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COBALT SOURCE REDUCTION

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Objectives: To investigate the extent of various contributions to cobalt sources in reactor systems and to seek appropriate ways to minimize these sources.

Comments: Cobalt sources may be classed as follows:

1. Residual impurities in structural alloys (nickel-base inconels and iron-base stainless and carbon steels)
2. Majority constituent in hardfacing alloys (cobalt-base Stellites)

Dose rate contribution depends on several factors:

1. Release due to corrosion and /or wear
2. Surface area in contact with primary coolant
3. in-core versus ex-core source

Cobalt content of structural alloys has been much reduced:

- Inconels from 450 to 150 ppm
- 300 series stainless steels from 1,500 to 200 ppm
- Zircaloy unchanged from 1 to 1 ppm

Low cobalt alloys are being used in structural components:

- Alloy 690 tubing in replacement steam generators
- In new BWR control blade tubing and sheathing
- In PWR control rod cladding
- Zircaloy is being used in PWR fuel spacer grids

Remarks: Cobalt-free hardfacing alloys are being developed for valves:

- The weldability of EPRI's NOREM alloys has been improved to facilitate repair applications
- Field use is being implemented
- Extensive use of Antinit and Everit iron-base alloys in Siemens/KWU PWR Konvoi design

References: Ocken, H., "Cobalt Source Reduction," Proceedings, EPRI Radiation Field Control and Chemical Decontamination Seminar, Tampa, Florida, November 1995, EPRI Distribution Center, P.O. Box 23205, Pleasant Hill, CA 94523.

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