

N3419. GETTING THE DOSE PROBLEM UNDER CONTROL IN SWEDEN

Systematic dose reduction is needed at nuclear plants, not only for safety reasons, but also for economic viability and public acceptance. In Sweden doses have increased significantly recently and a major effort is needed to buck the trend. To succeed there must be total commitment to ALARA at all levels of management.

Why Have Doses Increased?

The main reason for rising doses during 1992 and 1993 is the volume of work being carried out in the power plants. The increasing doses can partly be explained by the fact that some of the reactors are aging, thus requiring significant maintenance and repair. More stringent safety requirements resulting in extension of inspection programs have also contributed to the increase in doses during this period. In particular, a significant safety related event happened in 1992, when insulation material found its way to the inlets of safety injection systems at Barsebaeck causing risk of clogging. This event led to modification work being carried out on all the BWRs of similar design, resulting in collective doses of about 7 man-Sv for the five reactors concerned.

Turning the Tide

The trend towards high collective doses has called for the establishment of more fundamental ALARA (as low as reasonably achievable) programs, especially for the BWRs.

The Role of Fuel Failures at Swedish Nuclear Plants

Extensive computer simulations were performed to find the factors responsible for this radiation build-up.

Fuel failures are causing an increased spread of cobalt-60 from the fuel to the reactor systems. This phenomenon is currently being studied in more detail, but it is already evident that increased attention to fuel failures is needed. The increased burn-up level of more recent BWR fuel is also a factor responsible for the increasing radiation levels in Swedish BWRs. The present burn-up level is around 40 Mwd/kg U.

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