff concludes that the following impacts require mitigation.

- *The impact is adverse and cannot be successfully mitigated, and is of such magnitude that it should be avoided.* When impacts of this nature are identified, the reviewer should inform the reviewers for ESRPs 9.3 and 9.4 that an analysis and evaluation of alternative designs or procedures is needed. The reviewer should participate in any such analysis and evaluation of alternatives that would avoid the impact and that could be considered practical. If no such alternatives can be identified, the reviewer is responsible for providing this information to the reviewer for ESRP 10.1.

A statement similar to the following should be included in the EIS:

The staff reviewed the information on physical impacts of construction. Based on this review, the staff concludes that the following impact(s) cannot be mitigated and should be avoided. Alternatives should be considered.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental report."

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

40 CFR 50-90, as related to National Primary and Secondary Air Quality Standards.

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

Noise Control Act, as amended, 42 USC 4901 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
**ENVIRONMENTAL STANDARD
 REVIEW PLAN**

OFFICE OF NUCLEAR REACTOR REGULATION

4.4.2 SOCIAL AND ECONOMIC IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's analysis and evaluation of the social and economic impacts of construction on the surrounding region^(a) and individual communities that could be affected by the proposed project.

The scope of the review directed by this plan includes the social and economic impacts resulting from construction and from the activities and demands of the construction labor force. Categories of impacts resulting directly from construction of the station include (1) private sector regional materials, products, and services, (2) regional labor, (3) tax revenues to local jurisdictions, (4) public facilities and services, (5) social or economic significance of ecological and land-use impacts, including human displacement, and (6) local planning-political decision processes. Categories of impacts resulting from the activities and demands of the construction labor force include (1) population-settlement pattern, (2) housing, (3) land use, (4) education, (5) other public facilities and service, (6) transportation, (7) private-sector goods and services, (8) employment and regional income, (9) tax revenues to local jurisdictions, (10) local planning-political decision processes, and (11) social structure and community cohesion. The reviewer should identify specific impacts and where they will occur and predict their relative magnitude. Where necessary, the reviewer should access alternative locations, designs, practices, or procedures that would mitigate predicted adverse impacts.

(a) See ESRP 2.5.2 for a definition of "region."

October 1999

4.4.2-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

Review Interfaces

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

- ESRPs 2.5.1 and 2.5.2. Obtain the socioeconomic features, such as population and community characteristics, of the site environs that may be subject to economic impacts from construction.
- ESRPs 4.1.1, 4.1.2, 4.2, and 4.3. Obtain the potential environmental impacts from plant construction on the plant site, transmission corridors, offsite areas, water resources, and terrestrial resources of the region that may have associated social or economic impacts.
- ESRP 4.6.2. Provide a list of applicant commitments of practices to limit adverse environmental impacts of construction.
- ESRP 5.8.2. Provide the social and economic impacts of construction that are expected to extend throughout the operating lifetime of the plant.
- ESRPs 9.3 and 9.4. Provide a request to the reviewers for ESRPs 9.3 and 9.4 to consider alternate plant designs, locations, or construction activities that would avoid the impacts if the reviewer determines that proposed construction activities will result in adverse social or economic impacts that should be avoided.
- ESRP 10.1. Provide a list of unavoidable adverse social and economic impacts that are predicted to occur as a result of proposed construction activity.
- ESRP 10.2. Provide a brief summary of the irreversible and irretrievable commitments of social and economic resources predicted to occur as a result of proposed construction activity.
- ESRP 10.3. Provide an assessment of the incremental increase in regional productivity and the expected annual tax payments to local and State governments for the construction period. This information should support analysis of the trade-offs between short term uses of the site and long term productivity of the region.
- Interface with the Environmental Project Manager (EPM). Consult with the EPM to verify that proposed modifications based on socioeconomic impacts are practical and cost effective.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- economic base data and information, including
 - important regional industry by category, including employment (from ESRP 2.5.2)
 - the size and nature of the heavy construction industry and construction labor force within the region (from ESRP 2.5.2)
 - the total regional labor force (from ESRP 2.5.2)
 - regional unemployment levels and future economic outlook (from ESRP 2.5.2).
- data and information about the political structure, including regional political jurisdictions, tax districts, and local and regional planning and administrative organizations (from ESRP 2.5.2)
- demographic information, including population forecasts (from ESRP 2.5.1)
- social structure information that covers the major community structures (from ESRP 2.5.2)
- housing information, including the sales and rental market in region, number of units, turnover and vacancy rates, and trends in addition to housing stock, adequacy of structures, and location of existing and projected housing (from ESRP 2.5.2)
- data and information about the educational system, including regional primary and secondary schools and higher institutions, including capacity and present percentage of utilization (from ESRP 2.5.2)
- recreational information that covers public and private recreational facilities and opportunities, including the present and projected capacity and percentage of utilization (from ESRP 2.5.2)
- information about taxation, including the regional tax structure and distribution of the present revenues to each jurisdiction and district (from ESRP 2.5.2)
- land-use planning and zoning information about local plans concerning land use and zoning that are relevant to population growth, housing, and changes in land-use patterns (from ESRP 2.5.2)
- information about social services and public facilities, including the
 - present and projected water and sewer facilities, including present capacity and projected percentage of utilization (from ESRP 2.5.2)
 - present and projected police and fire capabilities (from ESRP 2.5.2)

- location of hospitals, number of medical doctors, and specialized health facilities, including present and projected capacity (from ESRP 2.5.2).
- information about highways and transportation that covers
 - regional and local highway systems, including carrying capacity and condition of roads and highways (from ESRP 2.5.2)
 - modifications that might affect traffic flow to and from the station site (from ESRP 2.5.2).
- construction induced factors, including the following:
 - annual expenditures within the region for materials and services during construction (from the environmental report [ER])
 - plans to supplement public facilities and services to support construction and agencies responsible for facility expansion (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - taxes by type and jurisdiction to be paid during construction (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies)
 - annual construction labor force requirements (for each quarter year, if possible) over the construction period. Where necessary, requirements by major construction craft may be reported (from the ER).

II. ACCEPTANCE CRITERIA

Acceptance criteria for including socioeconomic impacts during construction are based on meeting the relevant requirements of the following:

- 10 CFR 51.45(c) with respect to the analysis of socioeconomic data
- 10 CFR 51.45(d) and 51.71(d) with respect to the analyses required in the development of the ER and EIS
- 10 CFR 52.18 with respect to reviewing applications for early site permits
- 10 CFR 52.81 with respect to reviewing applications for combined licenses
- 10 CFR 51 and 52 with respect to describing the significance or potential significance of socioeconomic impacts of plant construction activities.

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), addresses benefits and costs to nearby populations from construction activities.

Technical Rationale

The technical rationale for evaluating the applicant's potential social and economic impacts during construction is discussed in the following paragraph:

In accordance with 10 CFR 51.45(d), the applicant is required to submit in the ER information needed for evaluating potential socioeconomic impacts on communities in the vicinity of the plant. Similar information is required to be present in the environmental impact statement (EIS) pursuant to 10 CFR 51.71. Detailed information about the potential for social and economic impacts of plant construction on the surrounding region and individual communities is needed in the ER so that the staff may evaluate the significance of these impacts.

III. REVIEW PROCEDURES

The reviewer's analysis of the social and economic impacts of construction should be linked to the environmental descriptions provided by the reviewer for ESRP 2.5.2 (Community Characteristics). The reviewer should ensure that the environmental factors most likely to be impacted by plant construction are described in sufficient detail to permit assessment of the predicted impacts. Based on these descriptions, the reviewer should identify and analyze components of the regional and community social, political, and economic systems that would be potentially impacted. The reviewer should take the following steps:

- (1) From the full scope of potential impacts, determine the impacts that are minor and those that are likely to be adverse and thus need detailed analysis.
 - Where practical, develop quantitative measures of adverse impacts.
 - Consider all impacts identified during the analysis to the extent practical, in terms of location, duration, and magnitude.
 - Be aware that the duration of some impacts will be longer than the construction period and that the character of such impacts may be altered due to completion of construction and dispersal of the construction labor force.
 - Confer with the reviewers for ESRP 4.1, Land-Use Impacts; 4.2, Water-Use Impacts; and 4.3, Ecological Impacts, to determine if any of the construction impacts identified under these sections are of sufficient social or economic consequence to be examined further under this plan.

(2) Consider the socioeconomic impacts of construction on regional housing and public services such as safety, social services, tourism and recreation, public utilities, education, transportation, and offsite land use.

(3) For analytical purposes, it is effective to categorize impacts into those directly resulting from plant construction and those resulting from the activities and demands of the construction labor force. Analyze the social and economic impacts directly associated with construction, as follows:

- Estimate the annual value of the major categories of materials and services to be purchased within the region and compare that value with the estimated value of the materials and services that would have been produced without plant construction.
- Estimate the annual construction labor force requirements (for each quarter year, if possible) over the construction period and compare them with the number of workers available from within the region. Where necessary, determine these requirements for the major construction crafts, using standard craft categories.
- Identify the jurisdictions receiving significant tax revenues derived from plant construction purchased services and materials.
- Estimate the physical demands placed by plant construction on local public facilities and services (e.g., fire, police, sewer, and water) and compare these demands with existing facilities and services.
- In consultation with appropriate reviewers, determine if any impacts identified under land-use, water-use, and ecological impacts require further analysis regarding social and economic consequences. Such impacts could include economic impacts of changes in visual quality or recreation resources.
- Determine the families or households to be displaced by plant construction. Analysis should
 - determine any equitable compensation for relocation and include analysis of adequacy of mitigation plans
 - address socioeconomic effects of labor force mobility, and residential choices.

(4) Analyze the socioeconomic impacts associated with the construction labor force, as follows:

- From the previous estimates of construction labor requirements and the number of workers available within the region, predict the number of workers originating from within the region and the number of in-migrants.

- Estimate the number of construction force in-migrants, and predict their temporal and geographic distribution.
- Estimate the number of induced in-migrants, and predict their temporal and geographic distribution.
- Estimate the overall impact of in-movers and procurements of goods and services on regional income, employment, and population, and identify critical services and goods for the affected region.
- Predict potential changes in regional housing patterns (e.g., introduction of mobile homes).
- Estimate the additional level of public facilities and services required to support in-migrants as a function of their probable location. Types of facilities and services that should be considered include education, water and sewer, safety, health, welfare, transportation, and recreation.
- Identify adverse traffic conditions caused by transportation of workers and materials to and from the site.
- Identify the jurisdictions expected to receive significant tax revenues generated by the project payroll and induced economic activity.
- Compare the total flow of tax revenues from the various sources associated with plant construction to the expenditures required to meet the additional demand for public facilities and services.

IV. EVALUATION FINDINGS

Input from the ESRP 4.4.2 review to the EIS should be directed toward meeting the following objectives: (1) public disclosure of social and economic impacts resulting from construction, (2) presentation of the basis for the staff analysis, and (3) presentation of staff conclusions regarding impacts of the reviewed construction activity to the region's social, political, and economic structure.

The following information should be included in the EIS:

- a statement of the scope of coverage and the objectives of the analysis
- a summary of the steps taken in the analysis and reference to methodologies employed
- a summary of the findings of the analysis for each impact category with the level of detail being related to the importance/severity of the anticipated impact
- identification and assessment of potential mitigation measures.

Evaluation of each identified impact should result in one of the following determinations:

- *The impact is minor, and mitigation is not required.* When all impacts are of this nature, the reviewer should include a statement of the following type:

The staff reviewed the available information on the construction of the proposed facility. Based on this review, the staff concludes that there are no significant socioeconomic impacts on communities in the vicinity of the plant as a result of construction.

- *The impact is adverse, but can be mitigated by design changes or procedure modifications that the reviewer has identified and determined to be practical.* For these cases, the reviewer should consult with the EPM and the reviewers for ESRPs 9.3 and 9.4 for verification that identified mitigation measures are practical and will lead to an improvement in the benefit-cost balance. The reviewer should prepare a list of verified modifications and identified measures and controls to limit the corresponding impact. These lists should be provided to the reviewer for ESRP 4.6.
- *The impact is adverse and cannot be successfully mitigated, and is of such magnitude that it should be avoided.* When impacts of this nature are identified, the reviewer should inform the reviewers for ESRPs 9.3 and 9.4 that an analysis and evaluation of alternative sites, designs, or procedures is required. The reviewer should participate in any such analysis and evaluation of alternatives that would avoid the impact and that could be considered practical. If no such alternatives can be identified, the reviewer should be responsible for providing this information to the reviewers for ESRPs 10.1 and 10.2.

The reviewer should categorize impacts as those over which the applicant has some control and those over which the applicant has little or no control. The impacts over which the applicant has some control usually are a direct result of the construction process. The impacts over which the applicant has little or no control are indirect results of construction and are usually associated with the influx of the construction labor force.

Where the applicant has control over impacts, the criteria outlined above should be applied.

Where the applicant has little or no control over alternatives to mitigate impacts that in the reviewer's judgment are adverse, the reviewer should (1) prepare a description of these impacts for inclusion in the EIS, (2) where appropriate, identify potential solutions to the problem that are beyond the jurisdiction of the NRC, and (3) ensure that these impacts are considered in the staff's final evaluation of the proposed action.

The reviewer should verify that sufficient information has been provided in accordance with the requirements of this ESRP and that the evaluation supports the following type of concluding statement, to be included in the staff's EIS:

The staff reviewed the available information relative to the socioeconomic impacts of construction. The staff concludes that the information is adequate to satisfy the requirements of 10 CFR 51.45. These conclusions are based on the following:

- the applicant has developed the information using the recommended information sources and approaches suggested by prevailing professional practice
- the information sources used are recently updated versions.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR 51.45, "Environmental report."

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

10 CFR 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."

10 CFR 52.18, "Standards for review of applications."

10 CFR 52.81, "Standards for review of applications."

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**

OFFICE OF NUCLEAR REACTOR REGULATION

4.4.3 ENVIRONMENTAL JUSTICE IMPACTS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's review of environmental impacts on minority and low-income populations by construction to the extent that such information can serve as the basis of an environmental impact statement (EIS) section on environmental justice.

The scope of the review directed by this plan should include consideration of the methods that are used to identify and quantify impacts on minority and low-income populations, the location and significance of any environmental impacts during construction on populations that are particularly sensitive, and any additional information pertaining to mitigation. The descriptions to be provided by this review should be of sufficient detail to permit subsequent staff assessment and evaluation of specific impacts, in particular whether these impacts are likely to be negative and disproportionate.

Review Interfaces

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

- ESRP 2.5.4. Obtain descriptions of the minority and low-income populations that could be disproportionately impacted by proposed project construction activities and the mechanisms (including socioeconomic) by which disproportionate harm could occur.

October 1999

4.4.3-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRPs 4.1.1 through 4.6. Obtain descriptions of potential environmental (including socioeconomic [CEQ 1997]) impacts of construction that may have a bearing on environmental justice.
- ESRPs 9.3 and 9.4. If the reviewer concludes that construction will result in disproportionate adverse impacts on minority or low-income populations that should be avoided, then request that the reviewers for ESRPs 9.3 and 9.4 consider alternate plant designs, locations, or construction activities that would avoid the impacts.
- ESRP 10.1. Provide descriptions of unavoidable adverse environmental impacts that disproportionately affect minority and low-income populations during construction.
- ESRP 10.2. Provide descriptions of environmental impacts that disproportionately affect minority and low-income populations during construction through short-term use and effects on long-term productivity.
- ESRP 10.3. Provide descriptions of irreversible and irretrievable environmental impacts that disproportionately affect minority and low-income populations as a result of construction.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The data requirements analysis should generally be the same for any type of environmental review that requires the preparation of an environmental report (ER). The following data or information should be obtained:

- pathways where any environmental (including socioeconomic) impact during construction may interact with cultural or economic facts that may result in disproportionate environmental impacts on minority and low-income populations
- any assessment (qualitative or quantitative, as appropriate) of the degree to which each minority or low-income population would disproportionately experience adverse human health or environmental (including socioeconomic) impacts during construction as compared with the entire geographic area. In addition, information should be obtained on any assessment comparing the impacts with the larger overall geographic area encompassing all of the alternative sites.
- any assessment (qualitative or quantitative, as appropriate) of the significance or potential significance of such environmental impacts on each minority and low-income population
- any assessment of the degree to which each minority and low-income population would disproportionately receive any benefits compared with the entire geographic area

- any discussion of any mitigative measures for which credit is being taken to reduce environmental justice concerns
- when alternative sites are being evaluated, the same reviews should be available for each site.

Supplemental data provided by other individuals and organizations may be useful in determining the completeness of the applicant's identification of minority and low-income populations.

II. ACCEPTANCE CRITERIA

The acceptance criteria for environmental justice impacts during construction are based on the following:

- 10 CFR 51.45(c) with respect to analysis of socioeconomic data
- Executive Order 12898 (59 CFR 7629) with respect to minority populations and low-income populations.

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

- the Council on Environmental Quality (CEQ) guidance for addressing environmental justice (CEQ 1997), which should be followed as appropriate
- the guidelines for specific information requirements for environmental justice determinations, which are described in Attachment 4 to Office of Nuclear Reactor Regulation (NRR) Office Letter No. 906, Revision 1 (NRC 1996). NRR Office Letter No. 906 is revised periodically. Obtain the latest revision for current guidance. Information submitted by the applicant is adequate and meets the 10 CFR 51.45 requirements and NRR guidelines if it permits the identification of minority and low-income populations as required in that guidance.
- Regulatory Guide 4.7, Rev. 2., *General Site Suitability Criteria for Nuclear Power Stations* (NRC 1998a), which specifies the avoidance of disproportionately high and adverse impacts on minority and low-income populations during plant siting.

Technical Rationale

The technical rationale for evaluating the applicant's potential environmental justice impacts is discussed in the following paragraphs:

10 CFR 51.45(e) requires applicants to provide the information that the Commission needs in its development of independent analysis of environmental impacts. Executive Order 12898 directs

Federal agencies to consider environmental justice as part of the NEPA process. NRC, while an independent agency, has agreed to comply with the Executive Order.

The purpose of the environmental justice assessment is to identify and address, as appropriate, disproportionately high and adverse human health and environmental effects on minority and low-income populations. These populations may be present in scattered small groups or may have unusual customs, practices, or dependencies on specific resources that would be overlooked in a reconnaissance level analysis that focuses on the majority population. As a result, it is necessary to evaluate impacts for each such population and more carefully examine unusual environmental pathways (including socioeconomic pathways) that could result in disproportionately high and adverse impacts on them.^(a)

III. REVIEW PROCEDURES

To determine which impacts are likely to be of concern and, therefore, what environmental impact areas should be discussed, the reviewer should take the following steps:

- (1) Coordinate with the reviewers of ESRPs 4.1 through 4.6 to ensure that the appropriate impact areas are being discussed.
- (2) Examine the record of the public scoping process to determine whether appropriate environmental impact areas are being discussed with respect to environmental justice.
- (3) Contact the cognizant personnel of each affected State for sites located on or near State boundaries, or where transmission line routes, access corridors, or offsite areas pass through more than one State.
- (4) Analyze the potential impacts on minority and low-income populations.
 - (a) Briefly describe pathways by which any environmental impact during construction may interact with cultural or economic facts that may result in disproportionate environmental impacts on minority and low-income populations.
 - (b) Assess (qualitative or quantitative, as appropriate) the degree to which each minority or low-income population is disproportionately receiving adverse human health or environmental (including socioeconomic) impacts during construction as compared with the entire geographic area. In addition, there should be an assessment comparing the impacts with the larger overall geographic area encompassing all of the alternative sites.

-
- (a) An example of unusual practices or pathways can be found in NRC (1998b), where proposed relocation of a road between two settlements disproportionately or adversely affected minority and low-income individuals, who ordinarily walked between the two settlements.

- (c) Assess the degree to which each minority and low-income population is disproportionately receiving any benefits compared with the entire geographic area.
- (d) Assess (qualitatively or quantitatively, as appropriate) the significance or potential significance of such environmental impacts on each minority and low-income population. Significance is determined by considering the disproportionate exposure, multiple-hazard, and cumulative hazard conditions outlined in the Environmental Justice: Guidance Under the National Environmental Policy Act (CEQ 1997).
- (e) Discuss any mitigative measures for which credit is being taken to reduce environmental justice concerns.
- (f) When alternative sites are being evaluated, the same reviews should be available for each site.

IV. EVALUATION FINDINGS

The depth and extent of the input to the EIS will be governed by the extent and significance of the identified minority and low-income populations and by the nature and magnitude of the expected impacts of construction.

Data provided by the applicant are useful if

- data in the ER describe the degree to which each minority or low-income population is disproportionately prone to adverse human health or environmental impacts during construction as compared with the entire geographic area
- the data are consistent with data obtained from other sources, when available. In addition, a similar assessment is made in the ER for each of the alternative sites in comparison with the larger geographic region that encompasses all of the sites.
- when applicable, data in the ER describe the significance or potential significance of such environmental impacts on each minority and low-income population
- when applicable, data in the ER describe the degree to which each minority or low-income population is disproportionately prone to any benefits during construction in comparison to the entire geographic area
- when applicable, data in the ER describe any mitigative measures for which consideration is made to reduce environmental justice concerns
- the data in the ER consider the unique lifestyle and practices of minority and low-income communities (for example, subsistence activities or dependence on specific water supplies) that could result in disproportionate impacts from plant construction and site operations.

The following information should be included in the EIS:

- a statement (qualitative or quantitative, as appropriate) about the degree to which each minority or low-income population is disproportionately receiving adverse human health or environmental impacts during construction as compared with the entire geographic area, together with the significance of these impacts
- a discussion of the reasoning (e.g., based on locations of minority and low-income populations and the environmental pathways described in ESRP 2.5.4) behind the estimated degree of impact
- a discussion of any mitigative measures for which credit is being taken to reduce environmental justice concerns.

The reviewer should verify that sufficient information is available to meet the relevant requirements and that the evaluation supports statements of the following type to be included in the staff's EIS:

Based on review of the information provided by the applicant, the staff finds that no minority or low-income group will experience disproportionately high and adverse environmental impacts as a result of activities during construction.

If the reviewer determines that there will be a disproportionately high and adverse environmental impact on some minority or low-income population as a result of activities during construction, an input to the EIS should be prepared that describes the impact(s) and the staff evaluation of alternatives that would mitigate or avoid the impact(s).

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 51.45, "Environmental reports."

Council on Environmental Quality (CEQ). 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act*. CEQ Guidance, December 10, 1997, Washington, D.C.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." 59 *Federal Register* 7629-7633 (1994).

U.S. Nuclear Regulatory Commission (NRC). 1998a. *General Site Suitability Criteria for Nuclear Power Stations*. Second Proposal. Regulatory Guide 4.7, Rev. 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1998b. In the Matter of Louisiana Energy Service Claiborne Enrichment Center. Docket 70-3070-ML. CLI-98-3. Washington, D.C. April 3, 1998.

U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation (NRC/NRR). 1996. "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues." NRR Office Letter No. 906, Revision 1, Attachment 4, Washington, D.C.



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

4.5 RADIATION EXPOSURE TO CONSTRUCTION WORKERS

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's analysis and assessment of potential radiological impacts on the proposed project construction work force. The scope of the review directed by this plan should be limited to those projects proposed to be located on or adjacent to the site of an operating nuclear fuel cycle facility^(a) and should include an analysis and evaluation of the radiological impact of such a facility on the construction work force and a determination that the regulatory requirements of 10 CFR 20 are met. The review should be in sufficient detail to enable the staff to determine and confirm the quantitative radiological impact of the operating nuclear fuel cycle facility on construction workers at the site of the proposed plant.

Review Interfaces

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

- ESRP 4.6. Provide a list of issues, if any, regarding compliance with 10 CFR 20.

-
- (a) For the purposes of this environmental review, the term "nuclear fuel cycle facility" or "nuclear facility" is interpreted to mean an operating nuclear power reactor or other nuclear installation associated with the nuclear fuel cycle process and located on or adjacent to the proposed plant site. It includes operation of individual reactors of a multi-unit plant while construction of the remaining unit or units continues.

October 1999

4.5-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 5.4. Provide a construction work force collective annual dose.
- ESRP 10.4.2. Provide the estimated annual collective dose to construction workers for use in the benefit-cost balance.

Data and Information Needs

This review applies to applications for construction and combined licenses. The following data or information should be obtained when construction of the proposed plant will take place on or adjacent to a site where there are operating nuclear fuel cycle facilities:

- the physical layout of the site, including the location and orientation of onsite or adjacent nuclear fuel cycle facilities that are expected to be operating during construction of the proposed plant (from the environmental report [ER] or Preliminary Safety Analysis Report [PSAR])
- the location and characteristics of radiation sources and radioactive effluent emission sources of the adjacent nuclear facility, including detailed descriptions of the radioactive content of unshielded tanks or storage areas, the steam system in boiling-water reactor (BWR) facilities, and the emissions from vents and stacks (from the ER or PSAR)
- measured radiation dose rates and airborne radioactivity concentrations at specific locations throughout the construction site where environmental radiological monitoring data exist for an operating facility (from the ER or PSAR)
- calculated radiation dose rates at specific locations throughout the construction site where environmental radiological monitoring data are not available, including a description of the methodology used to determine dose rates at the construction site (from the ER or PSAR)
- the number and principal locations of construction workers who will be exposed to the radiation sources described above and the total amount of time per year that they will spend at those locations (from the ER or PSAR)
- the calculated annual collective dose to the construction work force, including all models, assumptions, and input data used in arriving at the figures that have not already been provided in the above described required data and information. This may include assumptions about shielding provided by buildings or structures between the construction location and the radiation sources (from the ER or PSAR).

When the applicant's PSAR and ER are submitted at the same time for review, either document may be used for submission of the data and information required for this review. In the PSAR, the assessment of radiation exposure to construction workers is discussed in Chapter 12, Radiation Protection, Section 12.4, as described in Regulatory Guide 1.70, *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants - LWR Edition* (NRC 1978a). The information should be used in the

staff's safety review to determine whether turbine-building radiation sources in BWRs are adequately shielded and whether outside tanks or storage areas for radioactive materials need to be shielded.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the analysis and evaluation of radiation exposure to construction workers are based on the relevant requirements of the following regulations:

- 10 CFR 20; 20.1301; 20.1302 with respect to public dose limits; or 10 CFR 20; 20.1001; 20.1201; 20.1203; 20.1204; and 20.1205, with respect to occupational dose limits requirements for summation of internal and external doses and the determination of the dose if construction workers need to be classified as radiation workers
- 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low As Is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents" with respect to design objectives for dose when construction workers are considered members of the public.

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

- Regulatory Guide 8.8, Rev. 3, *Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable* (NRC 1978b) with respect to methods of ensuring that the calculated occupational doses are as low as is reasonably achievable.

Technical Rationale

The technical rationale for evaluating the applicant's potential radiation exposure to construction workers is discussed in the following paragraph:

When construction is taking place nearby or adjacent to an operating light-water-cooled power reactor, there is a possibility that the workers may be exposed to radioactive materials that would cause them to receive doses in excess of limits for members of the public. To ensure that radiation levels are low enough to prevent inadvertent exposure or to properly assess the exposure to construction workers, methods have been developed to determine the potential exposure to these workers. If evaluation of the doses indicate that workers may be exposed to levels above the limits to the public, then construction workers must be treated as radiation workers by the licensee (or applicant), and the requirements in 10 CFR 20 must be followed.

III. REVIEW PROCEDURES

In the analysis of the potential radiation exposures to construction workers, the reviewer should first determine whether there is a need to consider radiological impacts to construction workers. The reviewer should consult the site and vicinity maps of ESRP 2.1 and the NRC list of operational nuclear facilities. If there are or will be no adjacent operating nuclear facilities during the proposed project construction period, the review should be terminated. The reviewer should prepare an input for the environmental impact statement (EIS) stating that there will be no expected radiation exposure to construction workers during construction of the proposed project.

If the reviewer determines that there is or will be an adjacent operating nuclear facility during the construction period, the reviewer should take the following steps:

- (1) Identify the sources of radiation that will contribute to the radiation exposure of construction workers.
 - Base this identification on review of the adjacent nuclear facility description provided by the applicant as appropriate.
 - Consult with the reviewers of ESRP 3.1 and Chapter 12 of the applicant's PSAR, if available, and participate in or get information from reviewers who participate in the site visit to complete this portion of the analysis. Sources to be considered in this portion of the analysis have been identified in the "Data and Information Needs" of this ESRP.
- (2) Determine the source strength for each of the sources identified in Item 1, above.
 - Accomplish this determination by either direct reviewer calculation of these values or by analysis to validate and accept the applicant's data.
 - When the latter procedure is used, conduct this portion of the analysis by comparing the applicant's data with available data from similar systems.
- (3) From the information provided in the ER or PSAR (if available), determine the location, number, duration of stay, and possible shielding of construction workers.
 - If shielding is not practical, consider these workers to be occupationally exposed. Consult with the reviewer of ESRP 3.1 or Chapter 12 of the applicant's PSAR, if available, to confirm plant and station layout and establish possible worker shielding factors and plant construction schedules through the site visit and consultation with the applicant.
- (4) Determine the radiation dose rates at the principal onsite locations where construction workers will be present and at locations where particularly high dose rates could be expected on the basis of the source strengths determined in Item 2 above.

- Accomplish this either by direct reviewer calculation of these values or by analysis to validate and accept the applicant's data. Acceptable codes and methods include the following:
 - The SKYSHINE computer code, developed by Radiation Research Associates and available through the Radiation Shielding Information Center at Oak Ridge National Laboratory, is an acceptable code for calculating dose rate at distances from nitrogen-16 sources in BWR steam system components.
 - The GASPAR code, described in Regulatory Guide 1.109, Rev. 1, *Calculation of Annual Doses to Man from Routing Releases of Reactor Effluents for the Purpose of Evaluating Compliance with CFR 50, Appendix I*, (NRC 1976), is an appropriate code for calculating dose due to gaseous-effluent-plume immersion.
- The dose rate may also be determined through comparison with measured results, such as those available in EPRI NP-243 and HASL-305.
- When the applicant has used these codes or methods to predict dose rates, the reviewer's determination may be limited to verification of the techniques of calculation and input.

(5) Based on the doses or dose rates determined in Item 4 above, and the number, location, and duration of stay of construction workers determined in Item 3 above, determine the estimated individual and annual collective dose to construction workers at the proposed site.

The reviewer's evaluation of radiation exposure to construction workers involves (1) a determination that the predicted doses are realistic and accurate and (2) an evaluation of the predictions with respect to the requirements of 10 CFR 20 for doses to individuals in restricted areas.

The reviewer should take the following steps for estimating the doses to determine if predicted doses are realistic and accurate:

- (1) Analyze radiation sources and source strength.
 - Verify that all potential radiation sources associated with the adjacent nuclear facility have been identified and that their source strengths have been accurately predicted.
 - Determine this on the basis of a site visit to the adjacent facility and through comparison of the facility sources and source strengths with similar facilities.

(2) Analyze the impacts on the work force.

- Verify that the size of the projected work force is consistent with work force data from similar projects and that the locations of workers and the duration of their stay at a particular location are consistent with the proposed plant layout, the schedule of construction, and the nature of the construction task.
- Evaluate the realism of any radiation shielding factors proposed by the applicant to take credit for work force shielding provided by the plant structures under construction.

(3) Evaluate dose rates and collective doses by verifying that

- dose rates have been calculated on the basis of accepted computational models or on the basis of actual measurements.
- dose rates or doses have been calculated for those site locations where principal concentrations of construction workers will be located and that appropriate work force/work duration data have been used.
- the individual and collective doses to the construction work force are realistic and accurate.
 - When the evaluation establishes that there are significant differences in the determination of radiation exposure to construction workers and the applicant's determinations of radioactive exposure, consult with the applicant to determine the reasons for these differences.
 - Request that additional data be provided or that calculations be repeated until the reviewer and the applicant are in reasonable agreement about the estimated individual and collective doses.

The reviewer should take the following steps to evaluate the predicted doses with respect to 10 CFR 20 requirements:

- Determine whether public or occupational dose limits apply to construction workers.
- If public dose limits apply, determine whether construction personnel will be monitored in accordance with 10 CFR 20.1302(a).
- If occupational limits apply, determine whether monitoring of construction personnel under the requirements of 10 CFR 20.1205 is required.
- Summarize measures necessary to meet the requirements of 10 CFR 20 and prepare input to appropriate EIS sections, identifying their merit.

- When advised that such measures have been implemented, recalculate the construction-worker doses.

IV. EVALUATION FINDINGS

The evaluation of the radiation exposure to construction workers should accomplish the following objectives: (1) public disclosure of predicted radiological impacts to the construction work force resulting from construction of the proposed project in the vicinity of an operating nuclear facility, (2) presentation of the basis for the staff analysis, and (3) presentation of staff conclusions, regarding radiological impact to construction workers. The following information should be included in the EIS:

- a description of sources of radiation and physical relationship of these sources to the proposed project construction zone
- estimates of maximum individual doses and a brief discussion of how the estimates were calculated, a comparison of these doses with the requirements of 10 CFR 20, and the reviewer's conclusions with respect to compliance with 10 CFR 20, including any measures necessary to achieve compliance
- estimates of the annual collective dose to the construction force by year of construction, a brief discussion of how the estimates were made, and the reviewer's conclusions with respect to the accuracy of the dose commitment estimates.

When the reviewer has determined that the predicted collective dose is realistic and accurate and that the requirements for protecting construction workers from radiation exposure are being met according to 10 CFR 20, the following statement should be used:

The staff reviewed the available information relative to the radiological impacts to construction workers. The staff concludes that the predicted individual doses are realistic, accurate, and within the limits specified in 10 CFR 20.

V. IMPLEMENTATION

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

VI. REFERENCES

10 CFR 20, "Standards for Protection Against Radiation."

10 CFR 20.1001, "Purpose."

10 CFR 20.1201, "Occupational dose limits for adults."

10 CFR 20.1203, "Determination of external dose from airborne radioactive material."

10 CFR 20.1204, "Determination of internal exposure."

10 CFR 20.1205, "Conditions requiring individual monitoring of external and internal occupational dose."

10 CFR 20.1301, "Dose limits for individual members of the public."

10 CFR 20.1302, "Compliance with dose limits for individual members of the public."

10 CFR 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low As Is Reasonably Achievable' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents."

Electric Power Research Institute (EPRI). *Analysis of N-16 Radiation Measurements at the Cooper Nuclear Station*, EPRI NP-243, Palo Alto, California.

Health and Safety Laboratory (HASL-305), *Determination of N-16 Gamma Radiation Fields at BWR Power Stations*.

U.S. Nuclear Regulatory Commission (NRC). 1976. *Calculation of Annual Doses to Man from Routing Releases of Reactor Effluents for the Purpose of Evaluating Compliance with CFR 50, Appendix I*. Regulatory Guide 1.109, Rev. 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1978a. *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants - LWR Edition* (NUREG-75/094). Regulatory Guide 1.70, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1978b. *Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable*. Regulatory Guide 8.8, Rev. 3, Washington, D.C.



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

4.6 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING CONSTRUCTION

REVIEW RESPONSIBILITIES

Primary—Appendix B

Secondary—Appendix B

I. AREAS OF REVIEW

This environmental standard review plan (ESRP) directs the staff's summarization of potential adverse environmental impacts of construction and measures and controls to limit adverse impacts committed to by the applicant, and the staff's evaluation of those measures and controls. The scope of the review directed by this plan includes evaluating measures and controls for feasibility and adequacy in limiting impacts. The result of this review should be a table listing the potentially adverse impacts, the applicant's commitments, and the staff's evaluation.

Review Interfaces

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

- ESRPs 4.1 through 4.5. Obtain lists of adverse impacts and measures and controls to limit adverse impacts.
- ESRP 6.7. Obtain a list on adverse impacts during construction so that monitoring plans may be designed to quantify and limit such impacts as possible.
- ESRPs 9.4.1 through 9.4.3. Provide input to the process of evaluating measures and controls to limit adverse impacts.

October 1999

4.6-1

NUREG-1555

USNRC ENVIRONMENTAL STANDARD REVIEW PLAN

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

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

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

- ESRP 10.1. Provide a list of those adverse environmental impacts that cannot be mitigated or for which mitigation is not practical.
- ESRPs 10.2 and 10.3 Provide a list of the irreversible and irretrievable resources that the proposed plant constitutes. These resource commitments and any unavoidable adverse construction impacts identified as input to ESRP 10.1 should be provided to the reviewer of ESRP 10.3 for the evaluation of short-term versus long-term uses and impacts of the proposed action.
- Project Manager's Handbook. Refer to the *Project Manager's Handbook*, NUREG/BR-0073, Rev. 1, *Project Manager's Handbook* (NRC 1989), for information on applicant commitments and their applicability with and linkage to ESRP 4.6.
- Interface with Environmental Project Manager (EPM). Consult with the EPM on any adverse impacts, discovered in the reviews of ESRP Chapter 4.0 that are likely to result from construction of the proposed plant and that are identified through the analysis. Potential mitigation measures and their merits should be presented as they are identified.

Data and Information Needs

The type of data and information needed will be affected by site- and station-specific factors, and the degree of detail should be modified according to the anticipated magnitude of the potential impacts. The following data or information should be obtained:

- Staff listing of potentially adverse impacts should be developed in consultation with the reviewers of other plans related to plant construction and with the reviewers of plans related to consideration of alternatives.
- Data and information related to the applicant's commitments to measures and controls to limit potential impacts should consist of the following three elements: (1) identification of the impact, (2) the planned control program, including monitoring, and (3) the control procedures. The following elements may be found in the environmental report (ER):
 - noise
 - erosion
 - dust
 - traffic
 - effluents and wastes
 - surface-water impacts
 - groundwater impacts
 - land-use protection/restoration
 - water-use protection/restoration
 - terrestrial ecosystem impacts
 - aquatic ecosystem impacts

- socioeconomic impacts
- radiation exposure to construction workers
- other site-specific impacts.

II. ACCEPTANCE CRITERIA

Acceptance criteria for the summary of measures to monitor and control adverse impacts during construction are based on the relevant requirements of the following:

- 10 CFR 50.36(b) with respect to requirements for monitoring and keeping records of environmental data for the protection of the nonaquatic environment.

Regulatory positions and specific criteria 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 inclusion of a construction-impact control program.

Technical Rationale

The technical rationale for evaluating the applicant's commitments to measure and control adverse impacts during construction is discussed in the following paragraph:

Evaluation of the proposed action includes identification and evaluation of the potentially adverse impacts of plant construction. This review results in a summary of the potentially adverse impacts and lists the applicant's commitments to measures and controls to limit adverse impacts during construction. The applicant's commitments must be compared with the list of potentially adverse impacts identified by the staff and evaluated for efficacy to determine those impacts that cannot be avoided or mitigated. A list of those adverse impacts that cannot be avoided or mitigated should be provided to the reviewer of ESRP 10.1.

III. REVIEW PROCEDURES

The reviewer's analysis should include identification and tabulation of potentially adverse construction impacts, identification of the applicant's commitments that limit and control these impacts, and comparison of applicant commitments with the staff's list of impacts needing mitigation. The reviewer should take the following steps:

- (1) Identify and tabulate the impacts of construction (see reviewers for ESRPs 4.1.1 through 4.5) that are of sufficient severity to need mitigation (i.e., measures and controls to limit the impact).
- (2) List the applicant's commitments for mitigating the impact.

- (3) Based on consultation with appropriate staff reviewers, identify the applicant commitments that will satisfy the staff's concerns for mitigation.
- (4) When it is determined that there are no applicant commitments to control or limit an adverse impact, consult with reviewers for the appropriate ESRPs 4.1 through 4.5, the reviewers for ESRPs 9.4.1 through 9.4.3, and the EPM to identify and evaluate available mitigation measure(s). Also note those impacts for which no appropriate measures and controls to limit the impact can be identified.
- (5) Prepare a table similar to that shown in Table 4.6-1 to compare potentially adverse impacts of construction with the applicant's commitments and identify those adverse impacts that cannot be mitigated or for which mitigation is not practical.

Table 4.6-1. Summary of Potentially Adverse Impacts of Construction

| Impact | Impact Description | Applicant's Commitment | Staff Evaluation |
|------------------------------------|---------------------------|-------------------------------|--|
| Land-Use Impacts | impact 1 | commitment a | evaluation α |
| | impact 2 | commitment b | evaluation β |
| Hydrological and Water Use Impacts | impact 3 | commitment c | evaluation γ |
| | impact 4 | | There are no practical measures for mitigation of this impact. The impact will be considered in the evaluation of unavoidable adverse environmental impacts. |

Following the analysis above (Steps 1-5), the reviewer should seek confirmation that (1) the tabulated impacts are adverse and that measures and controls to limit the magnitude of the impact are required, (2) the measures and controls are reasonable and specific, and (3) benefits/costs have been considered. To do this, the reviewer should take the following steps:

- (1) Confirm that the construction impacts, when considered on a site-specific basis, are adverse and should be mitigated.

- Make this determination through consultation with the appropriate reviewers for ESRPs 4.1 through 4.5, and take into account experience gained in the review of other projects having similar impacts.
 - Ensure that adequate documentation is available to support the staff conclusions with respect to the nature and severity of those impacts requiring mitigation.
- (2) Confirm that the selected measures and controls to limit each impact have been evaluated to verify that a practical level of mitigation can be achieved by the methods and controls to be applied.
- Confirm that each measure and control is reasonable (i.e., involves methods and techniques that are appropriate and achievable on a site-specific basis).
 - Confirm that the measures and controls are specific, unambiguous, and are structured such that their application and results can be verified through subsequent field reviews and inspections.
- (3) Confirm that environmental, economic, and social costs of the available measures and controls to limit adverse impacts have been balanced against the expected benefits to be achieved.
- Consult with the appropriate benefit-cost reviewers in conducting this portion of the evaluation. Benefit-cost reviews cannot be used as a basis for noncompliance with NRC regulations.
 - Note that when mitigation techniques do not lead to an improvement in the overall benefit-cost ratio and if mitigation is not required by law, the impact may be accepted without mitigation and considered in the overall project benefit-cost balancing.

IV. EVALUATION FINDINGS

This review should prepare a summary of (1) adverse impacts of construction where measures and controls to limit the impacts can be applied, (2) the applicant's commitments to limit these impacts, and (3) the staff's evaluation of the potential adverse impacts and the applicant's measures and controls to limit adverse impacts. The results of this review will be used by the reviewer for ESRP 10.1 to describe the unavoidable adverse impacts of construction. The input to the environmental impact statement (EIS) should include

- a summary of the potentially adverse impacts of construction
- a description of the applicant's commitments for measures and controls to limit adverse impacts
- the staff's evaluation of applicant's commitment related to each impact.

V. IMPLEMENTATION

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

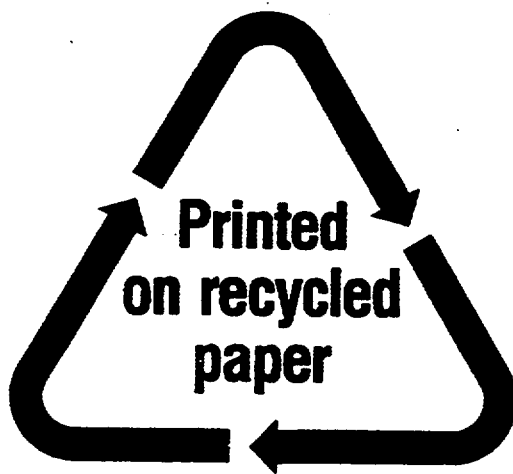
VI. REFERENCES

10 CFR 50.36(b), "Environmental conditions."

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). 1989. *Project Manager's Handbook*, NUREG/BR-0073, Rev. 1, Washington, D.C.

| | | | | | | |
|---|--|--|------|-------|------|-------------------------------|
| NRC FORM 335 (2-89) NRCM 1102, 3201, 3202 | U.S. NUCLEAR REGULATORY COMMISSION BIBLIOGRAPHIC DATA SHEET <i>(See instructions on the reverse)</i> | 1. REPORT NUMBER (Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.) NUREG-1555, Vol. 1 | | | | |
| 2. TITLE AND SUBTITLE Environmental Standard Review Plan Standard Review Plans for Environmental Reviews for Nuclear Power Plants (Chapters 1-4) | 3. DATE REPORT PUBLISHED <table border="1"> <tr> <td>MONTH</td> <td>YEAR</td> </tr> <tr> <td>March</td> <td>2000</td> </tr> </table> | MONTH | YEAR | March | 2000 | 4. FIN OR GRANT NUMBER |
| MONTH | YEAR | | | | | |
| March | 2000 | | | | | |
| 5. AUTHOR(S) | 6. TYPE OF REPORT Final | 7. PERIOD COVERED <i>(Inclusive Dates)</i> | | | | |
| 8. PERFORMING ORGANIZATION - NAME AND ADDRESS <i>(If NRC, provide Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)</i> Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation U.S. Nuclear Regulatory Commission Washington, D.C. 20555-0001 | | | | | | |
| 9. SPONSORING ORGANIZATION - NAME AND ADDRESS <i>(If NRC, type "Same as above"; if contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)</i> Same as 8 above | | | | | | |
| 10. SUPPLEMENTARY NOTES | | | | | | |
| 11. ABSTRACT <i>(200 words or less)</i> This document provides guidance to the staff in implementing provisions of 10 CFR 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," related to new site/plant applications. It supercedes "Environmental Standard Review Plans for the Environmental Review of Construction Permit Applications for Nuclear Power Plants," NUREG-0555, issued in 1978. New technical issues- such as environmental justice and severe-accident mitigation design alternatives, and new licensing structures, such as early site permits, combined licenses, and license renewal - have raised the need for new regulatory guidance. | | | | | | |
| 12. KEY WORDS/DESCRIPTORS <i>(List words or phrases that will assist researchers in locating the report.)</i> Environmental Protection Standard Review Plans 10 CFR Parts 50, 51, 52, 54, and 100 National Environmental Policy Act Early Site Permits Combined Licenses Construction Permits Operating Licenses License Renewal Siting | 13. AVAILABILITY STATEMENT unlimited | 14. SECURITY CLASSIFICATION <i>(This Page)</i> unclassified | | | | |
| | | <i>(This Report)</i> unclassified | | | | |
| | | 15. NUMBER OF PAGES | | | | |
| | | 16. PRICE | | | | |



Federal Recycling Program