

August 16, 1982

Docket No. 50-409  
LS05-82-08-037

Mr. Frank Linder  
General Manager  
Dairyland Power Cooperative  
2615 East Avenue South  
LaCrosse, Wisconsin 54601

Dear Mr. Linder:

SUBJECT: SEP SAFETY TOPIC II-4.E, DAM INTEGRITY  
LACROSSE BOILING WATER REACTOR

We have completed our review of the subject topic for LaCrosse Boiling Water Reactor. Enclosed is a copy of our evaluation report for this topic.

You are requested to examine the facts upon which the staff has based its evaluation and respond either by confirming that the facts are correct, or by identifying errors and supplying the corrected information. We encourage you to supply any other material that might affect the staff's evaluation of this topic or be significant in the integrated assessment of your facility.

Your response is requested within 30 days of receipt of this letter. If no response is received within that time, we will assume that you have no comments or corrections.

Sincerely,

SEO4  
DSu 456(38)

Dennis M. Crutchfield, Chief  
Operating Reactors Branch No. 5  
Division of Licensing

ADD:  
T. Michaels

Enclosure:  
As stated

cc w/enclosure:  
See next page

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Mr. Frank Linder

cc

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Systematic Evaluation Program Topic Assessment  
Topic: II-4.E - Dam Integrity  
Plant Name: LaCrosse Boiling Water Reactor Plant (LACBWR)  
Docket Number: 50-409

## INTRODUCTION

This topic pertains to the Geotechnical Engineering review of the stability of all earth, rock, or earth and rock-fill embankments and dams whose failure, under any of the conditions to which they could be exposed during the life of the nuclear power plant, could adversely affect the safety of the plant. The scope of the review embraces the following subjects which are evaluated using data developed by the applicant and information available from all sources: (a) purpose and location of the embankment and appurtenant structures (spillways, outlet works, etc.); (b) specific geologic features of the site; (c) results of subsurface investigations, including borings, shafts, pits, trenches, and field and laboratory tests; (d) engineering properties of the bedrock, foundation soils, borrow soils and rock, and embankment soils and rock; (e) design assumptions, data analyses, and discussions of foundation and abutment treatment and embankment design; (f) construction requirements; (g) excavation and compaction specifications and quality assurance programs; (h) instrumentation and performance monitoring systems and programs; (i) construction notes; and (j) operation notes.

## II. REVIEW CRITERIA

The applicable roles and basic acceptance criteria pertinent to the review of this topic are:

### 1. 10 CFR Part 50, Appendix A

#### A. General Design Criterion 1 - "Quality Standards and Records."

This criterion requires that structures, systems and components important to safety shall be designed, fabricated, erected and tested to quality standards commensurate with the importance of the safety function to be performed. It also requires that appropriate records of the design, fabrication, erection and testing of structures, systems and components important to safety shall be maintained by or under the control of nuclear power unit licensee throughout the life of the unit.

#### B. General Design Criterion 2 - "Design Bases for Protection Against Natural Phenomena." This criterion requires that safety-related portions of the system shall be designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety function.

- C. General Design Criterion 44 - "Cooling Water." This criterion requires that a system shall be provided with the safety function of transferring the combined heat load from structures, systems and components important to safety to an ultimate heat sink under normal operating and accidental conditions.
- II. 10 CFR Part 100, Appendix A. "Seismic and Geologic Siting Criteria for Nuclear Power Plants." These criteria describe the nature of the investigations required to obtain the geologic and seismic data necessary to determine site suitability and identifies geologic and seismic factors required to be taken into account in the siting and design of nuclear power plants.

The following Regulatory Guides provide information, recommendation and guidance and in general describe a basis acceptable to the staff that may be used to implement the requirements of the above described procedure.

- A. Regulatory Guide 1-127, "Inspection of Water Control Structures Associated with Nuclear Power Plants." This guide describes a basis acceptable to the NRC staff for complying with the commission's regulation of 10 CFR Part 50, §50-36 with regards of developing an appropriate in service inspection and surveillance program for dams, slopes, channels and other water control structures associated with emergency cooling water systems or flood protection of nuclear power plants.

- B. Regulatory Guide 1.132, "Site Investigations of Foundations of Nuclear Power Plants." This guide describes programs of site investigations related to geotechnical engineering aspects that would normally meet the needs for evaluating the safety of the site from the standpoint of the performance of foundation and earthworks under anticipated loading condition including earthquake in complying with 10 CFR Part 100 and 10 CFR Part 100 Appendix A. It provides general guidance and recommendations for developing site specific investigation programs as well as basic guidance for conducting subsurface investigations, the spacing and depth of borings, and sampling.
- C. Regulatory Guide 1.138, "Laboratory Investigations of Soils for Engineering Analysis and Design of Nuclear Power Plants." This guide describes laboratory investigation and testing practices acceptable for determining soil and rock properties and characteristics needed for engineering analysis and design for foundations and earthworks, for nuclear power plants in complying with 10 CFR Part 100 and 10 CFR Part 100 Appendix A.

### III. RELATED SAFETY TOPICS AND INTERFACES

The slope stability aspect of embankments and dams will be reviewed under topic II-4.D. Settlement of embankments and dams will be reviewed under topic II.4.F. Both interface topics include: II-3.C "Ultimate Heat

Sink"; III-6 "Seismic Design Consideration": XVI "Technical Specifications; III-3.C "In Service Inspection of Water Control Structures"; II-3.A, "Hydrologic Description"; II-3.B "Flood Potential"; III-3.A "Effects of High Water on Structures"; and IX-3 "Stations Service and Cooling Water Systems."

#### IV. REVIEW GUIDELINES

In general, the review process is conducted with procedures similar to those described in Standard Review Plan Sections 2.5.4 and 2.5.5. The Geotechnical Engineering aspects of the design and as-constructed condition of embankments and dams are reviewed and compared to current criteria and the safety significance of any differences is evaluated.

#### V. TOPIC EVALUATION

The LaCrosse Boiling Water Reactor (LACBWR) site is located approximately 19 mi south of the City of LaCrosse, Wisconsin and approximately 1 mi north of the Village of Genoa, Wisconsin on the east bank of the Mississippi River. The Mississippi River Valley which is bordered by nearby vertical bluffs of flat lying sedimentary sandstone strata is approximately 2-6 miles wide at this location.

The only water retention structure in the vicinity of the site is the U. S. Army Corps of Engineer Lock and Dam No. 8, a concrete gravity dam, located approximately 2000 ft upstream of the plant. The pool

elevations at Lock and Dam No. 8 is 631 feet MSL (upstream) and 620 feet MSL (downstream). The estimated upstream river elevation for the Standard Project Flood (SPF) at Lock and Dam No. 8 is 643.2 ft MSL. The Licensee has shown that the plant can withstand the SPF stage elevation of 643.2 conservatively transported 2000 ft downstream to the site (Reference 1).

Lock and Dam No. 8 is a Low Head Navigation dam. At the normal river flows the dam can induce about 10 feet of differential in the upstream and downstream river levels. As river flows increase above normal, the gates on the dam are opened to pass the flow downstream. As river flows increase, the head differential across the dam decreases such that at the SPF level the differential is only the head loss through the dam (1 or 2 feet). Since the LaCrosse Nuclear Plant can accommodate flows up to the SPF level and since flows above the SPF level can not generate a substantial flood wave (less than one foot) at the plant, it is our judgement that the Dam need not be classified as Category 1. In addition, there is a low earth dike that connects the right (west) dam abutment to the right river bank and this dike would overtop and fail at flows nearing the SPF level further reducing any head differential across the dam.



VI. CONCLUSIONS

Based upon our review of site data available in the NRC Docket File and on information obtained during a visit by the NRC staff to the LACBWR site on July 8, 1982, we conclude the failure of U.S. Corps of Engineers Lock and Dam No. 8 would not adversely affect the safety of the LACBWR plant.

VII. REFERENCE

1. Dairyland Power Cooperative Letter, Linder to Crutchfield, NRC dated May 12, 1982 Subject: SEP Topic II-3.B - Flooding Potential and Protection Requirements, SEP Topic II-3.B.1 - Capability of Operating Plants to Cope with Design Basis Flooding Conditions and SEP Topic III-3.A - Effects of High Water Level on Structures (Revision 1).