VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

84 SEP 7 P2:19

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

August 31, 1984

Mr. James P. O'Reilly
Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 2900
Atlanta, Georgia 30323

Serial No. 525
NO/JHL:acm
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Dear Mr. O'Reilly:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNIT NOS. 1 AND 2
RESPONSE TO I.E. BULLETIN 84-03

We have reviewed I.E. Bulletin 84-03, "Refueling Cavity Water Seal", dated August 24, 1984. An evaluation of the potential for and the consequences of a refueling cavity water seal failure is provided in the attachment. Based on the evaluation and the design differences between the seals at North Anna and the failed seals at Haddam Neck, we believe that the refueling cavity water seal being used at North Anna is adequate.

The information contained in the attachment is true and accurate to the best of my knowledge and belief. Should you have any further questions, please contact us.

Very truly yours,

W. L. Stewart

Attachment

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

Mr. James R. Miller, Chief
Operating Reactors Branch No. 3
Division of Licensing

Mr. M. W. Branch
NRC Resident Inspector
North Anna Power Station

IE11

NORTH ANNA POWER STATION
RESPONSE TO IEB 84-03
REFUELING CAVITY WATER SEAL

North Anna Unit 1 has just completed a refueling outage and is in Mode 5. North Anna Unit 2 is currently in a refueling outage with refueling cavity filling scheduled for September 3, 1984, and fuel transfer scheduled to begin September 5, 1984. Therefore, responses to item 1 and item 2 are provided.

The refueling cavity seal assembly at North Anna Units 1 and 2 consists of a 2 inch thick carbon steel annular plate and neoprene gaskets as shown in Figure 1. The inner edge of the seal ring rests on the reactor vessel flange and is secured by thirty six 0.75 inch diameter bolts torqued to 100±10 ft. lbs. The outer edge rests on the seal ring lower assembly, which is a permanent fixture in the refueling cavity floor, and is secured in the same fashion. Each of these sealing surfaces utilizes redundant neoprene gaskets which are trapezoidal in shape and firmly held in place by a bolted seal spacer. These gaskets are deformed by the hydrostatic load of the water in the refueling cavity and the torqueing of the seal ring bolts to provide for leaktight integrity. This is verified prior to flooding the refueling cavity by the performance of a pressure drop test on each set of gaskets. This test consists of applying an air pressure of 20 psi between each set of gaskets and verifying essentially no pressure drop after 30 minutes.

On Unit 2, the refueling cavity seal gaskets were replaced prior to entering MODE 6.

The refueling cavity seal assembly is designed to retain its integrity under the hydrostatic load imposed by 30 feet of refueling cavity water concurrent with a seismic event.

In a postulated accident consisting of a complete loss of all gaskets, the hydrostatic pressure of the refueling water will force the seal ring against the reactor vessel flange and the seal ring lower assembly. In this event, some leakage from the refueling cavity is expected due to minor seal plate flatness irregularities, however this leakage would be minor and much less then the minimum make up capacity provided by the Chemical and Volume Control System (150 gpm). Additional makeup capacity is provided by the Refueling Purification pumps (400 gpm) and/or Low Head Safety Injection pumps (3000 gpm) taking suction from the Refueling Water Storage Tank. Due to the redundancy of the seal assembly design, a partial gasket failure would only result in minor leakage. A failure of one or several of the 72 bolts, which secure the seal ring, will not result in excessive leakage due to the hydrostatic load of the refueling cavity water. A failure of the annular plate (seal ring) is not considered plausible.

In the event of any type of gasket failure during fuel transfer where the fuel transfer tube is open (i.e., the spent fuel storage pool and the refueling cavity are connected) the fuel assembly in transit could safely reach its destination and the transfer tube could be isolated before a significant drop in level resulted. In addition, the fuel transfer canal is at a significantly lower elevation than the minimum water level which would result from gross

seal leakage without makeup. Should the transfer tube remain open, and a leak greater than the available makeup capacity occurred, a 15 foot high concrete barrier between the spent fuel storage pool and fuel transfer canal would prevent the spent fuel storage pool level from decreasing below an elevation which is 2 feet 8 inches above the stored spent fuel. Also an alarm would alert the control room operator of a low spent fuel storage pool level when it decreased approximately 7 inches below the normal water level. A decrease in the refueling cavity water level would be detected by the cavity watch operator who is stationed at the refueling cavity whenever it is flooded. A significant decrease in either the spent fuel storage pool or refueling cavity water levels would also result in increased radiation levels detected by Technical Specification required monitors which read out in the Control Room.

A complete failure of the refueling cavity seal ring assembly is not a credible accident at North Anna. Due to the design and redundancy of the refueling cavity seal, any type of failure is unlikely. Even in the event of a credible failure, sufficient time would exist to detect such a leak and take corrective action to prevent damage to spent fuel or fuel in transit.

As a result of this I.E. Bulletin, a new abnormal procedure has been written, approved and is in place for both North Anna Units 1 and 2. This procedure was written to further amplify the corrective actions to be taken on a decreasing refueling cavity water level, including makeup, movement of fuel and isolation of the fuel transfer tube.

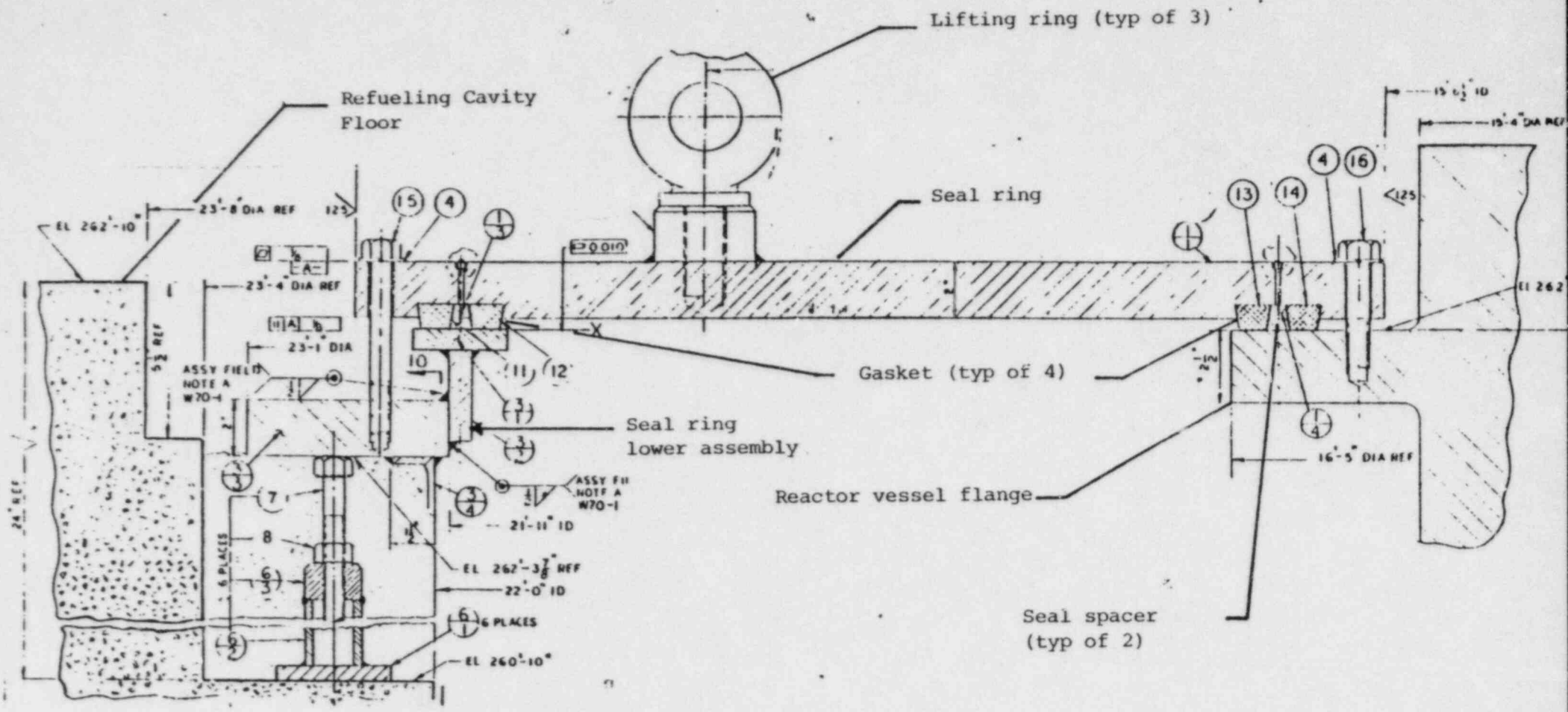

Figure 1. Refueling Cavity Water Seal - North Anna Units 1 and 2