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PWR IN-PILE LOOP STUDIES IN SUPPORT OF COOLANT CHEMISTRY OPTIMIZATION

Keywords: COMPONENT RELIABILITY; CONTAMINATION PREVENTION; PRIMARY COOLANT CHEMISTRY; PH; CORROSION CONTROL; RADIATION BUILDUP

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Objectives: The aim of this study is to investigate the effects of primary coolant pH on corrosion product oxide mass and radionuclide inventories on loop component surfaces.

Comments: A series of three 3000 hour in-pile loop runs are in progress using the MIT PWR Coolant Chemistry Loop (PCCL) to verify the selection of pH for use in PWR coolant. The following measurements and examinations are made:

- corrosion product oxide mass
- radionuclide inventories
- surface SEM examination before and after crud removal
- waterborne radionuclide concentration
- crud filter assays pH is optimized through adjustment of relative concentrations of LiOH and H₃BO₃

Remarks/Potential for dose limitation: Essentially, all the work to date supports operation at about pH(300°C) = 7.3. Future tests will study the efficacy of zinc injection for reduction of corrosion product radionuclide buildup.

References: Kohse, G.E., Cabello, E.C., Doboie, L., Driscoll, M.J., and Harling, O.K., "PWR In-Pile Loop Studies in Support of Coolant Chemistry Optimization," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 1, British Nuclear Energy Society, London, 1992.

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