BNL ALARA Center Data Base

U.S.A. R-386

UTILITY APPROACH TO RADIATION FIELD REDUCTION BY COOLANT CHEMISTRY CONTROL

Keywords: CONTAMINATION PREVENTION; ALARA; PH; PH CONTROL; ZINC INJECTION; WATER CHEMISTRY; PRIMARY COOLANT CHEMISTRY; RADIATION FIELD CONTROL; COBALT REDUCTION; LITHIUM

Principal Investigator:

M. Hudson
Northeast Utilities
P.O. Box 270
Hartford, Connecticut 06141
U.S.A.
Phone: 203-665-3977

Project Manager:

Objectives: Describe the field testing and implementation of zinc injection at Millstone 1 (BWR), and elevated pH control at Millstone 3 (PWR). The results after two cycles of operations are presented.

Comments: In 1986 Northeast Utilities (NU) initiated an aggressive ALARA improvement program for application at all four of its nuclear generating stations. A part of this program was to focus on achieving lower radiation fields by implementing the latest technologies available in coolant chemistry control, cobalt source removal, component surface conditioning and decontamination.

Remarks/Potential for dose limitation: Two cycles of operation with zinc injection at Millstone 1 were successful in reducing surface dose rates by factors up to 2. The zinc injection process does not seem to introduce any unmanageable concerns, while the expected use of zinc depleted in Zn-64 is likely to improve considerably the benefits of this process. Elevated pH control for two cycles at Millstone 3 has also been successful in controlling the increase of dose rates in SG channel heads and associated piping. Unfortunately, the fuel cladding oxide concerns, possibly enhanced by operation at higher lithium levels, have led to a temporary respite from elevated pH operations until cladding oxidation limitations are better defined, and/or more corrosion resistant cladding alloys become generally available.

Decontamination, surface treatments and cobalt source removal programs are in place or are being introduced at all of the NU nuclear stations. It is anticipated that these programs, in conjunction with the coolant chemistry programs, will continue to reduce occupational radiation exposure at all of NU's operating reactor units.

References: Hudson, M.J.B. and Klisiewicz, J.W., "Utility Approachy to Radiation Field Reduction by Coolant Chemistry Control," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 2, pp. 96-102, British Nuclear Energy Society, London, 1992.

Duration: from: 1986 to: 1992

Funding: N/A

Status: Completed

Last Update: September 17, 1993