Robinson Nuclear Plant

RHR Valves 750 & 751

March 25, 2003

During the preparation of the IPEEE it was identified RNP had two valves that were outliers, RHR-750 and RHR-751. These valves had a calculated HCLPF of 0.28g. A reanalysis was performed in 1998 that looked at the response at the actual elevation of the valves and calculated a HCLPF of 0.39g. This is a value above the 0.3g deemed appropriate for RNP using the guidance of NUREG 1407. RNP now has demonstrated that all components of interest in the IPEEE are above the 0.3g HCLPF and has no outliers. It further demonstrated that these valves have approximately 100% design margin to the 0.2g Design Basis Earthquake.

It should be noted that no credit is taken for the orientation of the valves in this sensitivity case. The valves are oriented approximately 25 degrees apart in relation to a north-south line, which may reduce the likelihood that both valves will fail in a given seismic event. When one valve fails the probability is assumed to be 1.0 for failure of the second valve.

The LERF (Dose Risk and Offsite Economic Cost Risk based of NUREG 1488 values) benefit from going from the existing calculated HCLPF of 0.39g to an expected 0.6g for a yoke of a different material is as follows:

Acceleration Range (g)	Benefit in Dollars
0.4 – 0.5	69,001
0.5 – 0.6	92,238
0.6 – 0.7	132,061
0.7 – 0.8	123,989
0.8 – 0.9	176,350
0.9 – 1.0	59,963
1.0+	354,637
Total Range	1,008,239

It is inappropriate to try and determine the benefit of improving the HCLPF further for these valves without looking at the effects of a more intense earthquake on the rest of the plant. For RNP the mean frequency of exceedance differs by more than an order of magnitude for similar earthquakes between EPRI NP6395-D and NUREG 1488. For NUREG 1488 for RNP for the earthquakes of interest, the mean values exceed those of the 85 percentile indicating an unusual distribution of expert opinion. Figure 1 of NUREG 1488 reads, "…can lead to unrealistically large estimates of recurrence rate at larger magnitudes." It is expected that use of the EPRI data and the above technique of multiplying delta risk with the associated fragility value would reduce the benefit by at least a factor of 15. Using the approach from the IPEEE with EPRI values gives an

exceedance for 0.39g HCLPF of 9E-6. Multiplying this by the 0.05 (95% probability that no more than 5% fail) gives a risk of 4.5E-7 which converts to $39,420. This all leads to a low confidence of any cost benefit computed.

Changes to the cost estimate write-up. The value that should be used for dose is $2000/Rem not $10,000/Rem. There may be some future outage where yoke replacement could be done and not be on critical path. There is a lot of desire to continue to shorten outages and this becomes less likely with time. If the valves require major maintenance (none scheduled) most of the dollars associated with dose would also go away if yoke replacement was done at the same time.