Nebraska Public Power District
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NLS8400020

September 20, 1984

Mr. John T. Collins
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76011

Subject: NPPD Response to IE Bulletin 84-03, "Refueling Cavity Water Seal"

Reference 1: U. S. Nuclear Regulatory Commission IE Bulletin 84-03 Dated August 24, 1984, "Refueling Cavity Water Seal"

Dear Mr. Collins:

Reference 1 requested that NPPD evaluate the potential for and consequences of a refueling cavity water seal failure and provide a summary report of these actions. Specific areas of concern and consideration are as follows:

1. Gross seal failure.

2. Maximum leak rate due to failure of active components such as inflated seal.

3. Make-up capacity.

4. Time to cladding damage without operator action.

5. Potential effect on stored fuel and fuel in transfer.

6. Emergency operating procedures.

A summary report for each of the areas of concern is given below:

1. <u>Gross Seal Failure</u>

The refueling bellows forms a seal between the reactor vessel and the surrounding primary containment drywell to

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permit flooding of the space (reactor well) above the vessel during refueling operations. The refueling bellows assembly (see Attachment "A") consists of a stainless steel bellows, a backing plate, a self-energizing spring seal, and a removable guard ring. The backing plate surrounds the outer circumference of the bellows to protect it and is equipped with a tap for testing and for monitoring leakage. The self-energizing spring seal is located in the area between the bellows and the backing plate and is designed to limit water loss in the event of a bellows rupture by yielding to form a seal against the backing plate. The guard ring attaches to the assembly and protects the inner circumference of the bellows. The guard ring can be removed from above to inspect the bellows. The assembly is welded to the reactor bellows support skirt and the reactor well seal bulkhead plate. The reactor refueling bellows assembly is welded to the reactor vessel shell flange (see Attachment "B") and the reactor well seal bulkhead plate. The bulkhead plate is welded to the primary containment drywell wall.

Due to the passive design of the reactor well bellows seal, gross seal failure is considered to be a remote possibility. However, in the event that gross seal failure did occur, the backup, self-energizing spring seal would significantly limit the amount of seal leakage. As a precautionary measure, seal leakage is monitored locally once per shift by station operators. In addition, seal leakage in excess of five gallons per minute will annunciate an alarm in the control room.

2. <u>Maximum Leak Rate Due to Failure of Active Components Such as Inflated Seal</u>

   As stated above, the design does not incorporate any active seal components.

3. <u>Make-Up Capacity</u>

   Gross make-up capacity for the refueling cavity can originate from two sources, Core Spray (CS) and Reactor Heat Removal (RHR). Two Core Spray pumps can supply 4720 gpm each, while four RHR pumps can supply 7700 gpm each. Both systems have redundant sources of water, either from the condensate storage tank or from the suppression pool. The spent fuel pool normal make-up supply is from the Reactor Building auxiliary condensate pump with a flow of 275 gpm.

4. <u>Time to Cladding Damage Without Operator Action</u>

   Due to station design, the only time fuel would be uncovered would be if it was in transit at the time of bellows failure. And, since it is anticipated that the refueling cavity water level can be restored and maintained through the Core Spray and/or the Reactor Heat Removal systems, ample time would exist to place such fuel in a safe location (either into the reactor vessel or the spent fuel pool), as described below. The exact time to cladding damage without operator action would require a significant amount of analysis by the NSSS vendor, General Electric. Due to the passive nature of the bellows seal, and the remote possibility of gross seal failure, the District does not believe that such an evaluation is warranted.

5. Potential Effect On Stored Fuel and Fuel In Transfer

In the event of gross seal failure and loss of water level in the refueling cavity with the fuel pool gate removed, a minimum of 2 feet of water would remain over the spent fuel located in the fuel pool. In the event of refueling floor high radiation as a result of the low fuel pool level, Emergency Operating Procedure 5.3.5 would be implemented as described in paragraph 6 below.

If the decreasing refueling cavity water level was detected while fuel was being transferred, the common action taken by Operations would be to return the fuel to the reactor vessel or fuel pool, whichever is more expedient.

6. Emergency Operating Procedures

Emergency Operating Procedure 5.3.5, "Refueling Floor High Radiation", provides instructions to Operations personnel as to required actions to take in the event of a refueling accident. Actions to take in the event of a problem with reactor cavity water level are addressed therein.

It is the judgement of the District that the stainless steel, passive refueling cavity seal design at Cooper Nuclear Station would fail in a manner such that only minor leakage would occur and that a gross seal failure would not occur.

Should you have any questions on this response, please contact me.

L. G. Kuncl
Assistant General Manager-Nuclear

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Attachments

cc: U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

STATE OF NEBRASKA)
)ss
PLATTE COUNTY)

L. G. Kuncl, being first duly sworn, deposes and says that he is an authorized representative of the Nebraska Public Power District, a public corporation and political subdivision of the State of Nebraska; that he is duly authorized to submit this information on behalf of Nebraska Public Power District; and that the statements contained herein are true to the best of his knowledge and belief.

L G Kuncl

L. G. Kuncl

Subscribed in my presence and sworn to before me this 20th day of September, 1984.

John R. McPhail

NOTARY PUBLIC

GENERAL NOTARY - State of Nebraska
JOHN R. McPHAIL
My Comm. Exp. Aug. 10, 1988

Attachment A