

N314. Small-Scale Models Equal Large-Scale Savings

A combination of cost-effective tools can help reduce exposure and cost by improving outage planning. One effective tool is the physical scale model.

Reducing the amount of time spent in radiation fields is one of the most cost-effective ways of reducing radiation exposure. The model is an effective tool that reduces the time people spend in containment, saving both dose and money. By adding physical models to their operation and maintenance program, nuclear stations can improve the quality of their maintenance work, lower personnel radiation exposures, reduce design interference, lower modification costs, and improve the quality of design. Because a physical model presents total visual information, it can provide at a glance what would otherwise require examination of many drawings. Models can show a plant system or area in three dimensions, allowing station personnel to review and evaluate the area. Alternative designs can be compared, making the choice of a constructible, operable, and maintainable design easier.

In keeping personnel radiation exposure as low as reasonably achievable (ALARA), using a model can minimize the time needed for design personnel to conduct field verification activities in high radiation areas. Before planned outages, station personnel can use a model to look at the area and discuss the scope of the work. The model can be used to plan manpower allocation and identify restricting or interfering work assignments, which can save valuable outage time, reduce personnel radiation exposure, and help with future outage planning.

Commonwealth Edison (ComEd) has used three drywell area models to improve planning and contractor-employee plant orientation, and as a result has reduced radiation exposure for both ComEd and contractor staff.

The first model was of LaSalle 2, a BWR Mark II. The model was used to plan manpower allocation and identify restricting or interfering work assignments. The model cost around \$80,000. A questionnaire completed by ComEd and contractor personnel indicated benefits where the cost of the model was easily recovered. The second model, Dresden 3 has been used in one outage. It saved 57 person-rem through reducing man-hours and radiation exposure. The model cost about \$100,000, and it resulted in savings of approximately \$540,000 for one outage (valuing one person-rem at \$9500). The third drywell area model was used last year as a planning tool for a major outage. It saved a total of 4,000 hours and 45 person-rem. The model cost was around \$120,000 and resulted in saving about \$900,000 for one outage (valuing one person-rem at \$10,000).

For more, "Small-Scale Models Equal-Large Scale Savings," by R. Lee and R. Segroves, *Nuclear Engineering International*, pp. 42-43, August, 1994. For further information, contact Robert Segroves at Sargent & Lundy, Tel: (312)/369-6167, 55 E.Monroe, Chicago, IL 60603-5780.