



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

SECTION 2.4.1 HYDROLOGIC DESCRIPTION

REVIEW RESPONSIBILITIES

Primary - Site Analysis Branch (SAB)

Secondary - None

I. AREAS OF REVIEW

The areas of review under this plan are:

1. Identification of the interface of the plant with the hydrosphere.
2. Identification of hydrologic causal mechanisms that may require special plant design bases or operating limitations with regard to floods and water supply requirements.
3. Identification of surface and groundwater uses that may be affected by plant operation.

The review of Section 2.4.1.1 (Site and Facilities) of safety analysis reports (SAR) consists of comparing the independently verified or derived hydrologic design bases (see subsequent sections of 2.4) with the critical elevations of safety-related structures and facilities. The review of SAR Section 2.4.1.2 (Hydrosphere) requires identification of the hydrologic characteristics of streams, lakes (e.g., location, size, shape, drainage area, etc.), shore regions, the regional and local groundwater environments, and existing or proposed water control structures (upstream and downstream) influencing the type of flooding mechanisms which may adversely affect safety aspects of plant siting and operation.

II. ACCEPTANCE CRITERIA

Acceptance of the information presented in SAR Section 2.4.1.1 is based on a qualitative evaluation of the apparent completeness and quality of information, data, and maps. The description and elevations of safety-related structures, facilities, and accesses thereto should be sufficiently complete to allow evaluation of the impact of flood design bases. Site topographic maps must be of good quality and of sufficient scale to allow independent analysis of pre- and post-construction drainage patterns. All external plant structures

USNRC STANDARD REVIEW PLAN

Standard review plans are prepared for the guidance of the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate 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. Standard review plans are not substitutes for regulatory guides or the Commission's regulations and compliance with them is not required. The standard review plan sections are keyed to Revision 2 of the Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants. Not all sections of the Standard Format have a corresponding review plan.

Published 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. 20546.

and components should be identified on site maps. Data on surface water users, location with respect to the site, type of use, and quantity of surface water used are required.

The information presented in SAR Section 2.4.1.2 forms the basis for subsequent hydrologic engineering analysis. Therefore, completeness and clarity are of paramount importance. Maps must be legible and adequate in coverage to substantiate applicable data. Inventories of surface water users must be consistent with regional hydrologic inventories reported by applicable state and federal agencies. The description of the hydrologic characteristics of streams, lakes, and shore regions must correspond to those of the United States Geologic Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), Soil Conservation Service (SCS), Corps of Engineers, or appropriate state and river basin agencies. Descriptions of all existing or proposed reservoirs and dams (both upstream and downstream) that could influence conditions at the site must be provided. Descriptions may be obtained from reports of the USGS, United States Bureau of Reclamation (USBR), Corps of Engineers, and others. Generally, reservoir descriptions of a quality similar to those contained in pertinent data sheets of a standard Corps of Engineers Hydrology Design Memorandum are adequate. Tabulations of drainage areas, types of structures, appurtenances, ownership, seismic and spillway design criteria, elevation-storage relationships, and short- and long-term storage allocations must be provided.

III. REVIEW PROCEDURES

The information presented in SAR Section 2.4.1.1 is not generally amenable to independent verification, except through cross-checks with other SAR sections and chapters, available publications relating to hydrologic characteristics of the site region, and by site visits. The review procedure consists of evaluating the completeness of the information and data by sequential comparison with information available from references. Based on the description of the hydrosphere (e.g., geographic location and regional hydrologic features) potential site flood mechanisms are identified. Subsequent SAR sections addressing the mechanisms are cross-checked to assure that data and information required therein for review and substantiation are available.

An important facet of the review procedure for this plan and for other plans in hydrologic areas is the site visit. The site visit provides the principal technical reviewer with independent confirmation of hydrologic characteristics of the site and adjacent environs. The site visit is discussed in Appendix A to this plan.

IV. EVALUATION FINDINGS

For construction permit (CP) reviews, findings will consist of a brief general description of the site with respect to the general hydrosphere, and the off-site uses of surface water. For operating license (OL) reviews, findings will consist of the same material, updated as required for new information available since preparation of the CP findings. A sample description for a CP review follows:

"The proposed site for the ABC Nuclear Plant is located about 26 miles SSE of Augusta, Maine, on the southwest bank of the DEF River at about river mile 152. Plant grade will be at about elevation 220 feet above mean sea level (MSL).

Significant hydrologically related plant features include the river intake structure, the natural draft cooling towers, mechanical draft nuclear service cooling towers (these are redundant towers and serve as the ultimate heat sink), and various groundwater wells."

V. REFERENCES

Because of the geographic diversity of plant sites and the large number of hydrologic references, no specific tabulation is given here. In general, maps and charts by the USGS, NOAA, Army Map Service (AMS), and Federal Aviation Administration (FAA); water-supply papers of the USGS; River Basin Reports of the Corps of Engineers; and other publications of state, federal, and other regulatory bodies, describing hydrologic characteristics and water utilization in the plant vicinity and region, are referred to on an "as available" basis. Other plans in the hydrology area (plans 2.4.2 through 2.4.14) contain references that are to be used in evaluating the hydrologic description of the site.

1. Appendix A, Standard Review Plan 2.4.1, "Hydrologic Engineering Site Visits," attached.
2. Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," Revision 2.

APPENDIX A

STANDARD REVIEW PLAN 2.4.1
HYDROLOGIC ENGINEERING SITE VISITS

I. PURPOSES

The purposes of hydrologic engineering site visits are as follows:

1. Acquaint the reviewer with general site and regional hydrologic characteristics and topography.
2. Confirm the applicant's general appraisal of the site/plant hydrologic interfaces.
3. Review specific hydrologic engineering problem areas with the applicant, his engineers, and his consultants.

The site visit objectives will have been achieved if, in addition to viewing pertinent hydrologic features, the reviewer has had the opportunity to discuss specific questions and concerns with the applicant's hydrologic engineers, and is assured that the questions and concerns are understood. In addition, generally acceptable techniques and procedures necessary to respond to staff concerns should be discussed.

II. PROCEDURES

Draft questions, or items of staff concern, are to be developed by the hydrologic engineering section reviewer and discussed in detail with the Section Leader 7-14 days before the scheduled site visit. For any unscheduled site visit (which may be necessary to resolve issues or prepare for hearings), similar draft questions or items of staff concern should be prepared at least 3 days prior to such site visit and also discussed in detail with the Section Leader.

Areas of overlap or interfaces with reviewers in other areas (such as geology, foundation engineering, auxiliary and power conversion systems, mechanical engineering, effluent treatment systems, and structural engineering) should be coordinated before final typing of drafts.

The Section Leader will discuss any unusual or potentially controversial areas of concern with the Chief, SAB, prior to transmittal of drafts to the Project Manager. Transmittal of the drafts will be by Memo Route Slip through the Section Leader.

Site visits are generally to consist of a detailed reconnaissance of site areas and environs with the applicant and technical counterparts, discussions of questions (or items of staff concern), discussions of acceptable methods of analysis, and a general summarization of the areas discussed and conclusions reached.

Normally, a small group composed of the staff reviewer and licensing project manager (LPM) should meet with an applicant representative responsible for responding to staff questions and the applicant's technical advisor. For verbal summarization during the site visit, the recommended method is to have the applicant or his technical advisor summarize the discussions to assure understanding.

III. TRIP REPORT

A trip report on a site visit should be prepared within 5 days of the reviewer's return. The report is to be as brief as possible and should summarize the trip and the areas of discussion and should list the participants in technical discussions. Within 7-10 days of returning, the reviewer should prepare final question lists, updating the draft for new areas of concern, deleting areas for which the site visit revealed that no safety or environmental problems remain, and clarifying draft questions based upon discussions and information obtained during the site visit.

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SRP 2.4.2