Docket No. 50-255

Mr. David P. Hoffman Nuclear Licensing Administrator Consumers Power Company 212 West Michigan Avenue Jackson, Michigan 49201

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Dear Mr. Hoffman:

RE: COMPLETION OF SEP TOPIC XV-18 Radiological Consequences of Main Steam Line Failure Outside Containment.

Your letter dated December 7, 1979 indicated that you have examined our draft evaluation of the subject topic dated November 8, 1979. You suggested editorial or corrective changes to the assessment to make it more accurately reflect your facility design. We have incorporated your suggested modifications in the enclosed assessment. With these modifications our review of SEP Topic XV-18 is complete and will be a basic input to the integrated assessment of your facility.

The subject assessment compares your facility design with the criteria currently used by the staff in licensing new facilities. This assessment may need to be re-examined if you modify your facility or if the criteria are changed before we complete our integrated assessment.

Sincerely,

Original Signed by: Dennis L, Ziemann

Dennis L. Ziemann, Chief **Operating Reactors Branch #2** Division of Operating Reactors

Enclosure: Completed SEP Topic XV-18

cc w/enclosure: See next page

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Mr. David P. Hoffman

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Palisades

Topic XV-18 Radiological Consequences of Main Steam Line Failure Outside Containment

The safety objective of this topic is to assure that the releases from this postulated event will not result in exposures in excess of the established guidelines.

The rupture of a main steam line is considered a limiting fault not expected to take place during the lifetime of the plant. Nevertheless, it is postulated because its consequences could include the release of significant amounts of radioactive material. In particular, the failure of a steam line outside containment would result in the release of activity contained within the secondary system, in addition to opening a potential, albeit small path for the release of reactor coolant to the environment via postulated steam generator leaks.

An analysis of the radiological consequences of a main steam line failure at the Palisades plant has been performed following the assumptions and procedures indicated in the Appendix to S.R.P. 15.1.5, "Radiological Consequences of Main Steam Line Failures Outside Containment (PWR)," The specific assumptions made regarding the plant conditions prior to the postulated accident and the expected responses are listed in Table XV-1.

In particular, it has been assumed that one steam generator is blown dry within 60 seconds following the accident, and that 1 gpm of reactor coolant is released directly to the environment during the first two hours. This is in accordance with Technical Specification 3.1.5 which limits the allowable steam generator primary to secondary leakage to 0.6 gpm in any one steam generator.

In addition, it has been assumed that prior to the accident the primary and secondary coolant activities were at the maximum levels allowed by the Technical Specifications 3.1.4 and 3.1.5. An evaluation of this accident in support of Amendment 31 to the provisional operating license in November 1977 concluded that no additional fuel clad failures would occur. The estimated site boundary doses resulting from this postulated accident (see Table XV-2) have been found to be within the 10 CFR Part 100 guidelines as specified in the Acceptance Criteria for S.R.P. 15.1.5.

On the basis of these results, we conclude that the Palisades plant design is acceptable with respect to the radiological consequences of a possible main steam line failure, and that the risk presented by this postulated accident is similar to that of plants licensed under current criteria.

This completes the evaluation of this SEP topic. Since the plant design conforms to current licensing criteria, no additional SEP review is required.

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Topic XV-18 (Palisades)

References

- 1. Palisades Plant FSAR, Section 14,14
- 2. Letter from D. P. Hoffman, Consumers Power Company to the Director, NRR. June 26, 1978 "Palisades Plant - Steam Generator Operating History Questionnaire." Docket 50-255
- 3. Consumers Power Company Steam Generator Repair Report for the Palisades Plant. Docket 50~255 January 1979
- Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 31 to Provisional Operating License No. DPR-20. Palisades Plant, Section 4.4 Docket 50-255,

5. Palisades Plant Technical Specifications

TABLE XV-1

Assumptions Made in Analysis of the Radiological Consequences of Postulated Tube Failure, Main Steam Line Failure and Control Rod Ejection Accidents

- 1. Reactor power = 2650 Mwth.
- 2. Loss of offsite power following the accident.
- 3. Primary coolant activity prior to the accident of $1.\mu$ Ci/g of Dose Equivalent I-131 and 100/E μ Ci/g of noble gases.
- 4. Iodine spiking factor of 500 after the accident.
- 5. Primary coolant activity of 40.µCi/g of Dose Equivalent I-131 at time of accident for cases assuming a previous iodine spike.
- Secondary coolant activity prior to the accident of 0.1 µCi/g Dose Equivalent I-131.
- 7. Iodine decontamination factor of 10 between water and steam.
- 8. 0-2 hour X/Q for ground release at exclusion area boundary boundary = $3.4 \times 10^{-4} \text{ sec/m}^3$

For the Steam Generator Tube Failure Accident

- 1. Failed steam generator is not isolated during the first 2 hours following the accident.
- 2. 98,000 lb. of primary coolant leak to the secondary side of the failed steam generator through the failed tube during the first 2 hours (one half during the first 30 minutes),
- 3. All releases through the secondary side safety and relief valves.
- 4. No additional fuel clad failures as a result of the accident.

For the Main Steam Line Failure Accident

- 1. Total primary to secondary leak rate of 1. gpm.
- 2. No additional fuel clad failures as a result of the accident.

For the Control Rod Ejection Accident

- 1. Total primary to secondary leak rate of 1. gpm.
- 2. 0.3% of rods suffer clad damage.

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3. o.l % of rods have at least incipient center line melting.

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TABLE XV-2

ACCIDENT DOSES AT NEAREST SITE BOUNDARY

	2-hour Dose to the Thyroid (rem)	2-hour Whole Body Dose (rem)
Tube Failure Acallent	10	
lube Failure Accident	12.	0,4
Tube Failure Accident with Previous Iodine Spike*	60,	0,4
Steam Line Failure Accident	1.7	< 0.01
Steam Line Failure Accident with Previous Iodine Spike*	2.6	< 0.01
Rod Ejection Accident**		
Case 1	3.6	0.05
Case 2	1.0	< 0.01

* For this accident sequence it is assumed that an iodine spike was initiated some time before the accident resulting in the highest coolant activity allowed by the Technical Specifications.

****** Case 1 assumes all releases through the secondary side safety and relief valves. Case 2 assumes all releases through the containment.