N128. Dose Reduction In Japan Atomic Power Company Plants

Annual collective dose per reactor in Japan Atomic Power Company BWRs was approximately 240 person-rem in 1990, and for PWRs approximately 170 person-rem. Reasons for the reduction were attributed to: the main dose-reduction measures taken in BWRs which reduced the amount of iron crud brought in with the feedwater and the installation of additional shielding; in the case of PWRs, optimization of water quality control of the primary cooling water and decontamination were important as well as installation of additional shielding and robotic devices. Recently constructed plants have improved designs resulting from previous experiences. In addition to facility improvements, a new management approach called "Target Dose Management System" was established and introduced. Facility improvements include: 1) reduction of radioactive corrosion products (iron crud); 2) installation of oxygen injection facility; 3) increase condenser purification system; 4) use of corrosion-resistant materials; 5) use of low cobalt materials; 6) application of decontamination technology; 7) use of reactor well bellows decontamination device; 8) use of stud bolt and brush cleaning device; and 9) installation of shields on recirculation piping and coolant purification systems.

Under the improved management approach, a number of operational improvements have been made including: 1) prefilming of the primary system equipment and piping; 2) operation of the feedwater and purification systems before startup to remove corrosion products generating during the annual maintenance outage; 3) prevention of dispersion of crud during refueling; 4) use of a simplified glove box in checking and overhauling valves; 5) use of mock-up training on control rod drive settings and removing activities; 6) pump mechanism disassembly and checking and operation of in-service inspection device; 7) keeping personnel engaged in radioactive operation well informed of the situation; 8) implementation of the ALARA coordinating group; and 9) setting of appropriate ALARA goals and follow-up after completion of work.

Taken From: "Dose Reduction Management and Practice at Nuclear Power Plants in JAPC," K. Muramatsu (Japan Atomic Power Company, Ohtemachi Bldg. 6-1, 1-Chome, Ohtemachi, Chiyoda Ku, Tokyo 100 Japan). Presented at the Workshop on Work Management and Occupational Dose Control, OECD Nuclear Energy Agency, Paris, France, February 4-6, 1992.