

Principles of Nuclear Safety

Module 16

EMISSIONS COMPLIANCE MONITORING

Slide 1

Derived Emission Limits

- DELs are regulatory limits on chronic effluent emissions of various radionuclide groups, derived (calculated) from the public dose limits
- The calculations make conservative assumptions about proximity of exposed persons to the plant, exposure time, shielding, source of food and drinking water, and meteorology

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Monitored Radionuclide Groups in Liquid and Airborne Effluents

- Airborne effluent releases
 - tritium, particulates, carbon-14, iodine, noble gases
- Liquid effluent releases
 - tritium, carbon-14, gross beta-gamma

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What is Environmental Compliance Monitoring?

- Measurement of radioactive emissions to:
 - demonstrate compliance with regulatory limits and operational targets
 - identify and quantify the significant radionuclides emitted in the effluent
 - provide a measure of environmental protection performance

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Compliance with What?

- **Public Dose Limits**
 - Recommended by ICRP; approved by AECB
 - 500 mrem whole body; 5 rem total all organs/tissues
- **Derived Emission Limits (DELs)**
 - PROL requires that DELs are not exceeded
- **Station Emission Targets**
 - typically 1% DEL
 - emissions > 1% DEL reported via SER

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Method of Compliance Monitoring

- **Radioactive releases are measured by analyzing cumulative, continuously collected samples of airborne & liquid effluents**
- **The exception is noble gases, which are counted continuously in sample stream, and the integrated count read out periodically**

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Unmonitored Releases

- Releases must be restricted to monitored pathways
- Unmonitored releases can occur either via pathway with no provision for monitoring, or due to temporary loss of monitoring capability on a monitored effluent stream
- Estimates of unmonitored releases are slow, and do not provide for timely response to abnormal release rates

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The SS Role in Compliance Monitoring

- Reviews planned releases, eg, pump-outs of active liquid waste tanks
 - to minimize release
 - to ensure release < 1% DEL
- Reviews O&M activities to ensure no unmonitored releases
- Reviews compliance monitoring results and specifies corrective actions as required

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