

## BNL ALARA Center Data Base

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### EVALUATION OF RECENT EXPERIENCE USING ZINC ADDITION TO REDUCE BWR PRIMARY SYSTEM RADIATION BUILDUP

**Keywords:** RADIATION BUILDUP; RADIATION PROTECTION; WATER CHEMISTRY; BWR; OPERATION AND MAINTENANCE

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**Objectives:** To evaluate the effectiveness of zinc addition to the BWRs in controlling shutdown dose rates in the primary system; to identify any possible adverse effects that accompany zinc injection.

**Comments:** Injecting zinc into BWR reactor water reduces radiation buildup on recirculation piping. It has been adopted by nearly half of all U.S. BWRs. Evaluations after 65 reactor years of operation with zinc additions show an average decrease at standard monitoring points of a factor of about 2.5. The sole adverse effect is an increase in Zn-65 levels, which can be reduced by the use of depleted zinc oxide. The report provides relevant plant data and evaluates the experience gained since the first plant demonstrations of zinc injection.

**Potential for dose limitation:** Fourteen BWR units are now adding zinc to control shutdown dose rates. The average contact dose rate at the standard measurement locations in the thirteen BWRs that have been injecting zinc for more than one cycle is 135 mR/hr, which compares with a historical value of 350mR/hr in non-zinc units. The concentration of Co-60 in the reactor water is reduced by a factor of about two. Changes in water conductivity and pH accompanying zinc injection are negligible. Zinc injection provides a marginal reduction in reducing susceptibility to IGSCC. No adverse effects have been found on fuel performance. The current passive system for adding zinc has proven to be reliable.

**References:** EPRI TR-104606, Interim Report, December 1994.

**Duration:** from: 1992 to: 1994

**Funding:** N/A

**Status:** Completed

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