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RADIATION FIELD CONTROL AT SUSQUEHANNA BWR

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Project Manager:

Objectives: To reduce shutdown radiation fields at Susquehanna.

- Susquehanna has two BWR units rated at 1140 MWe
- Shutdown radiation fields are low
- Zinc injection has not been implemented
- The plant does not operate under Hydrogen water chemistry

Previous studies showed that Susquehanna radiation fields are dominated by crud deposition (80%). Co-60 contributed about 75% of dose rate, Mn-54 contributed 20%.

Susquehanna had very high feedwater iron input, very low reactor water soluble cobalt-60, low reactor water insoluble cobalt-60 and high reactor water insoluble manganese-54.

The crud is due to the high feedwater iron input.

In order to further reduce radiation fields, Susquehanna has taken several actions to reduce the high feedwater iron input.

Comments: The following actions were taken to reduce radiation fields:

- Used condensate demineralizer resin with improved iron removal capability
- Improved the condensate demineralizer resin transfer for resin cleaning
- Replaced carbon steel steam extraction piping with more corrosion/erosion resistant material
- Improved operation of ultrasonic resin cleaning of condensate demineralizer resin
- Modified the condensate demineralizer resin vessels to improve transfer to URC
- Replaced RWCU pumps with more reliable pumps
- Replaced control blades containing stellite pins and rollers
- Used a condensate demineralizer resin with higher crud removal efficiency

It was found that Reactor Water isotopics were lowered while piping isotopic deposits and radiation fields were not changed significantly to date.

Remarks: The above actions have lead to the following positive effects:

- Reduced feedwater iron concentrations
- Reduced reactor water isotopic concentrations
- Reduced shutdown radiation fields

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The resin replacement, however, also had some negative impacts.

References: Pacer, J.C., "Radiation Field Control at Susquehanna," 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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