

October 4, 1982

Docket No. 50-29
LS05-82-10-006

Mr. James A. Kay
Senior Engineer - Licensing
Yankee Atomic Electric Company
1671 Worcester Road
Framingham, Massachusetts 01701

Dear Mr. Kay:

SUBJECT: SEP TOPIC III-3.C, INSERVICE INSPECTION OF WATER CONTROL
STRUCTURES - YANKEE NUCLEAR POWER STATION

In your Safety Assessment Report, dated January 4, 1982, you submitted an evaluation of SEP Topic III-3.C, Inservice Inspection of Water Control Structures for NRC review. Enclosed is the staff's evaluation of this topic (Enclosure 1) which is based on the review of our contractors Technical Evaluation Report (Enclosure 2). In summary, the staff concludes that the present inspection program for water control structures at the Yankee Atomic Plant does not conform with Regulatory Guide 1.127 and should be modified to incorporate the recommendations identified in the evaluation.

This evaluation will be a basic input to the integrated safety assessment of your facility. The assessment may be revised in the future if your facility design is changed.

Sincerely,

Ralph Caruso, Project Manager
Operating Reactors Branch #5
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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| SURNAME | Awang:dk | MBoyle | CGrimes | WRussell | RCaruso | DCatchfield | FRaglia |
| DATE | 9/15/82 | 9/15/82 | 9/21/82 | 9/21/82 | 9/21/82 | 9/30/82 | 9/30/82 |

Mr. James A. Kay

cc

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Systematic Evaluation Program Topic Assessment
Topic: III-3.C - Inservice Inspection of Water-Control Structures
Plant Name: Yankee Nuclear Power Station
Docket Number: 50-029

I. INTRODUCTION

The objective of this review topic is to assure that adequate and timely inspections of water-control structures, systems and components are accomplished to minimize the risk to public health and safety resulting from operation of nuclear power plants. The review specifically pertains to water-control structures (e.g., dams, reservoirs, conveyance facilities) built for use in conjunction with a nuclear power plant and whose failure could cause radiological consequences adversely affecting the public health and safety. In general, to be included under this topic, the structure must have been built, wholly or in part, for the purpose of controlling or conveying water for either emergency cooling operations or flood protection of a nuclear power plant. Such structures may be located on or off the site.

The scope of the review embraces the following subjects which are evaluated using data developed by the licensee and information available from all sources:

- (a) Engineering data compilation;
- (b) Onsite inspection program and reports of these inspections;
- (c) Technical evaluation of inspection results; and
- (d) Frequency of inspections.

II. REVIEW CRITERIA

The criteria which are applicable are (1) 10 CFR Part 50, Section 50.36, (2) 10 CFR Part 50, Appendix A (General Design Criteria 1,2 and 44), (3) 10 CFR Part 100 and (4) 10 CFR Part 100, Appendix A. Pertinent regulatory positions contained in Regulatory Guides 1.27, 1.28, 1.59, 1.127, and 1.132 (Ref. 1) also apply. Review procedures as contained in NUREG-0800-July 1981, Standard Review Plan Sections 2.5.4 and 2.5.5 (Ref. 2) are also used where appropriate.

III. RELATED SAFETY TOPICS AND INTERFACES

The slope stability aspect of water-control structures will be reviewed under topic II-4.D. Settlement of water-control structures will be reviewed under topic II-4.F. Other interface topics include: II-4.E, "Dam Integrity"; II-3.A, "Hydrologic Description"; II-3.C, "Ultimate Heat Sink"; III-3.A, "Effects of High Water Level on Structures"; IX-3, "Station Service and Cooling Water Systems"; III-6, "Seismic Design Considerations"; XVI, "Technical Specifications"; and III-3.B, "Structural and Other Consequences of Failures of Underdrain Systems".

IV. REVIEW GUIDELINES

In general the method, for complying with specific portions of the Commission's rules and regulatory positions as described in Regulatory Guide 1.127, is used in evaluating inservice inspection programs for water-control structures. Pertinent elements of the licensee's program are evaluated and compared to current criteria and the safety significance

of any differences is evaluated. The practices of other public agencies (e.g., the Federal Energy Regulatory Commission, FERC) for similar facilities posing similar public risk may also be used for applicable guidance.

V. TOPIC EVALUATION

The Yankee Nuclear Power Station is located in the town of Rowe, in Franklin County, Massachusetts, on the central portion of the Deerfield River Basin. The Upper Deerfield River Project includes the Somerset, Searsburg, Harriman and Sherman Developments. The Yankee Nuclear plant is located next to Sherman Dam and Sherman Reservoir. This reservoir serves as a source of water for the condenser and the service water cooling system.

Harriman Dam is located approximately 6 miles upstream of the power plant. The failure of this dam for any reason when the pool is above elevation 1490 feet msl will produce a flood level at the Yankee site that is anywhere from 25 to 70 feet above plant grade (Ref. 6). Therefore, the stability of Harriman Dam is crucial to the safe operation of the Yankee Nuclear power station. The other safety related water-control structures and their related features are identified in Section 3.2 of Reference 5.

The NRC staff consultant, Franklin Research Center (FRC), evaluated the submittal from the licensee, (References 3 and 4) and prepared the Technical Evaluation Report (TER) (Reference 5), entitled "Inservice Inspection of Water Control Structures", dated July 15, 1982. The staff has reviewed those documents (References 3, 4 and 5) and, based on this review, has prepared the following topic assessment.

The licensee has, in general, adequately identified the safety related water-control structures and the features that should be inspected. The licensee's selection of water-control structures include the intake and discharge structures and their associated features and Sherman Dam. If the licensee develops other means of providing cooling water for the ultimate heat sink, those other structures should be included in the future inservice inspection program.

The licensee has also appropriately identified the flood protection dike and greenhouse flood control panels located inside door casings as flood protection structures requiring surveillance. However, the licensee has not identified Harriman Dam as an essential flood protection structure. It is staff's and our consultant's conclusion that Harriman Dam is an essential flood protection structure and, therefore, it should be included in the licensee's formalized inspection program.

The staff and our consultants further conclude that the licensee's identification of details to be inspected have not been incorporated in their formal future inspection program. The recommended details to be

inspected for flood protection structures are outlined in TER section 3.2.

We also find that the licensee has not established a formal inspection program for inservice water control structures using the approach given in Regulatory Guide 1.127. The licensee should develop a formal inspection program as outlined in TER §3.3, which incorporates all aspects of Regulatory Guide 1.127. For those facilities, which utilize the inspection program outlined in 18 CFR 12, Safety of Water Power Projects and Projects Works, the intent of Regulatory Guide 1.127 will be considered to be met. However, we note that the applicability of Regulatory Guide 1.127 is based on the assumption that included Safety related structures, as constructed, meet current criteria with respect to quality and design requirements. This SER assumes included structures meet this basic requirement. However, in some cases, especially with respect to Harriman and Sherman Dams, that determination will be made in other related topics (II-3.B, II-4.E) or during the integrated assessment. The licensee's inspection program should include the following:

- a. Availability at the site of a file of engineering drawings pertaining to the water-control structures.
- b. Development of a comprehensive file of inspection reports conducted or overseen by qualified engineering personnel.
- c. Compliance with the requirement that the inspection program be conducted or overseen by qualified engineering personnel.
- d. Preparation of inspector checklist which contain details to be inspected for use in future inspections.
- e. Definition of inspection frequencies for all features using guidance from Regulatory Guide 1.127.

VI. CONCLUSIONS

The following conclusions result from our assessment of the program of inservice inspection of water-control structures at the Yankee Nuclear Power Station in comparison with the requirements of Regulatory Guide 1.127.

1. The licensee has appropriately identified the pertinent safety-related cooling water systems, and structures, with their associated features. If the licensee develops other means of providing cooling water for the ultimate heat sink, those other means should be included in the future inservice inspection program.
2. Harriman Dam is a water control structure and is under review in SEP Topics II-3.B, "Flooding Potential and Protection Requirements," and II-4.E, "Dam Integrity" to ensure that Harriman Dam, as constructed, will meet current criteria with respect to quality and design requirements.
3. The licensee should perform special inspections immediately after the occurrence of extreme events and prepare technical reports that present the results, recommendations and conclusions of such inspections.
4. The licensee should develop a formal inspection program with a detailed checklist as an inspection guide, in accordance with USNRC Regulatory Guide 1.127 (see Reference 3, TER, Section 3.3). The program should identify details to be inspected and it should be

conducted or overseen by qualified engineering personnel who would document the results of inspections, as recommended in Regulatory Guide 1.127.

5. The licensee should define inspection frequencies according to Regulatory Guide 1.127, for all pertinent features as well as for the details of these features.

6. The staff recommends that Harriman and Sherman Dams be included in the licensee's formal inspection program. Because the inspection requirements of 18 CFR 12 meet the intent of those identified in Regulatory Guide 1.127, the addition of these dams to the inspection program will only require formalizing the results of the 18 CFR 12 inspections in the licensee's ISI report, to document the results of the inspection of water control structures at the Yankee site. However, we note that the applicability of R. G. 1.127 is based on the assumption that included safety related structures, as constructed, meet current criteria with respect to quality and design requirements. This SER assumes that the included structures meet this basic requirement. With respect to Harriman and Sherman Dam, that determination and the applicability of R. G. 1.127 will be made in other safety related topics (Item 2) or during the integrated assessment.

VII. REFERENCES

1. The following U.S. Nuclear Regulatory Commission Regulatory Guides:
 - a. 1.27, "Ultimate Heat Sink for Nuclear Power Plants"
 - b. 1.28, "Quality Assurance Program Requirement (Design and Construction)"
 - c. 1.59, "Design Basis Floods for Nuclear Power Plants"
 - d. 1.127, "Inspection of Water Control Structure Associated with Nuclear Power Plants"
 - e. 1.132, "Site Investigation for Foundation of Nuclear Power Plants"
2. U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, "Standard Review Plan", NUREG-0800, July 1981.
3. Letter from J. A. Kay, Yankee Atomic Electric Company to D. Crutchfield, NRC, Subject "SEP Topic Assessment Completion", January 4, 1982.
4. Letter from J. A. Kay, Yankee Atomic Electric Company to D. Crutchfield, NRC, Subject "Additional Information for SEP Topics III-3.C, II-3.A, II-3.B and II-3.B.1, and II-3.C", June 16, 1982.
5. Letter from C. J. Crane, Franklin Research Institute to S. Bajwa, NRC, Subject "Technical Evaluation Report for Yankee Rowe Nuclear Power Station, Hydrologic Considerations, Inservice Inspection of Water Control Structures", July 15, 1982.
6. U.S. Nuclear Regulatory Commission (USNRC) Draft Report, January 26, 1981, "Draft Flood Study - Yankee Rowe Nuclear Plant and Upper Deerfield River Basin".