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R-447

COUPON EXPOSURE STUDIES AT DOEL-2 USING STABILIZED CHROMIUM SURFACE PRETREATMENT

Keywords: CONTAMINATION PREVENTION; SURFACE PRETREATMENT; PRETREATMENT; CHROMIUM; FILM; COBALT; RADIATION BUILD-UP; BUILD-UP REDUCTION; DOEL-2; PWR

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Objectives: To investigate the effect of a stabilized chromium surface pretreatment on radiation buildup. To optimize the technique.

Since 1988, a cooperative program between EPRI and the Belgian laboratory Laborelec, has been underway to study various surface pretreatment techniques for reducing out-of-core radiation level buildup. The program involves exposure of pretreated coupons made from materials typical of those used in the construction of PWR primary systems, which are attached to the primary side seal plates of both the hot and cold legs of a steam generator at the Doel-2 Reactor. After exposure for a fuel cycle, the coupons are analyzed during refueling outages to determine the level of deposited activation corrosion products. Following these analysis, the coupons can be replaced or reinstalled for exposure in the next fuel cycle.

Comments: Exceptionally good results were obtained by applying a very thin chromium film to the electropolished surface and then incorporating this chromium into a protective oxide coating. Reduction factors in activity buildup of up to twenty (20) were observed in the first cycle during which this technique was used. In subsequent fuel cycles, a test was run in which only the chromium film was used without the stabilizing step. The results of this test were also encouraging, but with significantly lower reduction factors. Efforts to improve the technique used in the early tests were also made.

Remarks: During the last two fuel cycles at Doel, the "Stabilized Chromium" process was verified for both its effect on radiation buildup and its long term stability. The reduction in activity deposition not only was extremely good with factors as high as 150, the film remained stable over the longer exposure time and the reduction factors were actually improved.

References: 1. Asay, R.H., and R.L. Roofthoof, "Update of Doel-2 Coupon Exposure Studies Using Stabilized Chromium Surface Pretreatment," Proceedings, EPRI Radiation Field Control and Chemical Decontamination Seminar, Tampa, Florida, November 1995, EPRI Distribution Center, P.O. Box 23205, Pleasant Hill, CA 94523.

Duration: from: 1988 to: 1998

Funding: N/A

Status: In progress

Last Update: May 7, 1996