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- After over 3 Cycles of exposure, the palladium coatings yielded no clear reduction of Co-58 and Co-60 uptake and enhanced uptake of Cr-51, Ag-110m, Sn-113 and Sb-125.

References: Pick, M.E., Young, M.A. and Roofthoof, R., "Effect of Surface Treatment on Radioactivity Deposition on Stainless Steel Coupons Exposed in Doel 2," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 2, pp. 74-79, British Nuclear Energy Society, London, 1992.

Duration: from: 1986 to: 1992

Funding: N/A

Status: Completed

Last Update: September 16, 1993

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EFFECT OF SURFACE TREATMENT ON RADIOACTIVITY DEPOSITION ON STAINLESS STEEL COUPONS EXPOSED IN DOEL 2

Keywords: CONTAMINATION PREVENTION; COMPONENT RELIABILITY; PRECONDITIONING; SURFACE PREPARATION; SURFACE TREATMENT; SURFACE CONDITIONING; STAINLESS STEEL; CHROMIUM; PALLADIUM COATING; ELECTROPOLISHING; PASSIVATION

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Objectives: Present the results of a joint LABORELEC-EBES/Nuclear Electric/EPRI study of surface pre-conditioning and coatings to reduce radioactivity uptake on surfaces undertaken on the Doel 2 PWR in Belgium.

Comments: Stainless steel 304L, 309L, 316L and CF8M coupons have been exposed for between one and three cycles in the hot and cold legs of a steam generator channel head on Doel 2 PWR between 1986 and 1991. In the present paper results from examination of coupons exposed up to 1991 during Cycles 14, 15 and 16 are reported. The surface finishes on these coupons included as received, electropolished, electropolished/passivated, chromium plated, chromium plated/passivated and palladium coated. Results from gamma spectrometry and scanning electron microscopy examinations of the coupons are reported. The most dramatic result is the very low activity uptake on the chromium plated coupons.

Remarks/Potential for dose limitation: Occupational radiation exposure arises principally from exposure to radiation fields on out-of-core surfaces during maintenance and inspection operations. Reduction of these radiation fields by treatment of surfaces is in the interest of ALARA.

The main conclusions from this study are:

- Chromium plated coupons showed an order of magnitude lower levels of activity than as received coupons.
- The activity levels of the 309L, 316L and CF8M chromium plated coupons were very similar.
- The addition of a passivation stage after the chromium plating treatment had a detrimental effect by increasing activity uptake by up to a factor of two.
- Electropolished/passivated (E/P) CF8M coupons have a factor of 2 lower activity while E/P 309L coupons have a slightly increased level of activity uptake compared with the as received coupons.