

N69. CONCLUSIONS OF THE EPRI WORKSHOP ON BWR ZINC INJECTION

Data from three plants which started zinc injection relatively early in life and five older plants were discussed. The main conclusions for normal water chemistry (NWC) plants were that radiation fields are reduced significantly by zinc, with a larger effect on fields around piping and a smaller effect on general-area fields, because of crud traps, which are not greatly affected by zinc. Long-term trends are uncertain since many plants have used zinc in conjunction with cobalt replacement and following decontamination. The data base will become much more extensive in a year or so because several plants have recently implemented zinc injection.

The zinc-65 problems that were observed in the first zinc applications in NWC plants seem to have been overcome, and no major zinc-65 problems have been experienced recently. The performance of the zinc injection equipment has consistently improved, and early results from the new passive injection system at Leibstat in Switzerland are encouraging.

The situation with hydrogen water chemistry (HWC) plants is more complex. Shutdown radiation fields increase significantly when switching from NWC to HWC. Recent plant data show a bigger impact on fields from HWC than was observed in the Dresden-2 demonstration several years ago. The effect of zinc in mitigating this jump in fields is uncertain. General Electric has obtained some samples of zinc depleted in Zn-64 (to avoid Zn-65 formation) from various sources, but there are no firm data on availability or cost.

Laboratory and plant data give a fairly high degree of confidence that there are no adverse effects of zinc on structural materials integrity. The best testimonial comes from a detailed comparison of natural zinc and non-zinc plants, which reveals no difference in inter-granular stress corrosion cracking (IGSCC) between the two categories. Zinc appears to increase adherence of corrosion product deposits on fuel cladding, though no effects on Zircaloy oxidation have been observed after two cycles of zinc injection. Three-cycle results are awaited with interest. Overall, the corrosion results are as expected, since zinc injection concentrations have been selected to be consistent with the experience of natural zinc plants.

For more, on the workshop, contact Howard Ocken (415-855-2055) or Christopher Wood (415-855-2379) at EPRI.