

N239. Reducing Radiation Dose by Effective ALARA Engineering

ALARA engineering should be an essential part of each phase of any operation. The ALARA engineering group should ensure that ALARA practices and lessons learned are included during outage planning, process preparation, training, and on-site work.

An effective ALARA program includes a full-service ALARA engineering unit staffed by qualified senior radiation protection technicians with field experience. The program is best planned by a team incorporating service company and utility staff, so a detailed ALARA plan covering all aspects of the job can be established. Individuals selected to implement an effective ALARA program must be technically knowledgeable, enthusiastic and good communicators, able to convince workers of the need and importance of making changes, and able to successfully convey that ALARA is a priority.

An effective ALARA program should emphasize dose prevention, not dose tracking. Unfortunately, many ALARA engineering programs simply supply customers with "ALARA engineers" who spend the bulk of their time reporting what happened, rather than playing a proactive role to ensure that work actions are indeed as low as reasonably achievable. Management-approved procedures should be in place that outline and control requirements of a proactive ALARA program.

Pre-Deployment Planning

ALARA involvement with outage planning should start several months before deployment, with a lead ALARA engineer assigned to the project and a detailed plan of action established. Working meetings should be scheduled between the service company ALARA engineers and the utility radiation protection or health physics department so that a detailed ALARA plan can be put together. This plan should include personnel responsibilities, jointly determined dose estimates, lessons learned and radiological guidelines for the outage tasks assigned to the service company. The result is an ALARA plan mutually agreed to by the service company and the utility. The team planning approach ensures the utilities' requirements are fully understood and are considered during training and pre-deployment preparation. It also ensures maximum use of site low-dose areas, lessons learned, realistic mockup areas, challenging dose estimates, and radiological control practices.

On-Site Leadership

The ALARA engineer's job, while on site, is to ensure that all work is accomplished in accordance with the ALARA plan, using the minimum exposure possible and without radiological control problems. This means observing work at the reactor building, control stations, and mockup training area. The ALARA engineer should continuously keep the site radiation protection supervisor informed of upcoming tasks and their radiological impact, to ensure timely support. Personnel entering a high radiation area such as the steam generator platform or reactor cavity should be interviewed by the ALARA engineer to ensure that they are qualified and trained for the task, thoroughly understand their job functions, have the necessary tools, and are aware of hot spots and low-dose areas. ALARA coverage should include at least one ALARA engineer per shift to cover refueling work and one ALARA engineer per shift to cover steam generator work. The ALARA engineer must be free from clerical duties, so ALARA clerks should be assigned to track dose and issue daily status reports.

ALARA engineering should be a part of post-outage critiques to ensure that all radiological control lessons are documented for future use.

Taken from, "Service Worker Dose Reduction: Whose Job is It?" by James F. Eaton. 1993 Dosimetry and Radiation Protection, published as a supplement to the January 1993 issue of Nuclear