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H-203

CHROMIUM TREATMENT OF RHR PIPING

Keywords: CONTAMINATION PREVENTION; SURFACE PRETREATMENT; SURFACE CONDITIONING; RESIDUAL HEAT REMOVAL SYSTEM; DIABLO CANYON PLANT; CHROMIUM

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Project Manager:

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Objectives:

- 1) Investigate feasibility of using phosphoric acid based chromium plating bath to improve process application
- 2) Develop a range of acceptable chromium plating parameters for treating plant components
- 3) Evaluate effectiveness of surface pretreatments to mitigate activity buildup on out-of-core components
- 4) Scale-up stabilized chromium pretreatment process to full size plant components

Comments: With the positive results obtained in the Doel-2 coupon testing for surface pretreatment using chromium films, a full-scale application program was initiated. This program involved pretreating surfaces of RHR replacement piping at the Diablo Canyon Plant. This new stainless steel piping is 8-inch nominal and was installed during the 1993 refueling outage.

Both chromium and stabilized chromium films were applied to two different sections of replacement piping. A third section of the piping was left in the electropolished only condition while all the remaining pieces were electropolished and pre-oxidized. The electropolished section will serve as the "reference" surface. The pre-oxidation process is the RCT process as is typically applied to boiling water reactor primary system piping. Thus, there are four distinctly different surface treatments in the plant which will be monitored for activity buildup over the next two fuel cycles. Both gross gamma and gamma spectrographic measurements will be made at each opportunity to access the piping.

Remarks/Potential for dose limitation:

- Piping exposed to reactor coolant for only about 36 days at low temperature (~140°F)
- Gamma spectroscopy measurements made approximately 46 days after system was removed from service
- Co-58 was by far the predominant nuclide (>95%), with only trace levels of Co-60, Mn-54, and Fe-59
- Only small differences in activity buildup were observed due to the short exposure period
- General trend of activity buildup correlates with the various surface pretreatments (i.e., stabilized chromium pipe had the lowest buildup and the as-received pipe had the highest buildup)

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References:

Asay, R.H., "Chromium Treatment of RHR Piping," *Radiation Field Control Seminar*, Electric Power Research Institute, Seattle, Washington, 1993.

Asay, R.H., "Activity Pickup by Coated Coupons Exposed in the Doel Reactor," *Radiation Field Control Seminar*, Electric Power Research Institute, Seattle, Washington, 1993.

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Status: In progress

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