

# BNL ALARA Center Data Base

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R-451

## ELEVATED PH COOLANT CHEMISTRY CONTROL AT MILLSTONE POINT-3

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**Objectives:** To investigate the effect of pH on dose rates. In the early 80's it was recognized that a constant pH was necessary in PWR in order to minimize the formation and mass transportation of radionuclides. Original industry standard pH 6.9 was based on solubility of magnetite. As part of an industry research for "optimum pH" the Ringhals units operated with 3.5ppm Li in the reactor coolant until reaching a high temperature pH of 7.2 to 7.4. This pH was then maintained constant until the end of the cycle.

**Comments:** The Ringhals success in maintaining low steam generator (SG) channel head dose rates led to an EPRI-sponsored elevated pH program at Millstone Point 3 (MP3). This program covered 5 different fuel cycles. Result showed that the elevated pH cycles (3.5 ppm Li) were successful in maintaining low channel head dose rates, but the appearance of some oxide thickness value above fuel vendor's data base became a major concern. In the meantime, as a partial result of the MP3 testing, a group of industry experts (EPRI primary Chemistry Committee) decided that the right compromise for a normal coolant pH would be to follow a modified elevated pH regime. This regime consists of following a constant pH of 6.9 at the beginning of the cycle until reaching 2.2 ppm Li. The Li is then held at 2.2 ppm until reaching a pH value of 7.2 or 7.4. The pH is then maintained constant by coordinating Li/B until the end of the cycle.

**Remarks:** At the end of Cycle 5 radiation survey showed a considerable decrease in component and SG channel head dose rates. As a result of this reduction, MP3 was able to complete its scheduled first cycle after initial start up. Therefore, it can be concluded that SG channel head electropolishing, in conjunction with other dose reduction measures, definitely contributed to the low radiation field witnessed within the SGs at MP2.

**References:** Hudson, M., "Elevated pH Coolant Chemistry Control at Millstone Point-3," Proceedings, EPRI Radiation Field Control and Chemical Decontamination Seminar, Tampa, Florida, November 1995, EPRI Distribution Center, P.O.Box 23205, Pleasant Hill, CA 94532.

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