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AUTH.NAME AUTHOR AFFILIATION
ZIMMERMAN,S.R. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
VARGA,S.A. Operating Reactors Branch 1

SUBJECT: Responds to 840207 request for info re util investigation of generic interest in refueling canal drain valve operation. Procedures will be revised to establish operation w/valve open except during refueling.

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Director of Nuclear Reactor Regulation
Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
United States Nuclear Regulatory Commission
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
REQUEST FOR INFORMATION
GENERIC INTEREST IN REFUELING CANAL DRAIN VALVE OPERATION

Dear Mr. Varga:

SUMMARY

In a February 7, 1984 telephone conversation, Mr. R. Palla of the Office of Nuclear Reactor Regulation (NRR) discussed with Carolina Power & Light Company (CP&L) NRC's generic interest in refueling canal valve operation and requested information on CP&L's investigation of this issue at H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2). The results of CP&L's study of potential safety concerns and the necessity of operating the plant with closed valves are discussed below.

BACKGROUND

During an inspection at HBR2, the NRC Region II Office questioned the practice of operating with the refueling canal drain valve closed. Should a Loss of Coolant Accident (LOCA) occur when the drain valve is closed, water released from the containment spray system would enter the canal and be unavailable for recirculation. The Regional Office requested that NRR address the issue on a generic basis. The NRR then asked to review CP&L's analysis of operating HBR2 with the refueling canal drain valve closed.

DISCUSSION

Carolina Power & Light Company investigated two questions with respect to operating the plant with the drain valve closed. The first is the potential effect of entrapped water in the refueling canal on the long-term recirculation of cooling water from the containment sump. Carolina Power & Light Company estimated the maximum volume of water that could collect in the canal without spillover to be 48,700 gallons. This estimate does not consider the time required for filling.

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This estimate of refueling canal volume was then compared with the margin in water inventory available for recirculation above the minimum requirement, as shown in the attachment. The FSAR (Section 6.2.2.2.1) states that a minimum of 215,000 gallons is required on containment floor for recirculation. This value, derived from Reactor Coolant System (RCS) water inventory and 60% of the Refueling Water Storage Tank (RWST) capacity, is extremely conservative when compared to the total water inventory available of approximately 337,000 gallons. Furthermore, the RWST provides approximately 48,000 gallons of margin to account for water inventory lost from recirculation. This margin would essentially offset the CP&L estimate of water lost to the refueling canal. Carolina Power & Light Company concluded that sufficient water would be available for circulation independent of water lost to the canal because of the closed drain valve.

The second question CP&L investigated was the maintenance of proper water chemistry in the recirculating water. The principle recirculation water chemistry operating requirements are: 1) maintaining pH between 8.5 and 9.5 in the RWST and 2) a fixed quantity and concentration of NaOH in the spray additive tank. Subsequent to long-term recirculation, two days are available to adjust the pH to 8.0. Timeliness in adjusting water chemistry is not critical, and these corrective actions are permissible independent of existing safeguards design. Carolina Power & Light Company concluded that the effect of the refueling canal water chemistry on recirculating water is not of concern.

Although no safety concerns were identified in operating the plant with the drain valve closed, CP&L examined the necessity of this procedure. This valve has historically been closed during operation. However, Westinghouse recently informed CP&L that it had intended for the drain valve to remain open during operation. The advantage of operating with the valve open is that water would be able to flow to the reactor cavity early in a LOCA and cool the reactor vessel. The only time the drain valve needs to be closed is during refueling. Consequently, CP&L has decided to operate the plant with the valve open. The applicable procedures are scheduled to be revised prior to start-up after the current steam generator replacement outage.

CONCLUSION

In conclusion, CP&L's investigation demonstrated that plant operation with the refueling drain valve closed does not increase risk to public health and safety because the water lost to the canal would not adversely affect the volume or chemistry of the recirculation water. Carolina Power & Light Company also concluded that plant operation with the drain valve closed was not necessary and will change procedures to establish operation with the valve open except during refueling.

If you or Mr. Palla have any additional questions on this subject, please contact Mr. David Stadler of the Nuclear Licensing Unit staff at (919) 836-6739.

Yours very truly,

S. R. Zimmerman
Manager
Nuclear Licensing Section

CGL/pgp (9555CGL)

cc: Mr. J. P. O'Reilly (NRC-RII)
Mr. G. Requa (NRC)
Mr. Steve Weise (NRC-HBR)
Mr. R. Palla (NRC)

ATTACHMENT

1. Calculation of total water inventory availalbe to Containment Sump:

   a. Total RCS volume including pzr. liquid = $9,930\ ft^3 + 780\ ft^3 = 10,710\ ft^3$: $\simeq$80,000 gal.

   b. Total accumulator liquid volume = $3 \times 825\ ft^3 = 2,475\ ft^3$: $\simeq$18,500 gal.

   c. Assume liquid volume retained in RCS $\simeq$ volume of reactor vessel = $3,660\ ft^3$: $\simeq$27,400 gal.

   d. Minimum liquid volume in RWST required by Tech. Specs. : 300,000 gal.

   e. Liquid volume unavailable from RWST if switchover to recirculation mode immediately upon reaching 10% level : $\simeq$37,000 gal.

   f. Minimum liquid volume in spray additive tank required by Tech. Spec. : 2,505 gal.

   Available water inventory = a + b - c + d - e + f
   = 336,605 gal.

Thus, available water inventory of 336,506 gal. >> minimum required water inventory from FSAR for recirculation of 215,000 gal.

Thus, margin available in water inventory $\simeq$ 122,000 gal.

2. Calculation of margin available in water inventory for recirculation using only RWST water inventory:

   a. Minimum liquid volume in RWST required by Tech. Spec. = 300,000 gal.

   b. Liquid volume unavailable from RWST if switchover to recirculation made immediately upon reaching 10% level = 37,000 gal.

   c. Minimum required water inventory for FSAR for recirculation = 215,000 gal.

   Margin in RWST water inventory = a - b - c
   = 48,000 gal.