
Irradiator Technology H-315

Session 15

Management, RSO & Operator
Responsibilities

Management Responsibility

- Commitment & responsibility for:
 - Radiation Safety, security & control of sources, compliance to regulations
 - Completeness & accuracy of radiation safety records
 - Knowledge about the contents of license & application
 - Meticulous compliance with regulations, operating & emergency procedures

Management Responsibility...

- Commitment & responsibility for:
 - Provide adequate resources to the radiation protection program
 - Selection & assignment of qualified RSO
 - Selection of management rep. with authority to stop unsafe operation (e.g., RSO)
 - Prohibition against discrimination
 - Provide information to employees about employee protection and deliberate misconduct

Management Responsibility...

- Commitment & responsibility for:
 - Obtaining NRC's consent before transferring control of the license
 - Notifying NRC immediately following filing of bankruptcy

Duty & Responsibilities of RSO

- Stopping activities that the RSO considers unsafe
- Keeping exposure ALARA
- Developing, maintaining, distributing & implementing up-to-date operating & emergency procedures
- Properly trained & evaluate everyone associated with the irradiator operation

Duty & Responsibilities of RSO...

- Non routine operations:
 - Ensuring that they are consistent with the limitation of the license
 - Analyzing potential safety consequences before conducting them
 - Ensuring that they are performed by the manufacturer or authorized personnel
- Ensuring that personnel monitoring devices are used properly and recorded

Duty & Responsibilities of RSO...

- Document that unmonitored individuals are not likely to receive, in any one year a radiation dose $>10\%$ of allowable limits
- Notify authorities of incidents
- Investigating emergencies & abnormal event & implement timely corrective actions
- Perform annual radiation safety program audits annually + implement corrective action

Duty & Responsibilities of RSO...

- Licensed material:
 - Ensure proper transport
 - Ensure proper disposal
 - Maintain appropriate records associated with irradiator operations
 - Maintain license up-to-date, + timely submission of amendments & renewal
 - Ensuring that the licensee identifies violations & that corrective actions are developed implemented & documented
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RSO Training & Experience

- Successful completion of training course such as described Appendix G: NUREG
- Three months full time equivalent experience
 - Preoperational involvement
- Curriculum ??

Initial Training & Experience

Operators

- Courses:
 - Irradiator manufacturer's operator specific course
or
 - Training course ref: Appendix G NUREG
- On the job training
 - One month

Operators Responsibilities

- Safety
 - License, certificate of competence
 - Familiar with:
 - Design
 - Operation
 - Preventative maintenance
 - Radiation detection, radiation protection
 - Biological effects
 - Routine operation procedures
 - Emergency procedures
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Operators Responsibilities

- Familiar with:
 - Radiation levels around
 - Security safeguards, locks, warning signs, interlocks systems
 - Requirements of personnel dose monitoring
- Demonstrate competence:
 - Use of source
 - Logs & reports
 - Organization structure

Operators Responsibilities

- Retrieving object(s) from the pool
 - Two persons
 - One retrieves, one surveys
 - Contamination check

RSO & Operator's Course

- Radiation Safety:
 - Contamination
 - Exposure
 - Biological effects
 - Units of radiation dose
 - Hazards
 - ALARA (As Low AS Reasonably Achievable)
 - Time, distance , shielding
 - Survey meters & personnel dosimeters

RSO & Operator's Course

- Regulatory Requirements:
 - Applicable regulations
 - NRC dose limits
 - License requirements
 - Location of use & storage
 - Material control & accountability
 - Annual audit
 - Transfer & disposal
 - Records

RSO & Operator's Course

- Regulatory Requirements:
 - Incidents
 - Handling incidents
 - Radiation warning signs
 - Licensing & inspection
 - Need for complete & accurate info
 - Employee protection
 - Deliberate misconduct

RSO & Operator's Course

- Operation for Irradiators
 - Basic function
 - Radiation safety features
 - Operating & emergency procedures
 - Routine & non-routine maintenance
 - Lock-out procedures
 - Design to prevent contamination

RSO & Operator's Course

- On the job training
 - Operating procedures
 - Test run of emergency procedures
 - Routine maintenance
 - Lock-out procedures
 - Experience:
 - RSO
 - Three months
 - Operators
 - One month
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RSO & Operator's Course

- Examination
 - Close book, 70% passing
 - Review wrong answers
 - Training Assessment
 - Management to ensure
 - Instructor Qualifications
 - BSc, completion of manufacturers course, radiation safety course & 8 hours hands on experience with irradiators
 - Or equivalent
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Annual Safety Review

- Includes:
 - Changes in operating procedures
 - Changes in regulations & license condition
 - Reports on recent events
 - Accidents, mistakes, problems
 - Results of inspections of operator performances
 - Results of facility's inspection & maintenance checks

Annual Safety Review

- Includes:
 - Drill to practice emergency or abnormal event
 - Written test

Annual Performance Evaluations

- Safety performance of each irradiator operator, discuss results

Training for Unescorted Access

- Precautions to avoid radiation exposure
 - Operating & emergency procedures in
 - 10CFR 36.53
 - Oral test ok
- (My own rule: The authorized operator stays with any person requiring access, he (she) is the first one in and last one out)

Applicable Regulations

- 10CFR 2
 - Rules of Practice for Domestic Licensing & issuance of order
 - 10CFR 19
 - Notices, Instructions and Report to Workers
 - 10CFR 20
 - Stds for Protection Against Radiation
 - 10CFR 21
 - Reporting of Defects & Noncompliance
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Applicable Regulations

- 10CFR 30
 - Rules of General Applicability to Domestic Licensing of Byproduct Material
- 10CFR 32
 - Specific Licenses to Manufacture or Transfer Byproduct material

Applicable Regulations

- 10CFR 36
 - Licenses and Radiation Safety Requirements for Irradiators
- 10CFR 71
 - Packaging & Transportation of Radioactive Material
 - **Must meet DOT requirements**

RSO Files

- Auditable files:
 - ❑ Source inventory
 - ❑ License & amendments, notice of violations
 - ❑ Emergency procedures
 - ❑ Irradiator log (may be electronic to-day)
 - ❑ Building survey
 - ❑ Personnel monitoring records
 - ❑ Safety checks

RSO Files

- Auditable files:
 - ❑ Contamination checks
 - ❑ Carrier/product contamination (Cs units)
 - ❑ Visitor handling procedures
 - ❑ Visitors log
 - ❑ Copy of current regulations
 - ❑ Calibration certificates
 - ❑ Key control (access)
 - ❑ Authorized operators' list

RSO Files

- Auditable files:
 - ❑ Manufacturer's record of inspection
 - ❑ Source measurement certificates
 - ❑ NRC-4 Forms
 - ❑ Exit letters re: exposure history
 - ❑ Operating procedures
 - ❑ Key control or password control for PLC units
 - ❑ Training records

RSO Files

- Auditable files:
 - Correspondence with authorities
 - Internal audits
 - Drills
 - Receiving & shipping documents
 - Water analysis
 - Deioniser water, resin or filter release
 - Special license requirements ???