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H-184

ZION UNIT 2 CYCLE 12 SHUTDOWN AND EARLY BORATION RESULTS

Keywords: OPERATIONAL AND MAINTENANCE TECHNIQUES;
SHUTDOWN CHEMISTRY; BORATION

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Objectives: The Commonwealth Edison (CECo) Zion unit 2 reactor had early boration and hydrogen peroxide treatment for the cycle 12 refueling outage. This report summarizes the chemistry and radiological observations from Zion 2 cycle 12 and from the refueling (Z2R12) shutdown.

Comments: Some of the results are as follows:

Zion 2 cycle 12 mid-cycle outage 9-27-91:

- * Outage extended beyond original end date to 11-12-91
- * De-lithiated to < 0.1 ppm
- * Borated to pre-determined shutdown margin (1381 ppm B max)
- * Removed 127 curies Co-58 and 7.3 curies Co-60 in the 1st 6 days
- * No nickel analyses requested (or performed)
- * No radiological problems

Zion 2 cycle 12 mid-cycle outage 4-3-92:

- * Outage extended beyond original end date to 6-19-92
- * Cool to 175 F and maintain 175 F for 38 days
- * 1 RCP operating and letdown demins aligned
- * De-lithiated to < 0.1 ppm
- * Borated to pre-determined shutdown margin (1273 ppm)
- * Removed 1637 curies Co-58 and 34.8 curies Co-60
- * Removed 4500-5000 grams nickel
- * No radiological problems

Remarks/Potential for dose limitation:

Zion 2 cycle 12 end-of-cycle outage 11-12-92:

- * De-lithiated to < 0.1 ppm
- * Borated to > 2000 ppm within 12 hours
- * Removed 822 curies Co-58 and 8.6 curies Co-60. Small removal compared to previous outages.
- * Removed > 4200 grams nickel. Large removal compared to previous outages.

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End-of-cycle outage exposure totals:

- * Pre-outage estimate 619 person-rem
- * Actual 268.8 person-rem
- * 36.6 of 268.8 person-rem was emergent work

Summary:

- * Mid-cycle outage cleanup and operating chemistry control combined to contribute to radiological improvements
- * May provide justification for chemistry and temperature hold during outages for ALARA purposes.

References: Stern, S., "Zion Unit 2 Cycle 12: Shutdown and Early Boration Results," 1993 *Radiation Exposure Management Seminar*, Westinghouse, Pittsburgh, Pennsylvania, 1993.

Duration: from: 1991 to: 1993

Funding: N/A

Status: Completed

Last Update: November 24, 1993