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UPDATE ON DOSE RATES IN SIEMENS-DESIGNED PWRs

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Objectives: Investigate

- 1) Radiation fields in Siemens/KWU PWRs
- 2) Influence of the cobalt replacements on Co-60 activity concentration in the coolant and on the system surface
- 3) Comparison of Co-60 and Co-58 concentration levels
- 4) Overview on the occupational radiation exposures

Comments:

- An improvement was shown going from pH 6.9 (at 300°C) to pH 7.2-7.4 and further at plants with low cobalt inventory
- 1991 conclusions were: Radiation field will be reduced by using cobalt-free hardfacing materials and by operating with the "modified" B/Li chemistry

Results Drawn From Dose Rate Development at 7 Siemens PWRs

- The plant starting to operate at pH 6.9 (300°C) (coordinated B/Li chemistry) continues to see a slight increase in radiation field
- The plant starting to operate with "modified" B/Li chemistry seems to have reached an equilibrium situation after 4 years
- All plants with cobalt replacements are operating with dose rates of ≤ 0.5 mSv/h

Remarks/Potential for dose limitation: The following summarizes the data from Siemens PWRs

- Radiation fields reduce with Stellite reduction
- Co-60 on surfaces reduces with Stellite reduction
- Coolant Co-60 reduces with Stellite reduction
- Coolant Co-60 correlates with Co-60 on surfaces
- Co-58 on surface: no correlation with Stellite reduction
- Coolant Co-58 does not correlate with Stellite reduction

All data available at Siemens/KWU confirm the Stellite replacement concept.

References: Marchl, T. and Riess, R., "Update on Dose Rates in Siemens-Designed PWRs," *Radiation Field Control Seminar*, Electric Power Research Institute, Seattle, Washington, 1993.

Duration: from: 1991 to: 1994

Funding: N/A

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