

AUG 22 1977

Docket No. 50-29

Ms. Ellyn R. Weiss
Assistant Attorney General
Environmental Protection Division
One Ashburton Place, 19th Floor
Boston, Massachusetts 02108

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POOR QUALITY PAGES

Dear Ms. Weiss:

I am pleased to reply to your letter dated July 22, 1977, in which you inquired about the recent shutdown of the Yankee Nuclear Power Station (Yankee-Rowe).

Yankee Atomic Electric Company (the licensee), elected to shutdown Yankee-Rowe on June 9, 1977, for earlier than scheduled refueling, Emergency Core Cooling System (ECCS) modifications and other maintenance. This early shutdown was prompted by the licensee's discovery on June 7, 1977, of an oversight in the emergency core cooling system (ECCS) analysis for the next core reload (Core XIII). Specifically, during the review of the small break analysis, the licensee identified a specific location in a short pipe section in the safety injection lines, for which an assumed worst case (complete severance and separation) type break could result in higher calculated fuel cladding temperature than previously calculated for another location which had been considered to be the most limiting small pipe break location.

The written material including the minutes of a recent meeting with the licensee, has been sent to Mr. Andrew Lipton, a member of your staff, with our letter dated July 26, 1977. This material provides a more detailed account of the circumstances related to the recent shutdown of Yankee-Rowe. A copy of that letter is enclosed.

Our responses to your specific requests for clarification are provided below in the order that those requests appear in your letter.

1. The situation that led to the shutdown of Yankee-Rowe involved an error in the ECCS performance analysis which has permitted operation of Yankee-Rowe prior to the June 9, 1977 shutdown, in a manner less conservative than assumed in the analysis. Discovery of this error is reportable as required in the facility Technical Specifications. The licensee met these requirements

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by promptly reporting this discovery to the NRC. In addition, the licensee on its own initiative, took appropriate conservative action by shutting down the facility pending further evaluation and resolution of the matter with the NRC. So far as we know at this time, there was no violation of NRC requirements, since the licensee has stated that the analytical error discovered on June 7, 1977, had not been known previously. It could probably have been established that Yankee-Rowe had been operated with the previous Core XII in a manner which would have resulted in exceeding NRC limits for a pipe break in a certain location, if the consequences were calculated according to the very conservative calculational methods specified by NRC regulations. However, a "best estimate" calculation performed by the licensee after shutdown has indicated that limits would not have been exceeded for this specific break. For continued operation we will, of course, require conservative, rather than "best estimate" calculational methods. For consideration of the period prior to shutdown before the existence of the calculational error was known, it should be noted that the probability of a pipe break occurring precisely in the specific location identified is extremely low and thus, did not contribute significantly to the overall risk.

2. The error in the analysis was discovered at this time, because the significant changes to the ECCS subsystem, involving the addition of a safety injection delay feature during the present refueling outage, required a complete ECCS reanalysis for operation with the new Core XIII.
3. To remedy the situation, the licensee is modifying the safety injection piping and is adding valves which are throttled to achieve acceptable flow resistance. The added resistance in the safety injection lines will provide the necessary ECCS injection characteristics. The magnitude of the flow resistances in the modified ECCS piping will be verified by flow testing to be performed during this refueling outage. The licensee will submit to the NRC an entirely revised ECCS analysis, to demonstrate by approved analysis methods that the calculated performance of the modified ECCS meets the NRC acceptance criteria.

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Ms. E. R. Weiss

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4. While it is true that Yankee-Rowe could have continued to operate at a reduced power level consistent with acceptable consequences based on conservative calculational methods, the performance of such calculations would have involved a rather extensive analysis which itself would have been time consuming and expensive. Because of significant time and expense required to perform such calculations and the recognized need to simultaneously perform such calculations on the modified facility to justify return to full power operation, the licensee elected to shutdown Yankee-Rowe for its refueling outage somewhat earlier than originally scheduled.
5. As discussed elsewhere in this letter, the licensee is making corrective modifications to the ECCS and is performing a complete ECCS reanalysis for the modified ECCS configuration to support operation at full licensed power. NRC is reviewing these revisions to determine acceptability. Before returning to power, the licensee will require a license amendment from the NRC.
6. In response 3. above, we indicated the corrective actions being taken by the licensee during the present refueling outage. The ECCS piping modification introduces additional flow resistance in the ECCS injection flow paths; calculations will be performed based on design values of the flow resistances as modified. This will demonstrate that the design of the modified ECCS is within acceptable limits; flow testing will verify that the expected resistances have been achieved. If not, appropriate adjustments of resistance will be made during the course of the test to achieve acceptable results.

I trust that our reply is responsive to your request for clarification of certain aspects relating to the recent shutdown of Yankee-Rowe.

Sincerely,

Original Signed By
E. G. Case

Eason G. Case, Acting Director
Office of Nuclear Reactor Regulation

Enclosure:

1. NRC letter dated July 26, 1977
to Mr. Andrew Lipton

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket No. 50-29

July 26, 1977

Mr. Andrew Lipton
Department of the Attorney General
of the Commonwealth of Massachusetts
Environmental Protection Division
1 Ashburton Place
Boston, Massachusetts 02108

Dear Mr. Lipton:

It has been brought to my attention that during a recent telephone conversation with a member of my staff, you inquired about the reasons for the earlier than anticipated shutdown of the Yankee-Rowe Nuclear Power Station.

To supplement the information given you during the telephone conversation, we enclose a copy of our letter dated July 20, 1977, to the Secretary of the Alternative Energy Coalition of Greenfield. That letter, with its enclosures, provides a more detailed account on the recent shutdown of Yankee-Rowe and identifies the actions required of the licensee to obtain NRC approval to operate Yankee-Rowe with the new core loading.

We trust that the enclosed documents provide all the information you need in this matter.

Sincerely,

for / R. Schwenn
Karl R. Goller, Assistant Director
for Operating Reactors
Division of Operating Reactors

Enclosures:

1. NRC Letter dated July 20, 1977
2. LER dated June 22, 1977
3. Minutes of Meeting dated June 22, 1977

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