ENERGY NORTHWEST

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February 11, 2002
GO2-02-024

Docket No. 50-397

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Gentlemen:

Subject: **COLUMBIA GENERATING STATION, OPERATING LICENSE NPF-21 REQUEST FOR ADDITIONAL INFORMATION REGARDING THE UNISOLABLE DRAIN LINE BETWEEN THE CONTROL ROD DRIVE/CONDENSATE PUMP AND REACTOR CORE ISOLATION COOLING PUMP ROOMS**

References: 1) Letter, dated April 16, 2001, RL Webring (Energy Northwest), to NRC, "Request for Amendment, Unisolable Piping Run Between Control Rod Drive and Reactor Core Isolation Cooling Pump Rooms"

2) Letter, dated January 17, 2002, J Cushing (NRC) to JV Parrish (Energy Northwest), "Request for Additional Information (RAI) Columbia Generating Station (TAC NO. MB1777)"

Energy Northwest requested an amendment to Operating License NPF-21 regarding an unisolable piping run between the control rod drive and reactor core isolation cooling pump rooms (Reference 1). The NRC has requested additional information regarding the license amendment (Reference 2). The Energy Northwest response to the NRC request is attached.

Should you have any questions or desire additional information regarding this matter, please call Ms. CL Perino at (509) 377-2075.

Respectfully,

D. W. Coleman

DW Coleman, Manager
Performance Assessment and Regulatory Programs
Mail Drop PE20

Attachment

cc: EW Merschoff - NRC-RIV
JS Cushing - NRC-NRR
NRC Sr. Resident Inspector - 988C
DL Williams - BPA-1399
TC Poindexter - Winston & Strawn

A001

NRC Question #1:

"Discuss the augmented piping inspection programs, if any, for the Service Water System (SWS) and condensate system."

Energy Northwest Response to Question #1:

The SWS is inspected and monitored to detect known damage mechanisms through periodic walkdowns to identify pressure boundary leakage, monitoring of corrosion rates with corrosion coupons, and pipe wall thickness measurements. The periodic walkdowns for leakage are performed as part of the ASME Section XI Inservice Inspection Program and are accomplished every 2 to 4 years.

There are no augmented piping inspections performed for the Condensate Storage and Transfer (CST) System.

NRC Question #2:

"Provide an estimate of the amount of SWS piping (in feet) and the number of welds in the control rod drive/condensate (CRD/COND) room. Also, provide an estimate of how much condensate storage and transfer (CST) piping and how many welds are in the CRD/COND room."

Energy Northwest Response to Question #2:

The following piping lengths are estimates based on a walkdown of the CRD/COND pump room, and measurement of piping lengths using scale drawings. The number of welds are also estimates based on a walkdown:

SWS, 'A' loop: 110 feet of pipe, 22 welds
SWS, 'B' loop: 50 feet of pipe, 6 welds
CST: 310 feet of pipe, 87 welds

The service water loops are used periodically in support of surveillance activities at Columbia Generating Station. In the Probabilistic Risk Assessment (PRA) flooding analysis, each loop is estimated to be pressurized as a possible flood source for 550 hours per year. Also, the SWS has no pressurized equipment other than piping in the CRD/COND pump room. The CST piping is always considered a possible source. For the CST system, 11 valves and 3 pumps located in the CRD/COND pump room were assumed to be possible rupture points and were included in the rupture frequency estimate.

NRC Question #3:

"It is stated on page 3 of the letter dated November 8, 2001, that "The analysis assumes if the plant operators cannot terminate the flooding in one hour, then core damage occurs." Based on this statement, it appears that the estimated probability of failure to isolate within one hour of 1E-4/demand for the SWS piping flooding dominates the conditional core damage probability (CCDP) for ruptures 1, 1R, 2, and 2R (and doesn't change between scenarios) and that this assumption is not used in the CST piping ruptures 3 and 3R. Is this conclusion correct? Discuss why there is not a one-hour time for the CST piping failure."

Energy Northwest Response to Question #3:

The probability for failure to isolate a service water break within an hour was estimated to be 2.0E-4/demand. It is correct that the CST piping ruptures were not assumed to result in core damage on a failure to isolate the break. The reasoning is that the high flow CST piping or equipment ruptures result in a gravity fed flooding event. The CRD/COND pump room will eventually fill to the top, and (given enough time) the RCIC pump room will fill via the EDR drain line to an elevation that is at equilibrium with the remaining water in the condensate storage tanks. Should this happen, the equipment lost will not be greater than that which is already modeled in the scenario, and will not cause core damage without additional random failures.

The service water scenarios were handled differently because the water is being pumped into the CRD/COND pump room by the service water pumps, which are housed separately. The reactor building basement is designed for possible flooding events, and is specifically built to handle static water head in excess of that resulting from a gravity fed CST piping rupture. However, it was not known what would happen if the CRD/COND pump room were pumped solid, and the service water pump was not shut off. The room could possibly experience pressure in excess of what it was designed for, and the analyst could not reliably predict the consequences. It is probable that the pressure would be relieved through a hatch in the ceiling leading to the railroad bay, and then out through the large doors to the exterior. However, the analyst felt that without additional resources and analysis, the possibility of breaking basement walls in the reactor building would not be ruled out. So, the assumption of core damage was taken if the operators failed to shut off the pump in the ruptured service water loop.

NRC Question #4:

"Discuss how high the water is expected to be in the CRD/COND room one hour after a SWS pipe break and one hour after a CST pipe break. State what equipment in the CRD/COND room modeled in the plant's probable [sic] risk assessment (PRA) may be expected to fail within the one hour because of the water from the pipe breaks."

Energy Northwest Response to Question #4:

There are a large range of rupture sizes and rupture locations that can be assumed. With very large ruptures, approaching the cross sectional area of the piping, it is possible in either the CST or the service water pipe rupture cases to fill the CRD/COND pump room to the top within one hour after the assumed rupture.

No equipment in the CRD/COND pump room is modeled in the station's PRA. The previous submittal included a list of all of the cables running through the room. In the PRA flooding analysis, cable which runs through a room but is not terminated in a junction box or at a piece of equipment within the room is assumed not to fail. The CRD pumps, three condensate storage and transfer pumps, an area radiation monitor, and two equipment drain sump pumps are located within the room. The station PRA does not credit any of this equipment to mitigate core damage.

NRC Question #5:

"Discuss how high the water is expected to reach in the reactor core isolation cooling (RCIC) room (caused by drainage through the unisolable drain line) within one hour after a SWS pipe break and one hour after a CST pipe break. State what equipment in the RCIC room that is modeled in the plant PRA may be expected to fail within the one hour because of the water from the pipe breaks. Discuss how long before equipment, other than RCIC modeled in the plant PRA, would be expected to fail."

Energy Northwest Response to Question #5:

The only equipment in the RCIC room that is modeled in the station PRA is equipment that supports the operation of the RCIC pump. The RCIC pump, and its associated keep-fill pump and associated room cooler all reside within the room. The RCIC pump was assumed to fail in all three of the cases where the open EDR line was modeled. Filling the RCIC room to the top would not result in the failure of any additional equipment modeled in the PRA.

The previous submittal included a list of all of the cables running through the room. In the PRA flooding analysis, cable which runs through a room but is not terminated in a junction box or at a piece of equipment within the room is assumed not to fail.

Because the RCIC pump was assumed to fail in all cases for which the open EDR line was modeled, and flooding the RCIC pump room impacts no other equipment modeled in the PRA, no detailed flooding calculations were performed to estimate flood level as a function of time.