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

October 4, 1990

Docket No. 50-029

MEMORANDUM FOR: Richard Wessman, Director
Project Directorate I-3
Division of Reactor Projects - I/II

FROM: Patrick M. Sears, Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II

SUBJECT: SUMMARY OF MEETING WITH YANKEE ATOMIC ELECTRIC COMPANY (YANKEE) CONCERNING YANKEE ROWE'S PLAN TO REDUCE UNCERTAINTIES AFFECTING REACTOR VESSEL INTEGRITY

Yankee management met with NRR on September 18, 1990, and discussed their preliminary plan for reduction of uncertainties concerning Yankee Rowe's reactor vessel. That discussion also included schedules. It was emphasized that requirements delineated in the August 31, 1990, letter concerning the Yankee Rowe Reactor Vessel would not be relaxed. Those requirements included as a minimum the following:

1. Develop instruction methods for the beltline welds and each beltline plate from the clad to 1 inch from the clad/steel interface to determine if the metal contains flaws.

2. Perform tests on typical Yankee Rowe based metal (0.18-0.20% Cu) to determine the effect of irradiation (f = 1-5E19 n/cm^2), austentizing temperature (1650°F-1800°F) and nickel composition (0.18-0.70 percent) on embrittlement at 500°F and 550°F irradiation temperatures.

3. Determine composition of the weld metal in beltline, circumferential and longitudinal welds by removing samples from the welds.

In addition, the licensee and staff discussed the installation of surveillance capsules in accelerated irradiation positions. The capsules are to include materials representing the beltline circumferential weld metal and upper and lower plates.

Enclosure 1 is a Preliminary Plan for the Yankee Reactor Vessel passed out by the licensee.

Enclosure 2 is a list of persons attending the meeting.

Original signed by:

Patrick M. Sears, Project Manager
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Division of Reactor Projects - I/II

Enclosures: As stated

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J. Craig

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10/ /90	10/ /90	10/2/90	10/4/90

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ENCLOSURE 1

Preliminary Plan for Yankee Reactor Vessel

NRC Staff Presentation

September 18, 1990

Reactor Vessel Plan

- Test Reactor Irradiation Program
- Weld Metal Temperature Effect
- Weld Samples
- Inspection
- Surveillance Program
- Current Issues

Test Reactor Irradiation Program

Objective

- To determine the effects of grain structure, temperature, and nickel on reference temperature shifts through data search and experiment.

Method

- Gain access to relevant Naval Test Reactor low temperature A 302-B irradiation data.
- Obtain representative A 302-B and A 302-B modified plate.
- Heat treat and cool the plate to obtain similar grain characteristics as Yankee plate.
- Irradiate longitudinal specimens of plate.

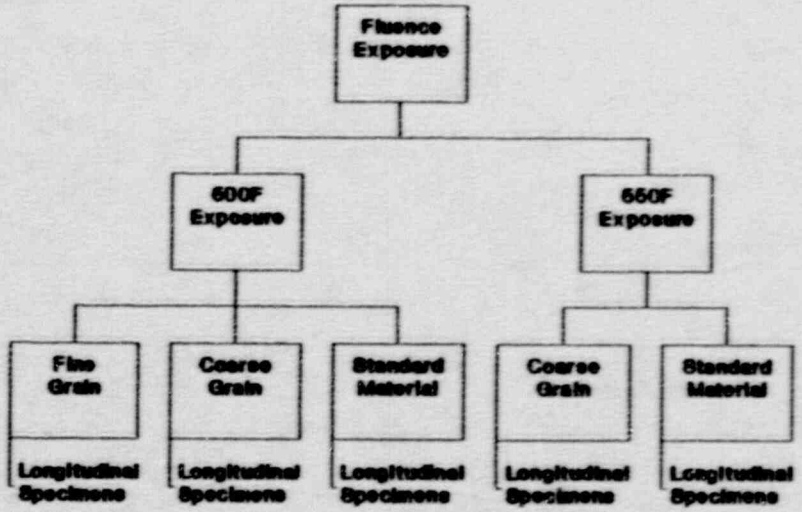
Test Reactor Irradiation Program

Results

- Show temperature effect by comparing reference temperature shifts for the same coarse grain material at 500F and 550F.
- Show nickel effect by comparing reference temperature shifts for coarse grain A 302-B and A 302-B modified (higher nickel) plate with approximately the same copper and other chemical content.
- Show grain structure effect by comparing reference temperature shifts for the same material with fine grain and coarse grain.

Irradiation Test Matrix for A 302-B Material

A302-B Low Cu, Low Ni



A302-B Low Cu, Mod. Ni

Number of Specimens Per Fluence Per Material

500F	Material
9	Fine grain, low Ni
9	Coarse grain, low Ni
9	Coarse grain, mod. Ni
9	Standard materail
9	Weld Metal
45	

550F	Material
9	Coarse grain, low Ni
9	Weld metal
9	Standard metal
27	

Weld Metal Temperature Effect

Objective

- To determine the temperature effect on weld metal reference temperature shifts for 500F to 550F.

Method

- Assuming the copper and nickel content of the nozzle course longitudinal weld samples as representative of the beltline weld chemistries, use existing B&W Owners Group or BR3 data for predictions of reference temperature.
- If temperature data is unavailable for the longitudinal weld sample chemistries, then we will perform test reactor irradiations at 500F and 550F. Existing B&W Owners Group weld material or newly fabricated weld will be used for irradiations.

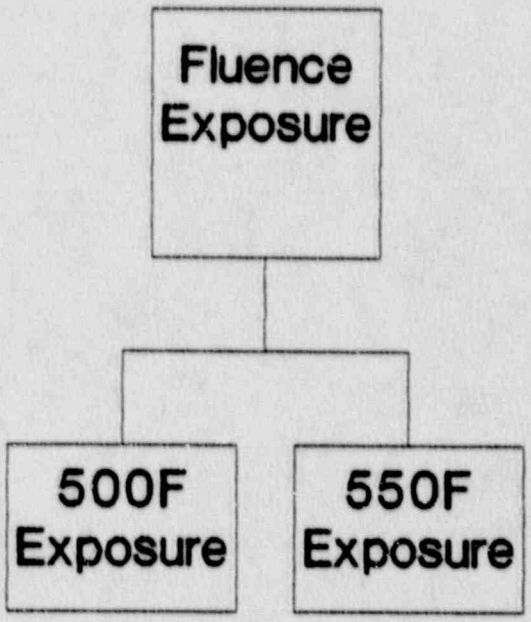
Weld Metal Temperature Effect

Results

- Show temperature effects by the use of existing data or comparison of test reactor data at two temperatures.

Weld Metal Matrix

Representative Copper and Nickel



Weld Samples

Objective

- Determine the beltline circumferential weld chemistry content. Sampling will be performed at the 1993 refueling outage, which requires the disassembly of the internals for the 10 year vessel inspection, if the nozzle region longitudinal samples match Yankee's prediction of low copper (0.2 wt%) content. If not, then the sampling will take place in the 1992 outage.

Method

- Develop similarity between nozzle region longitudinal weld chemistry and the beltline circumferential weld chemistry.
- Develop tooling to take samples of the inside surface of the beltline circumferential weld.
- Demonstrate ability to take samples on a mock-up.

Weld Samples

Results

- Confirm copper and nickel content of the circumferential weld by analyzing the samples.

Inspection

Objective

- Inspect the beltline plates and weld from the inside surface to a depth of one inch to find a surface flaw as defined by ASME.

Method

- Develop methods for unloading all internals and having the ability to inspect the beltline.
- Qualify Eddy Current technology to operate in annular space and detect ASME flaws.
- Model clad and vessel configuration using SAFT and conventional UT beams.
- Couple positioning and test equipment and demonstrate feasibility on a mockup.

Inspection

Results

- By the end of Cycle 21, demonstrate ability to detect surface flaws under cladding.
- Prior to 1993 outage, demonstrate the ability to perform inspection of surface flaws in an annular space on a mockup.

Surveillance Program

- Need to determine the objectives for re-establishing a surveillance program in the Yankee reactor.

Current Issues

- 60 day reply from startup of Cycle 21. What is the level of detail required in 60 day report?
- Need to identify an NRC technical contact.
- NRC funding support.
- Availability of test reactors. We have contacted University of Mi., Mo., Va., Buffalo and Penn St.
- Test reactor fluence which can be obtained by end of Cycle 21.
- Test reactor capacity for number of specimens at 500F and 550F.
- Availability of A 302-B and A 302-B Mod. plate similar to Yankee's.
- Availability of Naval reactor irradiation data.