



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

December 17, 1985

Docket Nos. 50-213

LICENSEE: Northeast Utilities  
Connecticut Yankee Atomic Power Company

FACILITY: Haddam Neck Plant

SUBJECT: MEETING SUMMARY ON NEW DESIGN OF  
THE REACTOR CAVITY POOL SEAL

By letter dated November 7, 1985, Connecticut Yankee Atomic Power Company (CYAPCo) submitted information on the design of the proposed reactor cavity pool seal. As required by letter dated October 2, 1984, the licensee reevaluated the use of the backup seal arrangement used during the 1984 outage as a permanent alternative and concluded that the optimum solution to the cavity pool seal problem was to install a permanent seal between the reactor vessel and the biological shield wall.

On November 26, 1985, a meeting was held with CYAPCo to discuss the proposed design of the permanent reactor cavity pool seal, as well as the CYAPCo position on the use of leak before break at the Haddam Neck Plant. A copy of the presentation and a list of attendees is enclosed.

Based upon the information presented, the staff concluded that there is reasonable assurance that the design objectives of the reactor cavity pool seal can be met and provide suitable pool integrity for refueling operations.

In the design of the cavity pool seal, a limited break loss-of-coolant accident (LOCA) was used to assure that the permanent seal would not become a missile as a result of the LOCA blowdown forces. From the discussion at the November 26, 1985 meeting, CYAPCo indicated that this was acceptable because they could show that the plant design would meet the conditions identified in Generic Letter 84-04 if the original design seismic spectra were used in the plant analyses for pipe and support stresses. However, when the seismic spectra developed under the Systematic Evaluation Program (SEP) were used, the piping stresses met the allowable criteria, but a limited number of supports would exceed the allowable stress values. CYAPCo indicated that plant modifications are planned for the 1987 outage to upgrade the supports to meet the design criteria. The licensee also noted that the use of the leak before break philosophy is not unique to the installation of the permanent reactor cavity seal, but rather is consistent with the overall evaluation of asymmetric LOCA loads for the Haddam Neck Plant and is addressed in that light.

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The staff agreed that the installation of the seal ring would not significantly change the consequences of a primary loop pipe failure. As part of the SEP Topic III-6 review, the staff concluded that if the Haddam Neck plant satisfied the two conditions identified in Generic Letter 84-04 with the SEP spectra that the leak before break philosophy could be applied. Based on this meeting, the staff requested clarification of the licensee's application of the leak before break philosophy at the Haddam Neck Plant. In particular, the staff requested a definitive statement describing how the Haddam Neck Plant proposes to satisfy the two conditions identified in Generic Letter 84-04 with the SEP spectra, including a description of the improvements planned to specific supports. This additional information was requested within 45 days of receipt of this summary.

Original signed by: F. Akstulewicz

Francis Akstulewicz, Project Manager  
Integrated Safety Assessment  
Project Directorate  
Division of PWR Licensing - B

Enclosure:  
As Stated

cc: See Next Page

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~~Docket File~~

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ISAP:PWR-B  
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ISAP:PWR-B *FAA*  
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*CGM*  
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Haddam Neck Plant

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## **HADDAM NECK CAVITY SEAL RING**

**WESTINGHOUSE N.S.S.S. STANDARD**

**CURRENTLY INSTALLED OR IN USE AT  
VOGTLE UNITS 1 AND 2  
COMMANCHE PEAK UNITS 1 AND 2  
SOUTH TEXAS UNITS 1 AND 2  
NUMEROUS FRAMATOME REACTORS**

**WELDED CONSTRUCTION PROVIDES A LEAKPROOF SEAL FOR  
THE THERMAL EXPANSION GAP BETWEEN THE REACTOR  
VESSEL AND THE SURROUNDING CONCRETE**

**ACCOMMODATES THERMAL GROWTH OF THE REACTOR, APPLIED  
WATER PRESSURE, SEISMIC, INCLUDING HYDROACOUSTIC  
LOADINGS, L.O.C.A., AND DROPPED FUEL LOADINGS**

**STRUCTURAL INTEGRITY DEMONSTRATED FOR ABOVE BY  
USE OF APPROVED FINITE ELEMENT CODES-  
STRESSES WITHIN ASME SECTION III ALLOWABLES**

**NO MAJOR RUBBER COMPONENTS SUBJECTED TO UNCERTAIN  
DEFLECTIONS, STRESSES, OR FORCES**

CONNECTICUT YANKEE  
PERMANENT CAVITY SEAL RING

DESIGN CRITERIA

- o SEAL MUST BE SUITABLE FOR NORMAL OPERATING CONDITIONS
  - o OPERATING ENVIRONMENT
  - o VESSEL DISPLACEMENT
- o SEAL MUST BE SUITABLE FOR REFUELING CONDITIONS
  - o FLOODED CAVITY
  - o DROPPED OBJECTS
  - o ACCESS FOR STUD TENSIONING & OTHER HEAD AREA ACTIVITIES
  - o MINIMUM TIME TO PREPARE FOR REFUELING AND FOR RETURN TO POWER
- o SEAL MUST BE SUITABLE FOR VARIOUS EMERGENCY AND ACCIDENT CONDITIONS
  - o SSE WITH FLOODED CAVITY, RETAINED POOL INTEGRITY
  - o LOCA IN REACTOR CAVITY BELOW OR ABOVE SEAL



CONNECTICUT YANKEE  
PERMANENT CAVITY SEAL RING

DESIGN OBJECTIVES


- o DEVELOP A RELIABLE SEAL OFFERING A MAXIMUM DEGREE OF SAFETY WITH LOWEST POSSIBLE EXPOSURE
- o INTEGRATE MAXIMUM OF INDUSTRY EXPERIENCE IN LARGE SEALING APPLICATIONS
- o SEAL MUST BE SUITABLE FOR ENTIRE PLANT ENVIRONMENT, ACCESS, OPERATING, REFUELING AND ACCIDENT CONDITIONS
- o SEAL MUST BE SIMPLE TO INSTALL AND MAINTAIN
- o SEAL MUST BE DESIGNED & FABRICATED TO SUPPORT JANUARY 1986 REFUELING

## DEVELOPMENT

- o SOLICITATION OF CONCEPTUAL DESIGN PACKAGES FROM 3 QUALIFIED SUPPLIERS
- o REVIEW OF CURRENT INDUSTRY STANDARDS FOR NEW PLANT SEAL DESIGNS
- o SELECTION OF BEST CONCEPT BASED UPON ITS ABILITY TO SATISFY OUR INITIAL DESIGN OBJECTIVES

## W - BETHESA LICENSING OPERATIONS

TIME 930 AM PM

CONFERENCE ROOM  LG  
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ORGANIZATION/PHONE

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