



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

AUG 22 1980

MEMORANDUM FOR: M. Ernst, Assistant Director for Technology

THRU: C. Berlinger, Acting Chief, Operating Experience Evaluation Branch, DST

FROM: R. Riggs, Operating Experience Evaluation Branch, DST

SUBJECT: AEOD PROPOSAL FOR ABNORMAL OCCURRENCE REPORT ON ANO-1 REACTOR COOLANT PUMP LEAKAGE

REFERENCE: 1. Memorandum to H. Denton et al, dated August 18, 1980 from N. Haller with enclosure.

2. Memorandum to R. Vollmer et al, dated July 11, 1980 from D. Eisenhut with enclosure.

Per your request, the Operating Experience Evaluation Branch (OEEB) has reviewed the Reactor Coolant Pump (RCP) seal leakage event at ANO-1 and AEOD's proposal to identify this event as an Abnormal Occurrence. In accordance with AEOD's proposal, they cited example II.A.2 of the Appendix A criteria published in the Federal Register 42FR 10950 on February 24, 1977 as the basis for their position. This example states that an Abnormal Occurrence is: "Major degradation of fuel integrity, primary coolant pressure boundary or primary containment boundary."

In the case of the ANO-1 RCP leakage neither the fuel integrity nor the primary containment boundary were violated. However, the primary coolant pressure boundary was lost by virtue of the RCP seal leakage. The key element in the above stated criterion is the phrase "Major degradation."

As a qualifier (yardstick) and reference point to establish the ANO-1 event as an Abnormal Occurrence, AEOD cited the H.B. Robinson-2 RCP seal leakage incident in May of 1975 as a precedent. AEOD did not address the results of Reference 2 in which at least five other plants experienced RCP seal leakages with an average of 22,600 gallons released into the containment. In two cases, namely; H.B. Robinson-2 and Indian Point-2, the RCP leakages of 132,000 gallons and 90,000 respectively both exceeded the ANO-1 RCP leakage of 60,000 gallons into containment.

If the amount of RCP leakage represents the only variable used to establish the meaning of "Major Degradation," it would appear reasonable to compare the H.B. Robinson event with the ANO-1 event and declare both events as similar Abnormal Occurrences. However, before this judgement is passed, the design

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state-of-the-art and other factors should be considered. With respect to the design state-of-the-art it should be recognized that an infinite seal life and zero leakage rate are presently beyond the existing state-of-the-art. However, by monitoring the seal leak off rate, accumulated leakage, and increases in the containment pressure, early warnings of gross RCP failures have been judged adequate by current licensing standards.

In the case of ANO-1, these assumptions appeared justified and a controlled shutdown using established small break procedures was attained. In the case of H.B. Robinson-2, abnormal procedures were implemented due to lack of operating limits and instructions for operating under these conditions. Also, at H.B. Robinson-2 flashing and high temperature in the seal water return line with apparent loss of seal flow and confusion as to how many RCPs to use to provide proper mixing of boron in preparation for cooldown compounded the damage and delayed shutdown operations.

It should also be noted that at all times during the controlled shutdown at ANO-1 the margin to saturation was at least 100 F. Also implementation of the ECCS equipment was initiated by manual control and no automatic ECCS actuation occurred during the ANO-1 small break procedures used to terminate this event.

Because the margin to safety at ANO-1 during the RCP seal leakage incident was maintained and controlled by established procedures the resultant ANO-1 "major degradation" could be perceived to be within the capabilities of normal procedural operations for this type transient. Thus there was no major breakdown in the level of protection to the public from the ANO-1 incident.

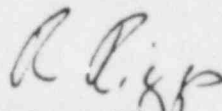
Therefore DEEB recommends that the ANO-1 incident more appropriately meets the criteria of an Appendix C, Event of Interest, as defined in 42 FR 10950, dated February 24, 1977.

The RCP seal leakage incident at ANO-1 did however indicate a potential problem in following normal (establish small break) procedures for dealing with similar events at ANO-1. This potential problem arises from the in-containment location of the breakers which supply power to the core flood tank isolation valves. If the containment environment is such that entry is prohibited, the operators would be required to deviate from their established normal small break procedures. To remedy this potential problem, AP&L has committed to a modification and early schedule of implementation to move the breakers or motor control centers for the core flood tank isolation valve and nitrogen vent valves to locations outside the containment (Reference 2).

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In consideration of the frequency of RCP seal failures in LWRs, NRC is initiating a program which is aimed at reducing the frequency of these type events.



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