N123. Advanced Technologies

Commonwealth Edison has employed advanced technologies in the areas of work planning, work performance, and monitoring to control and continually reduce occupational exposure. Included in these efforts are the application of computer-aided drawing systems, videomapping of work areas at Braidwood station by means of approximately 100,000 still pictures which have been incorporated into a laser disk video mapping system, and a similar system through use of still photography and computers at Quad Cities, where digitized photographs are being incorporated into computer memory systems. A submersible robot was utilized at LaSalle to obtain initial design measurements of the spent fuel pool in preparation of a rerack modification. At LaSalle, maintenance personnel recently employed the use of ABE/CE Wetlift 2000 equipment for the disassembly of the reactor vessel internals underwater. Automatic flange cleaners have been used at Byron Station and automatic welling equipment at Dresden and Quad Cities Stations. Automatic non-destructive examination equipment is in use at LaSalle for weld inspections; a semi-automatic controlled-rod-drive removal and installation tool is used at LaSalle, as well as some enhanced labeling techniques and self-illuminating light sticks attached to the bottom of the control-rod-drive to identify those to be exchanged or inspected.

Scavenger and super scavenger robots have been used at LaSalle and Dresden Stations for radwaste tank and floor cleaning and the Andros robot was used at LaSalle with an articulating arm to retrieve and process highly radioactive control-rod-drives and suction filters for shipment. Remote cameras are utilized at all six plants to monitor work in higher radiation areas. They can be fixed-focus or pan/tilt/zoom type, depending on their application. Repetitive work is videotaped utilizing these cameras to provide for future training. Electronic alarming dosimetry is employed at all six nuclear plants to monitor personnel while working in radiation areas. In addition, wireless remote electronic dosimeters are used during special activities in high radiation areas. In addition, wireless remote electronic dosimeters are used during special activities in high radiation areas.

Robots have been equipped with remote cameras and dose rate monitoring equipment to provide remote monitoring of high exposure activities at each of the nuclear stations. The Byron Station recently repaired guide pins on the bottom of the upper internals with the help of an underwater robotic monitoring device. Commonwealth Edison is currently working with EPRI and several U.S. utilities to develop the technology to replace the stellite pins and rollers of irradiated original equipment control blades.

The company has contracted with a leading robotics manufacturer and a consortium of U.S. utilities to develop an integrated radiation mapper assistant robot. The robot will be equipped with cameras, directional and area radiation monitors, and a laser range detector.

Taken From: "Advanced Technologies Applied to Work Management," L. Aldrich (Commonwealth Edison Company, Nuclear Services Radiation Protection, P.O. Box 767, Chicago, IL 60690-0767 USA). Presented at the Workshop on Work Management and Occupational Dose Control, OECD Nuclear Energy Agency, Paris, France, February 4-6, 1992.