

NRC-PDR



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

JUL 5 1979

MEMORANDUM FOR: C. Trammell, Lead Engineer, Operating Reactors  
Branch #1, Division of Operating Reactors

FROM: G. Lainas, Chief, Plant Systems Branch, Division  
of Operating Reactors

SUBJECT: REACTOR CAVITY ANNULUS SEAL RING STATUS (TAC 11846)

REFERENCE: D. Eisenhut letter to V. Stello, dated June 21, 1978<sup>1</sup>

On February 2, 1978, letters were sent to all PWR licensees requesting information related to the potential for the reactor cavity seal ring to become a missile following a LOCA. The results of a preliminary review of licensee responses were summarized in Reference (a). Per your request at our meeting in late March 1979, the Plant Systems Branch has reviewed the status of all licensee responses concerning this issue.

An updated detailed status is provided in the enclosed table, (Enclosure 1). The following summarizes the status:

- (1) The reactor cavity annulus seal ring is removed during normal operation at 27 of the 42 operating units.
- (2) The licensees for 4 of the 42 units (Haddam Neck, San Onofre, and Surry 1 and 2) propose to resolve the above cited problem at the same time as they would resolve the reactor asymmetric load problem. PSB has no objections to this proposal.
- (3) The licensees for 5 of the 42 units (ANO-1, Farley 1, Oconee 1/2/3) store the seal ring in a raised position during normal operation.

Because ANO-1 has determined (letter dated July 14, 1978) that the seal ring could become a missile if it is stored in a raised position during normal operation, we recommend that the licensees of the five units be required to supply additional analyses addressing this potential for their facilities.

- (4) Licensees for 2 of the 42 units (Fort Calhoun and Rancho Seco) have proposed design modifications which are currently under review. The proposed modifications are being reviewed by the EB and do not involve cavity pressurization analyses.

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- (5) The licensees for the remaining 4 units (Point Beach 1/2, Maine Yankee, Rankee Rowe), which are operated with the seal ring in place, have not performed the analyses needed to demonstrate that the missile potential associated with the seal ring does not have safety significance. Furthermore, these licensees have not proposed to remove the seal ring during normal operation. Consistent with the results of our previous review (summarized in the above referenced letter), we again recommend that additional analyses or commitments be required from the licensees of these 4 units.

Attached are sample letters (Enclosures 2 and 3) which should be sent to the licensees. Enclosure 2 is a redraft of a letter which was attached to Reference (a).

G. Lainas, Chief  
 Plant Systems Branch  
 Division of Operating Reactors

Contact:  
 J. Kerrigan  
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Enclosure:  
 As stated

- cc w/enclosure:
- D. Eisenhut
  - G. Lainas
  - E. Adensam
  - V. Noonan
  - J. Zudans
  - J. Kerrigan
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DATE	7/5/79	7/5/79	7/5/79			

ENCLOSURE 1  
 REACTOR CAVITY ANNULUS SEAL RING STATUS

PLANTS	LICENSEE ACTION	REMARKS
ANO-1	Analysis has concluded that the seal ring (although raised 3 feet above refueling floor) can become a missile; proposed a permanent fix in Fall 1980.	Seal ring raised 3 feet during normal operation.
Beaver Valley 1	None	Seal ring is removed during normal operation. Biological shield consists of hinged benelex segments.
Calvert Cliffs 1 & 2	None	Seal ring is removed during normal operation.
D. C. Cook 1 & 2	None	Seal ring is removed during normal operation.
Crystal River 3	Analysis showed that the seal ring could become a missile. Seal ring removed.	
Davis Besse 1	None	Seal Ring is removed during normal operation.
Farley 1	Analysis concluded that seal ring could not become a missile.	Seal ring raised 5 inches above reactor vessel flange.
Fort Calhoun 1	None	CRDM's are protected by missile barrier; under NRC review (TAC 11021)
R. E. Ginna 1	None	Inflatable seal ring is not left in place during normal operation.
Haddam Neck	Analysis will be included as part of Asymmetric LOCA loads task.	Analysis due 12/79.
Indian Point 2 & 3	Seal rings removed.	
Kewaunee	None	Seal ring removed during normal operation.

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REACTOR CAVITY ANNULUS SEAL RING STATUS

PLANTS	LICENSEE ACTION	REMARKS
Maine Yankee	None; AE calculations during design phase of MY showed that shielding could become a missile.	Licensee believes that a current analysis would show that missile generation is not possible. In addition, the CRDM is assumed inoperable during LOCA.
McGuire 1	None	Seal ring removed during normal operation.
Millstone 2	New neutron shield proposed. Seal ring removed.	New design reviewed and approved by PSB 4/17/79.
North Anna 1	None	Seal ring is removed during normal operation.
Oconee 1, 2, & 3	None	Seal ring raised 3-4 feet above installed position.
Palisades	None	Seal ring is removed during normal operation.
Point Beach 1 & 2	Based on Trojan's analysis, the licensee concluded that the seal ring could become a missile.	Licensee contends that missile generation would not affect the safe shutdown of the plant during a LOCA.
Prairie Island 1 & 2	None	Seal ring is removed during normal operation.
Rancho Seco	Proposed a modification for storing the reactor cavity seal plate.	Modification is under review by PSB/EB 2/12/79.
Robinson 2	Seal ring removed	
St. Lucie	Seal ring removed.	

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REACTOR CAVITY ANNULUS SEAL RING STATUS

PLANTS	LICENSEE ACTION	REMARKS
Salem 1 & 2	Seal rings removed.	
San Onofre 1	Analysis will be included as part of Asymmetric LOCA loads task.	Analysis is scheduled for completion by 1/1/80.
Surry 1 & 2	Analysis will be included as part of Asymmetric LOCA loads task.	Analysis scheduled for completion by 12/79.
TMI-1	Seal ring removed.	
Trojan	Seal ring removed.	
Turkey Point 3 & 4	Seal rings removed.	
Yankee Rowe	None	Licensee assumes no action is necessary since control rod insertion during a LOCA is not assumed.
Zion 1 & 2	None	Seal rings removed during normal operation.

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ENCLOSURE 2

Licensee (Point Beach 1 & 2, Maine Yankee, and Yankee Rowe)

Gentlemen:

We have reviewed your response to our letter dated February 2, 1978, in regard to the potential for the reactor cavity annulus seal ring to become a destructive missile in the event of a loss-of-coolant accident pipe break inside the reactor cavity.

In your response, you indicated that in the event of a large coolant pipe rupture the subsequent ECCS analysis takes no credit for control rod insertion. Therefore, damage to the control rod drive mechanisms (CRDM) would not affect the safe shutdown of the reactor subsequent to a loss-of-coolant accident as previously analyzed. However, the role of CRDM for the safe shutdown of the reactor for small break LOCA has not been addressed. Moreover, you have not analyzed the effects of the seal ring, should it become a missile, on other safety related components located inside the containment. Therefore, pursuant to 10 CFR 50.54 (f) of the Commission's regulations, you are hereby requested to (a) demonstrate by appropriate analysis that the seal ring cannot become a destructive missile during continued long-term operation and that it poses no threat to the health and safety of the public; or (b) furnish a statement that the seal ring will be removed by no later than the next refueling outage.

ENCLOSURE 3

Licensee (ANO-1, Farley, Ocone 1, 2 & 3)

Gentlemen:

We have reviewed your response to our letter dated February 2, 1978, in regard to the potential for the reactor cavity annulus seal ring to become a destructive missile in the event of a loss-of-coolant accident pipe break inside the reactor cavity.

In your response, you indicated that the seal ring is in a raised position and does not form a seal between the vessel and the cavity during reactor operation. One licensee has informed NRC that for their seal ring the raised position does not eliminate the possibility that the seal ring could become a missile following a postulated reactor coolant pipe rupture inside the reactor vessel cavity. Therefore, pursuant to 10 CFR 50.54 (f) of the Commission's regulations you are hereby requested to (a) demonstrate by appropriate analysis that the seal ring cannot become a destructive missile during continued long-term operation and that it poses no threat to the health and safety of the public; or (b) furnish a statement that the seal ring will be removed by no later than the next refueling outage.