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EFFECTS OF pH OF PRIMARY COOLANT ON PWR CONTAMINATION

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Project Manager:

Objectives: Present preliminary results on the effects of increasing pH(300)=7.0 to pH(300)=7.2 on six 900 MWe France PWRs.

Comments: Basic research has converged on an optimum pH lying between 7.2 and 7.4 with little difference between the two pH values. Thus, tests on six 900 MWe reactors were started in 1987 by increasing the Lithium concentration to obtain a pH(300) of 7.2. A systematic program for measuring the dose-rate around the primary piping of the reactors was set up. Each time there was a refueling shutdown, dose rate measurements were taken around the primary piping.

Two approaches to analysis were taken: 1) Comparing contamination in two groups of reactors with different chemical conditioning of the primary water. 2) Comparing the development of reactor contamination before and after changing the conditioning.

Remarks/Potential for dose limitation: The comparison in the two groups of reactors was inconclusive. The mean dose rate index for pH=7.0 was 59 (mRem/H) with a standard deviation of 19. For pH=7.2, it was 66 with SD of 21. The results were similarly inconclusive when comparing each reactor before and after changing the pH. Tests carried out on French EdF reactors did not reveal a significant impact due to changing primary coolant conditions to give a value greater than 7.0. But they did not contradict the tendencies revealed by the basic research. However, the effect of changing the pH is slight when compared with changes in design such as the composition of fuel assembly grids or steam generator production techniques.

References: Anthoni, S., Ridoux, P., Menet, O. and Weber, C., "Effects of pH of Primary Coolant on PWR Contamination," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 2, pp. 9-15, British Nuclear Energy Society, London, 1992.

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