FLORIDA POWER & LIGHT COMPANY

November 23, 1984
L-84-345

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

Dear Mr. O'Reilly:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
IE Bulletin 84-03

Florida Power & Light has reviewed IE Bulletin 84-03, Refueling Cavity Water Seal, as it pertains to Turkey Point Units 3 and 4. A response is attached.

Should you have any questions on this information, please contact us.

Very truly yours,

for J. W. Williams, Jr.
Group Vice President
Nuclear Energy

JWW/PLP/js

Attachment

cc: J. P. O'Reilly, Region II
Harold F. Reis, Esquire
PNS-LI-84-420-1

IE11

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RESPONSE TO IE BULLETIN 84-03
"REFUELING CAVITY WATER SEAL"

BACKGROUND

IE Bulletin 84-03 was issued to notify addressees of an incident in which the refueling cavity water seal failed at the Haddam Neck plant on August 21, 1984. The seal failure occurred when a part of the flexible boot portion of the seal was pushed by water pressure through the annulus between the reactor vessel and refueling cavity.

As requested by the IE Bulletin, FPL has reviewed the reactor cavity seal design used at Turkey Point Units 3 and 4.

TURKEY POINT SEAL DESIGN

The originally installed Turkey Point reactor cavity seal consisted of a 16 ft. 7 inch diameter carbon steel seal ring fitted with 2 pairs of O-rings (See Figure 1). The seal ring was positioned such that each pair of O-rings isolated the 2 inch annular gap between the reactor vessel seal ledge and the refueling cavity seal support ring from the refueling water. Twenty-four mechanical crank assemblies were used to apply a load to the seal plate to compress the O-rings to form the seal. Operating experience with this design showed that the irregularities in the seal ledge/seal support ring were beyond the sealing capabilities of the O-rings and leakage resulted.

A design change was made in 1974 (PC/M 74-74) in which use of the O-rings was abandoned and sealing was accomplished through the use of a 16ft. 7 inch diameter Presray Pneuma-Seal, Model #PRS-585. The seal is made of EPDM compound E603 with nylon reinforcing which exhibits a durometer hardness of 65 (See Figure 2). The seal is installed in the two inch annular gap and once positioned, the carbon steel seal ring is placed over the seal and the same twenty four mechanical crank assemblies are used to compress the seal lips between the seal ring and vessel seal ledge/seal support ring. After installation, the Presray seal is inflated to and maintained at 25 psig. Prior to acceptance, the maintenance supervisor verifies the seal is properly fitted, no anomalies are present and air leakage from the seal is within the allowable limit. Plant Maintenance Procedure 1407.6 is the governing installation procedure.

The design of the modified Turkey Point reactor cavity seal ring provides a double seal against leakage. The primary seal is achieved by the mechanical compression of the seal ring against the top surface of the inflatable seal. This compresses the seal lips against the vessel seal ledge/seal support ring. The secondary seal is achieved by inflating the Presray Seal. Inflation of this seal both expands the upper shoulder area of the seal as well as the balloon portion of the seal against the shield wall and the vessel ledge. The inflatable seal is held in a fixed position by the mechanical crank assemblies/seal ring and does not rely on the inflatable portion for this purpose.

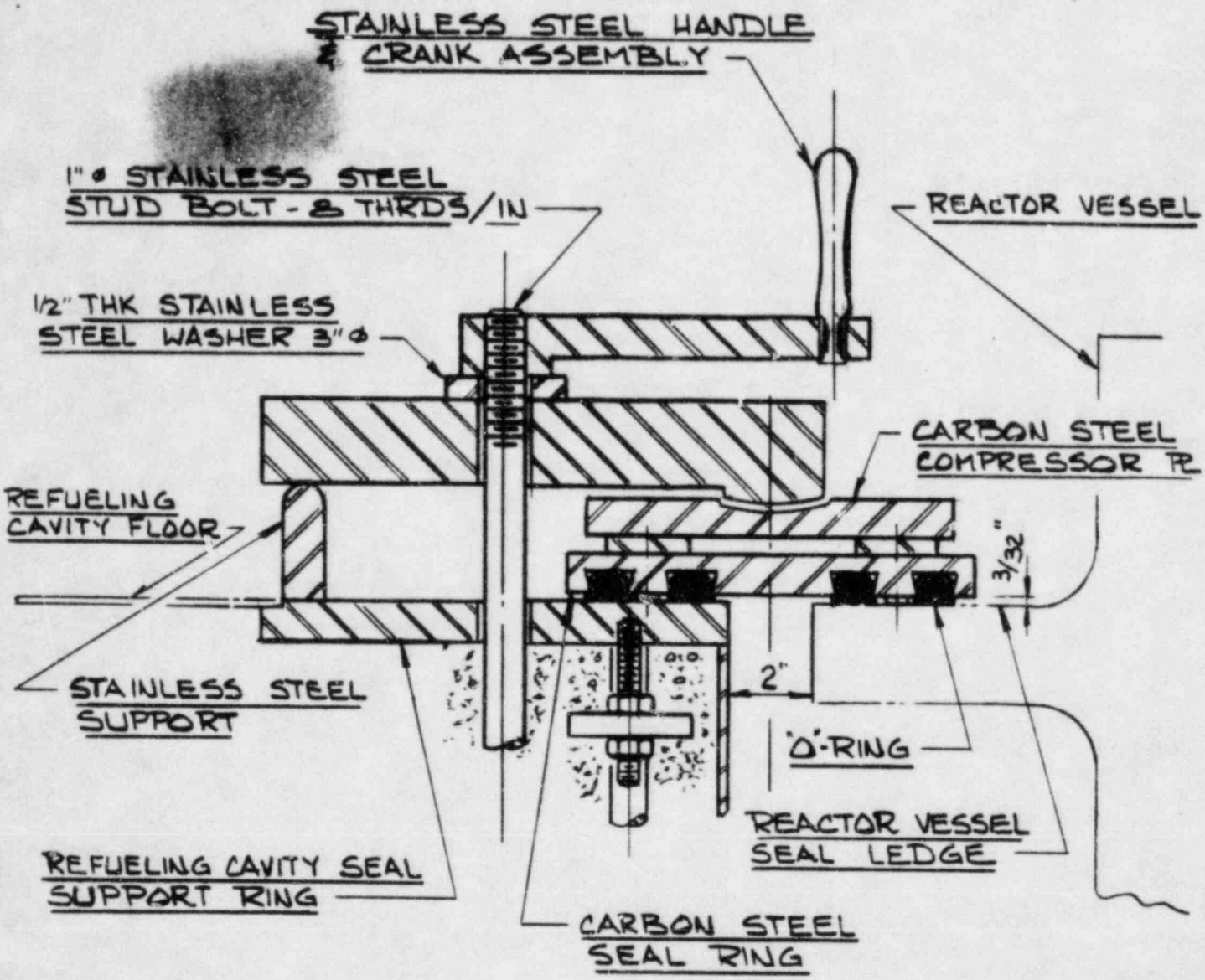
Without taking credit for the sealing contribution of the inflated portion of the seal (i.e., 0 psig inflation), conservative calculations indicate that the seal will maintain its position. The forces tending to hold the seal in place are a minimum factor of 2.3 greater than the forces tending to extrude the seal. If air pressure is maintained, the holding forces exceed the extruding forces by a minimum factor of 5.6. These factors assure adequate sealing capabilities for the maximum height of water above the seal.

Lateral movement of the seal ring is prevented by the mechanical cranking assemblies and 3 index pins located 120° apart. Vertical movement is prevented by the mechanical cranking assemblies. As such, no movement of the seal ring is expected to occur during operation which may affect sealing capability.

Since sealing capability is maintained, even given active failure of the seal (i.e., loss of pressurization), gross seal failure at Turkey Point is not considered a credible event. Therefore, the consequence analysis requested by IE Bulletin 84-03 was not performed.

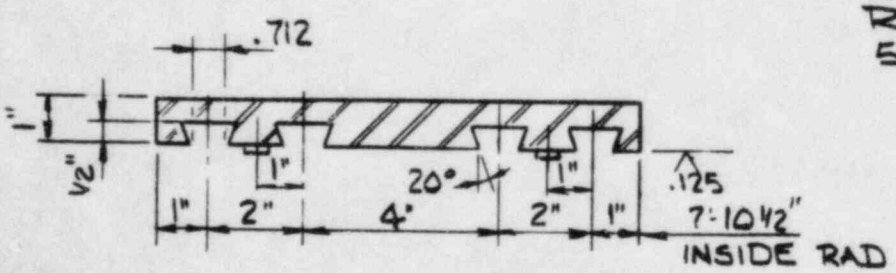
CONCLUSION

Catastrophic failure of the Turkey Point cavity seal, such as occurred at Haddam Neck, is not considered a credible event because of the inherent design differences.



REFERENCES:

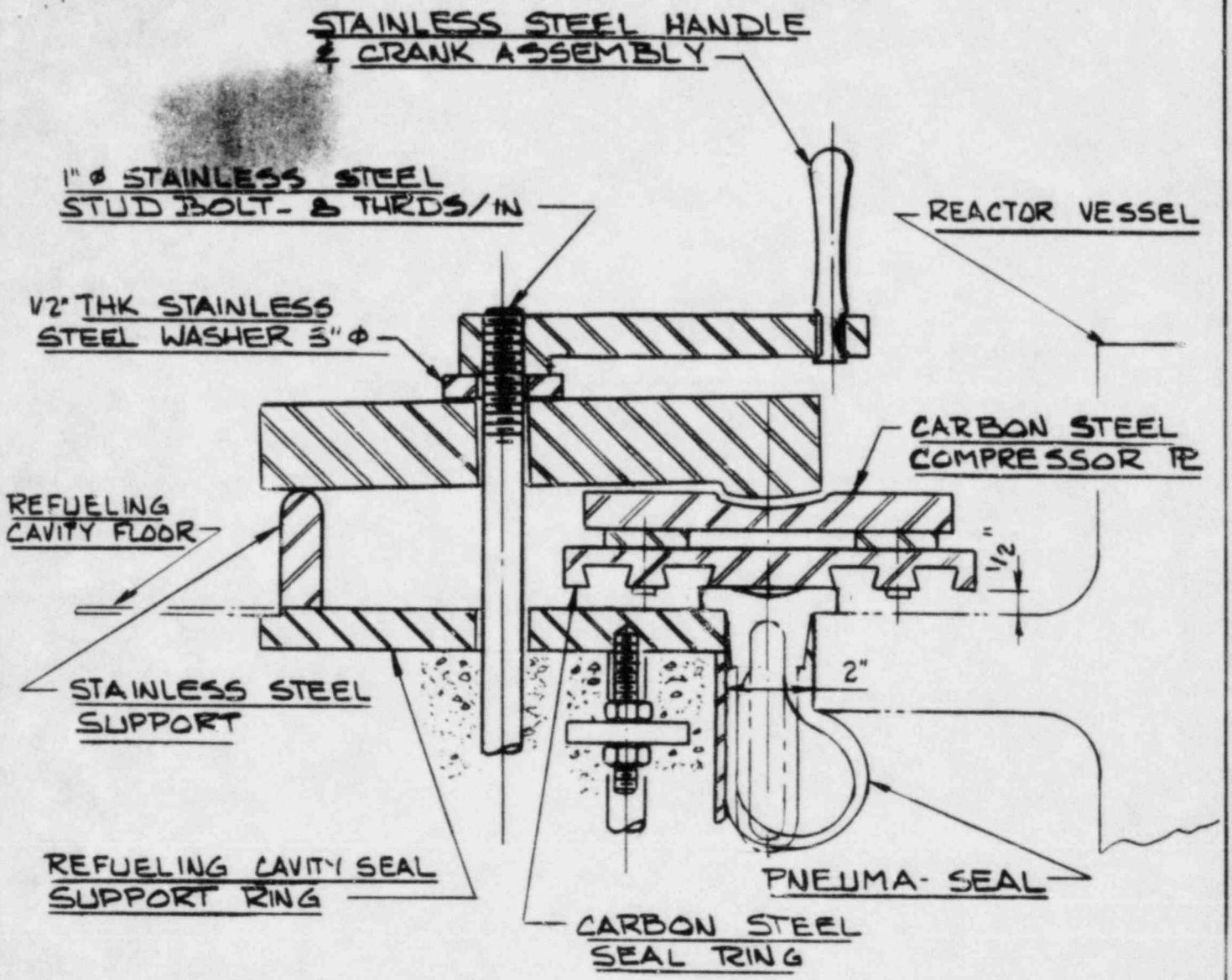
1. CONTAINMENT STRUCTURE REACTOR PIT SEAL RING 5610-C-562

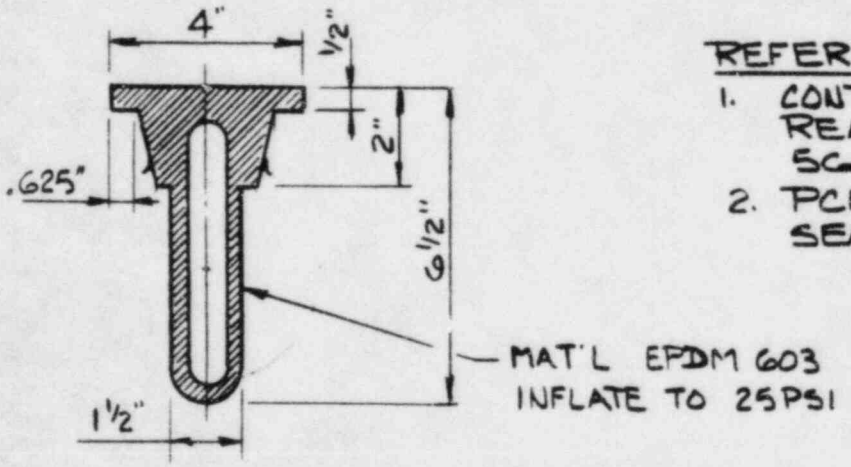


SEAL RING DETAIL

TURKEY POINT UNIT 3 & 4
REACTOR CAVITY SEAL WITH O-RINGS (ORIGINAL DESIGN)
FLORIDA POWER & LIGHT COMPANY

FIGURE 1





PRESRAY PNEUMA-SEAL DETAIL

REFERENCES:

1. CONTAINMENT STRUCTURE REACTOR SEAL RING 5610-C-562
2. PCM: 74-74 REACTOR PIT SEAL RING MODIFICATION

TURKEY POINT UNIT 3 & 4
REACTOR CAVITY SEAL WITH
(1974 MODIFIED DESIGN)
FLORIDA POWER & LIGHT COMPANY

FIGURE 2