

August 06, 1982

Docket No. 50-409
LS05-82-08-007

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

Dear Mr. Linder:

SUBJECT: SEP TOPIC XV-18, RADIOLOGICAL CONSEQUENCES OF A MAIN STEAM
LINE FAILURE OUTSIDE CONTAINMENT - LACROSSE

Enclosed is the staff's final evaluation of SEP Topic XV-18 for the LaCrosse Boiling Water Reactor. This evaluation is based on our review of your topic safety assessment report submitted by letter dated January 15, 1982. The staff has determined that LaCrosse meets the acceptance criteria for this topic.

This evaluation will be a basic input to the integrated safety assessment for your facility unless you identify changes needed to reflect the as-built conditions at your facility. This assessment may be revised in the future if your facility design is changed or if NRC criteria relating to this subject is modified before the integrated assessment is completed.

Sincerely,

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

Enclosure:
As stated

cc w/enclosure:
See next page

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DATE	8/2/82	8/2/82	8/2/82	8/2/82	8/5/82	8/4/82

Mr. Frank Linder

cc

Fritz Schubert, Esquire
Staff Attorney
Dairyland Power Cooperative
2615 East Avenue South
La Crosse, Wisconsin 54601

O. S. Heistand, Jr., Esquire
Morgan, Lewis & Bockius
1800 M Street, N. W.
Washington, D. C. 20036

Mr. R. E. Shimshak
La Crosse Boiling Water Reactor
Dairyland Power Cooperative
P. O. Box 275
Genoa, Wisconsin 54632

Mr. George R. Nygaard
Coulee Region Energy Coalition
2307 East Avenue
La Crosse, Wisconsin 54601

Dr. Lawrence R. Quarles
Kendal at Longwood, Apt. 51
Kenneth Square, Pennsylvania 19348

U. S. Nuclear Regulatory Commission
Resident Inspectors Office
Rural Route #1, Box 276
Genoa, Wisconsin 54632

Town Chairman
Town of Genoa
Route 1
Genoa, Wisconsin 54632

Chairman, Public Service Commission
of Wisconsin
Hill Farms State Office Building
Madison, Wisconsin 53702

Alan S. Rosenthal, Esq., Chairman
Atomic Safety and Licensing Appeal Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

U. S. Environmental Protection
Agency
Federal Activities Branch
Region V Office
ATTN: Regional Radiation Representative
230 South Dearborn Street
Chicago, Illinois 60604

Mr. John H. Buck
Atomic Safety and Licensing Appeal Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Ralph S. Decker
Route 4, Box 190D
Cambridge, Maryland 21613

Charles Bechhoefer, Esq., Chairman
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dr. George C. Anderson
Department of Oceanography
University of Washington
Seattle, Washington 98195

James G. Keppler, Regional Administrator
Nuclear Regulatory Commission, Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Thomas S. Moore
Atomic Safety and Licensing Appeal Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

LACROSSE

XV-18 RADIOLOGICAL CONSEQUENCES OF A MAIN STEAM LINE FAILURE OUTSIDE CONTAINMENT

I. INTRODUCTION

Rupture of a steam line outside containment will allow radioactivity contained in the coolant to escape to the environment. SEP Topic XV-18 is intended to review the radiological consequences of such failures. This review has encompassed those design features and technical specifications which limit the amount of radioactivity that can be released.

II. REVIEW CRITERIA

Section 50.34 of 10 CFR Part 50 requires that each applicant for a construction permit or operating license provide an analysis and evaluation of the design and performance of structures, systems, and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility. The steam line break accident is one of the postulated accidents used to evaluate the adequacy of these structures, systems, and components with respect to public health and safety.

In addition, 10 CFR Part 100.11 provides dose guidelines for a Design Basis Accident.

III. RELATED SAFETY TOPICS

Topic II-2.C, "Atmospheric Transport and Diffusion Characteristics for Accident Analysis" provides the meteorological data used to

evaluate the offsite doses. Topic III-5.B, "Pipe Break Outside Containment" covers the dynamic effects of the postulated pipe failure.

IV. REVIEW GUIDELINES

Guidelines for this review are contained in Regulatory Guide 1.5, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Steam Line Break Accident for Boiling Water Reactors" and in Standard Review Plan (SRP) Section 15.6.4, Revision 2.

V. EVALUATION

On January 15, 1982, the licensee submitted its evaluation of SEP Topic XV-18. In its submittal, the licensee provided an analysis of the consequences of the steam line break accident outside containment following the guidelines outlined in NRC Regulatory Guide 1.5. The evaluation stated that the reactor building isolation valves were assumed to close at the technical specification limit of 10 seconds with 17,000 pounds of primary coolant released. The reactor coolant activity was assumed to be 0.2 $\mu\text{Ci/gm}$ dose equivalent I-131 (DEI-131), the LaCrosse equilibrium technical specification limit. The iodine in the released coolant was assumed to be completely airborne. The licensee's evaluation, however, did not provide an analysis of the main steam line failure with an assumed preaccident iodine spike corresponding to the maximum iodine concentration as required in SRP Section 15.6.4. The LaCrosse technical specifications do contain a spike limit of 4.0 $\mu\text{Ci/gm}$.

The staff independently evaluated the accident for both cases required by SRP Section 15.6.4. Case I represents the accident occurring with the primary coolant at the quilibrium limit (acceptance criterion-small fraction of the 10 CFR Part 100 exposure guidelines) and Case II represents the accident occurring with the primary coolant at the spike limit (acceptance criterion-the exposure guidelines of 10 CFR Part 100). Because the staff has not received Topic II-2.C from the licensee, we have used atmospheric dispersion factors based on Regulatory Guide 1.5 which assumes a 30 meter release height under fumigation conditions for the first two hours.

All assumptions used in the staff's radiological consequence evaluation are consistent with those specified in SRP Section 15.6.4 and with Regulatory Guide 1.5. A summary of these assumptions is provided in Table XV-18-2.

In analyzing the accident, the licensee estimated that 17,000 pounds of primary coolant were released out the break prior to main steam isolation valve closure. SRP Section 15.6.4 provides for a case-by-case review of the coolant releases for small BWR plants. The staff finds the applicant's estimate to be reasonable and has used this estimate in its evaluation. However, even if much larger releases were assumed, including the release corresponding to the much larger GE BWR 238 plant (100,000 pounds), the acceptance criteria of the SRP would still be met.

The doses computed by the staff are listed in Table XV-18-1.

VI. CONCLUSION

Using the assumptions outlined above and noting the calculated doses the staff concludes that the LaCrosse design meets current licensing criteria and is, therefore, acceptably designed.

TABLE XV-18-1

RADIOLOGICAL CONSEQUENCES OF A MAIN STEAM LINE BREAK ACCIDENT

CASE I-Primary Coolant Concentration at the Technical Specification
Equilibrium Value of $0.2 \mu\text{Ci/gm}$ Dose Equivalent I-131

	Doses (Rem)	
	Thyroid	Whole Body
EAB	0.7	<0.1
LPZ	0.1	<0.1

CASE II-Primary Coolant Concentration at the Technical Specification
Limit of $4.0 \mu\text{Ci/gm}$ Dose Equivalent I-131

	Doses (Rem)	
	Thyroid	Whole Body
EAB	14.3	<0.1
LPZ	1.4	<0.1

TABLE XV-18-2

ASSUMPTIONS USED FOR THE MAIN STEAM LINE BREAK ACCIDENT

1. Concentration of Primary Coolant, Dose Equivalent I-131 ($\mu\text{Ci/gm}$)	
Case I	0.2
Case II	4.0
2. Exclusion Area Boundary Distance (meters)	338
3. Low Population Zone Boundary Distance (meters)	4827
4. X/Q Values (seconds/cubic meter)	
0-2 hour EAB	9.0 E-4
0-8 hour LPZ	9.0 E-5
5. Amount of primary coolant released (lbs)	17,000