

# Employee Training

## Maintaining Occupational Radiation Exposures

### ALARA

Facilities utilizing radioactive materials have an established regulatory obligation to ensure radiation exposures to staff members fall below certain numerical levels. The numerical levels are often many times greater than the doses actually received most occupationally exposed workers. This means that potentially a worker could maintain poor radiation safety habits and practices but still not exceed annual radiation exposure limits. Or, the employee's facility could expose its workers to unnecessarily high levels of radiation exposure with little concern for exceeding the annual dose limits. To ensure that situations such as these do not occur, the Nuclear Regulatory Commission (NRC) integrated the As Low As Reasonably Achievable (ALARA) concept into its regulations (10 C.F.R. 20.1101(b)). <http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/full-text.html#part020-1101>

The ALARA concept focuses on maintaining radiation exposures as low as possible while taking economic considerations into account. Any alteration to work practices, shielding requirements, or procedures should be made to lower radiation exposures so long as the 'cost' of the alterations is reasonable. With ALARA in mind, a facility is not just required to maintain radiation exposures below the annual occupational limits, but it must strive to attain the lowest possible exposures that are reasonably possible.

The implementation of the ALARA concept requires a licensee to do several things.

- First, a facility must review its radiation safety program, including ALARA considerations, at least annually (10 C.F.R. 20.1101(c)). <http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/full-text.html#part020-1101> The review must be formal and include dosimetry and dose reports, regulatory inspection reports, and consultations with those involved with radiation safety.
- Secondly, a facility must setup Investigational Levels (IL) to be used when reviewing radiation dosimetry reports. The ILs provide benchmarks that aid in determining which occupational exposures may need further review. Commonly, ILs are setup as:

**TABLE I: INVESTIGATIONAL LEVELS**

Body Part Exposed	Level I (mrem per calendar quarter)	Level II
1. Whole body; head and trunk; active blood forming organs; or gonads.	125	375
2. Hands and forearms; feet and ankles. Skin of whole body.	1250	3750
3. Lens of the eye.	375	1125

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Radiation exposures are to be reviewed by the Radiation Safety Officer (RSO) on at least a quarterly basis. Individuals whose quarterly exposures are below IL 1 require no further review of their dose. Individuals whose quarterly exposures fall between IL 1 and IL 2 require that their exposures are reported by the RSO to the Radiation Safety Committee (RSC) and the licensee's management. No further action is necessary for these individuals, but their exposures are to be compared to others performing similar duties to index whether the ALARA program is adequately operating. Radiation exposures that fall above the IL 2 are investigated by the RSO. The results of the investigation, including the individual's dose results, are to be reported to the RSC and licensee management.

In addition to reviewing radiation safety practices and dosimetry reports, the ALARA program requires that an adequate level of training be provided to those working with radioactive materials. The RSO should schedule briefings and educational sessions, as necessary, to inform workers of ALARA efforts and practices. The RSO must be consulted on any new uses of radioactive materials to ensure that the ALARA program will be utilized and that all involved staff members receive adequate radiation safety instruction in order to limit radiation exposures.

As an occupationally exposed radiation worker, you will receive training in maintaining radiation exposures As Low As Reasonably Achievable. Should you have any questions, concerns, or suggestions concerning radiation and the use of radioactive materials, you are encouraged to direct them to the Radiation Safety Officer for your facility.