

August 31, 1982

Docket No. 50-029
LS05-82-08-074

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

Dear Mr. Kay:

SUBJECT: YANKEE - SEP TOPIC XV-17, STEAM GENERATOR TUBE
RUPTURE (SYSTEMS)

By letter dated March 30, 1982, the staff issued a safety evaluation on the radiological consequences of a steam generator tube rupture event. Enclosed is our safety evaluation of the reactor systems aspects of this event. As noted in the evaluation, the results are acceptable. The staff is conducting a generic study of the consequences of steam generator overfill. Any modifications necessary as a result of that study will be implemented independently of the Systematic Evaluation Program.

The enclosed safety 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 of your facility. The assessment may be revised in the future if your facility design is changed or if NRC criteria relating to this topic are modified before the integrated assessment is completed.

Sincerely,

Ralph Caruso, Project Manager
Operating Reactors Branch No. 5
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

SEDA Add: M Boyle

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SURNAME	EMcKenna: dk	MBoyle <i>MLB</i>	CGrimes	WRussell	RCaruso	DCutchfield	Tippolito
DATE	8/23/82	8/23/82	8/23/82	8/23/82	8/24/82	8/26/82	8/26/82

Mr. James A. Kay

cc
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Yankee Nuclear Power Station
SEP TOPIC XV-17
Steam Generator Tube Rupture

I. Introduction

In the event of steam generator tube rupture, primary coolant will be discharged to the secondary side until the primary pressure is reduced below the secondary side pressure in the steam generator. The discharge of the primary coolant may result in radioactive release to the environment via the steam jet air ejector or through the safety and relief valves if there is a concurrent loss of offsite power.

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 generator tube rupture is one of the postulated accidents used to evaluate the adequacy of these structures, systems, and components with respect to public health and safety.

Section 50.36 of 10 CFR Part 50 requires the Technical Specifications to include safety limits which protect the integrity of the physical barriers which guard against the uncontrolled

release of radioactivity. In addition, 10 CFR Part 100.11 provides an acceptable dose consequence limit for reactor siting.

III. RELATED SAFETY TOPICS

Topic V-8, "Steam Generator Integrity", ensures that acceptable levels of integrity of the steam generator are maintained in accordance with current criteria. Various other SEP topics evaluate such items as ESF systems.

IV. REVIEW GUIDELINES

The review of the consequences was conducted in accordance with Standard Review Plan 15.6.3. The plant is considered adequately designed against a steam generator tube failure if systems and operator response is possible such that the resulting doses at the exclusion area and low population zone boundaries are less than a small fraction of the 10 CFR Part 100 exposure guidelines, and are within the 10 CFR Part 100 guidelines for the case of a preaccident iodine spike. The calculated doses based on the plant response are the subject of a separate evaluation.

V. EVALUATION

By letter dated February 1, 1982, the licensee provided a safety analysis report for SEP Topic XV-17, steam generator tube failure (Reference 1). The analysis was performed with the assumption of a complete loss of offsite AC power following the accident. With the condenser lost as a heat sink, the secondary steam is released to the environment via the secondary relief valves for 8 hours

following the accident. After 8 hours, the RCS pressure would be such that other means of plant cooldown, e.g., the RHR system, would be used. The total mass of primary coolant lost to the secondary side through the failed steam generator tube is 118,800 lb. The radiological consequences evaluation performed by the staff conservatively assumes all of the primary coolant released to the secondary side to be within a time span of 2 hours, and 17 percent of the primary side leakage is assumed to flash to steam and be released to the environment.

VI. CONCLUSION

We have evaluated the licensee's analysis and have concluded that the reactor system aspects in the mitigation of the event are acceptable. The radiological consequences were also found acceptable in a separate evaluation (Reference 2) using conservative assumptions and without consideration of operator actions for 2 hours. Therefore, we conclude that the licensee's analysis results are acceptable. The staff is conducting a generic study to examine the consequences of steam generator overfill. If the results of our study conclude that it would significantly impact the radiological consequences, modifications may become necessary and we will then require the licensee to comply with the modification requirements. Such actions would be taken independently from the SEP.

VII. REFERENCE

- (1) Letter from J. A. Kay to D. M. Crutchfield dated February 1, 1982.
- (2) Letter from D. M. Crutchfield to J. A. Kay dated March 30, 1982.