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### INTERNAL DOSE, RESPIRATORY PROTECTION AND REVISED 10CFR20 AT DAVIS-BESSE NUCLEAR POWER STATION

**Keywords:** OPERATIONAL AND MAINTENANCE TECHNIQUES;  
RESPIRATORY PROTECTION; RESPIRATORS; TOTAL EFFECTIVE DOSE  
EQUIVALENT; INTERNAL DOSE

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**Project Manager:**

**Objectives:** Describe the efforts at the Davis-Besse Nuclear Power Station (DBNPS) to limit the use of respirators in order to reduce the Total Effective Dose Equivalent (TEDE) for workers by allowing a small internal dose. The goal is compliance with the provisions of Title 10, Part 20 of the Code of Federal Regulations.

**Comments:** The DBNPS program is based on the philosophy that engineering controls are the preferred method of limiting intake of radioactive material as long as this does not result in higher total doses. The principal steps of the Respiratory Protection program at DBNPS are:

- 1) Determination of the area in which the job will take place.
- 2) Determination of the Deep Dose Equivalent (DDE) rate in the area of concern.
- 3) Determination of the expected fractional Derived Air Concentration (DAC) in the area of concern.
- 4) Determination of the efficacy of respiratory protection of any type.
- 5) If the use of engineering controls is justified, then apply it.
- 6) If the resulting air concentration after the application of engineering controls is still greater than 25% of the listed DAC, then a determination of whether a respirator would result in a lower TEDE is required.
- 7) Health and safety considerations may limit respirator use in areas of high temperature or on scaffolding, etc.
- 8) If the airborne contamination conditions are not sufficiently known in advance, respirators are used.

**Remarks/Potential for dose limitation:** A net savings of nearly thirty man-rem was achieved by permitting an internal dose of less than 1.5 man-rem.

This cost of the savings consisted of increased training on the concept of controlling the TEDE rather than controlling each type of dose separately and independently.

Further means of dose reduction of a similar nature can be found in the areas of excess protective clothing leading to a decrease in worker efficiency and therefore to increased stay times in radiation fields.

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Education is the key to dose reduction. The worker, and some of the RP personnel, must be made to understand that the cell does not know which direction the particle or photon is traveling.

**References:** Zibung, B., "Internal Dose, Respiratory Protection and Revised 10CFR20 at Davis-Besse Nuclear Power Station," 1993 *Radiation Exposure Management Seminar*, Westinghouse, Pittsburgh, Pennsylvania, 1993.

**Duration:** from: 1992 to: 1993

**Funding:** N/A

**Status:** Completed

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