

# *Principles of Nuclear Safety*

## Module 16

### EMISSIONS COMPLIANCE MONITORING

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## *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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