

U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

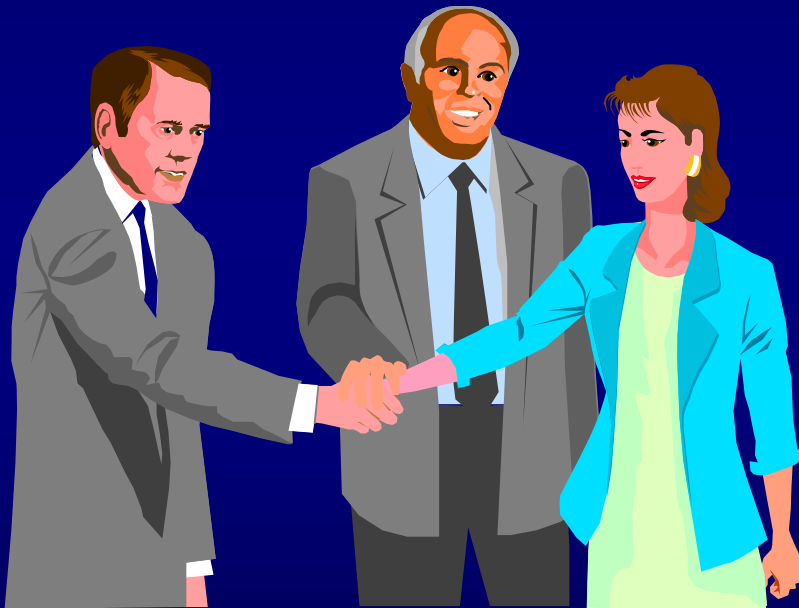
Protecting People and the Environment



Well Logging, Tracer and Field Flood Study Licenses



Topic Experience



- Experience in well logging, tracer, and field flood study topics?

10 CFR Part 39

- **Published in Federal Register on April 8, 1985**
- **Extension of comment period to October 9, 1985**
- **Effective date - July 14, 1987**
- **Last major revision date – April 17, 2000**

NOTE: Copy of 10 CFR Part 39 provided on CD

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Definitions

Well Logging

- **Means all operations involving the lowering and raising of measuring devices or tools which contain licensed material or are used to detect licensed materials in wells for the purpose of obtaining information about the well formations which may be used in oil, gas, mineral, groundwater, or geological exploration.**

Subsurface Tracer Study

- **Means the release of unsealed licensed material or a substance labeled with licensed material in a single well for the purpose of tracing the movement or position of the material or substance in the well or adjacent formation.**

Field Flood Study

- **Means the release of unsealed licensed material or a substance labeled with licensed material in multiple well applications for enhanced recovery of oil and gas wells.**

Tritium Neutron Generator Target Source

- **Means a tritium source used within a neutron generator tube to produce neutrons for use in well logging applications.**

Radioactive Marker

- **Means licensed material used for depth determination or direction orientation. For purposes of this part, this term includes radioactive collar markers and radioactive iron nails.**

Logging Tool

- **Means a device used subsurface to perform well logging.**

Irretrievable Well Logging Source

- **Means any sealed source containing licensed material that is pulled off or not connected to the wireline that suspends the source in the well and for which all reasonable effort at recovery has been expended.**

Field Station

- A facility where licensed material may be stored or used and from which equipment is dispatched to temporary jobsites.

Energy Compensation Source (ECS)

- Means a small sealed source, with an activity not exceed 3.7 MBq (100 microcuries) used within a logging tool, or other tool components, to provide a reference standard to maintain the tool's calibration when in use.

Uranium Sinkers Bar

- **Means a weight containing depleted uranium used to pull a logging tool toward the bottom of a well.**

Temporary Jobsite

- **Means a place where licensed materials are present for the purpose of performing well logging or subsurface tracer studies.**

10 CFR Part 39

- **Regulatory requirements for well logging license.**
- **Specific elements which the applicant must submit, as follows:**

10 CFR Part 39 Divisions

- **Subpart A – General Provisions**
- **Subpart B – Specific Licensing Requirements**
- **Subpart C – Equipment**
- **Subpart D – Radiation Safety Requirements**
- **Subpart E – Security, Records, Notifications**
- **Subpart F – Exemptions**
- **Subpart G – Enforcement**

Elements of an Application

- Training
- Operating and Emergency procedures
- Annual job performance inspection
- Organizational structure (chart) and delegation of authority and responsibility
- Leak test procedures:
 - Leak test kit; OR
 - “In-house” by applicant/licensee

NUREG-1556 VOL. 14

Program-specific Guidance About Well Logging, Tracer, And Field Flood Study Licenses

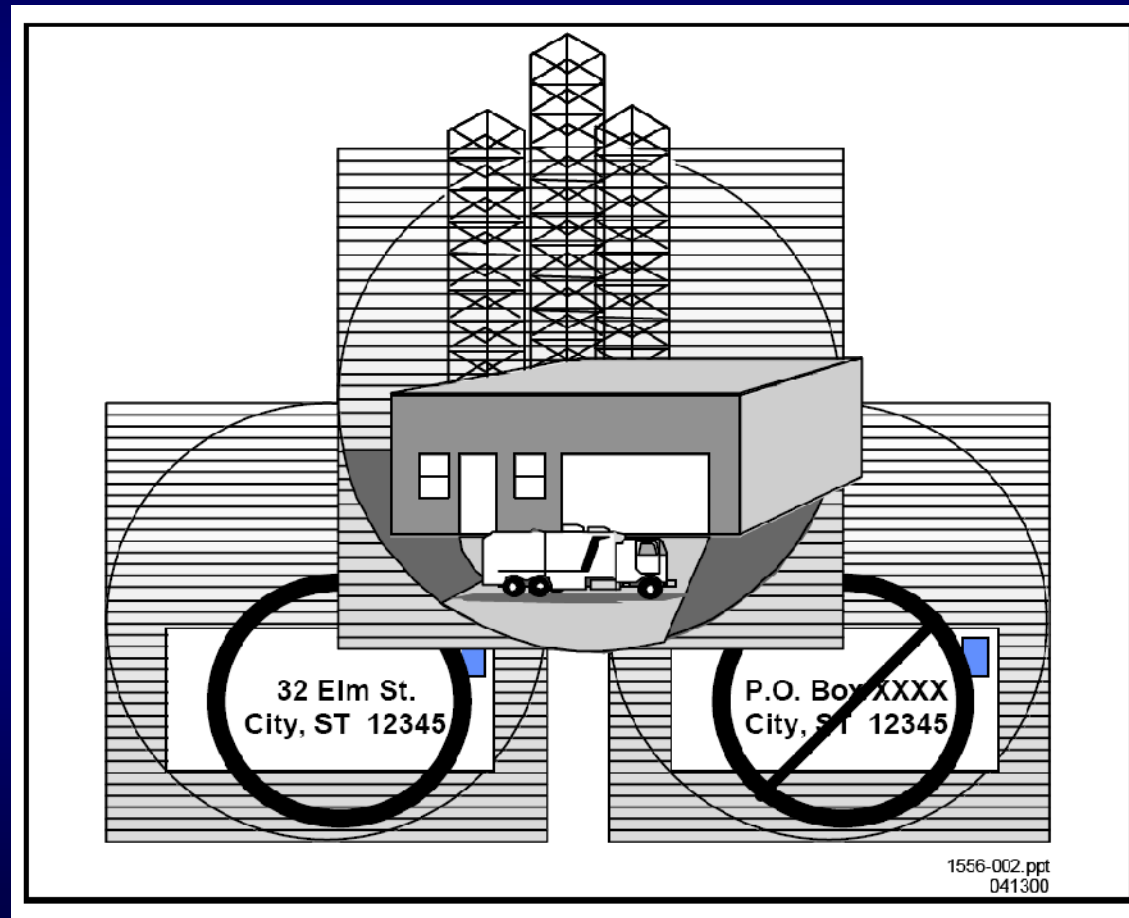
Action Type

- **New License**
- **Amendment to License**
- **Renewal to License**

Name and Mailing Address

- Legal Name of corporation or legal entity
- A division or department within a legal entity may not be a licensee
- Individual acting in private capacity
- Mailing address

Location of Use



Contact Person

- **Individual who can answer questions about the application.**
- **Telephone number**

Sealed Sources & Devices

Well Logging

- Identify each **sealed source** with an activity greater than 3.7 MBq (100 microcuries) by the manufacturer's name, model number, and radionuclide.
- Identify each **energy compensation source** with an activity less than or equal to 3.7 MBq (100 microcuries) by the manufacturer's name, model number, and radionuclide.
- Confirm that each **sealed source** is registered as an approved sealed source by NRC or an Agreement State and will be possessed and used in accordance with the conditions specified in the Sealed Source and Device Registration Certificate.

Sealed Sources & Devices

Well Logging

- Confirm that **sealed sources** not satisfying 10 CFR 39.41 performance requirements are approved by USASI N5 10-1968 standard for well logging.
- Confirm that the activity per source and maximum activity in each device will not exceed the maximum activity listed on the approved certificate of registration issued by NRC or by an Agreement State.
- Provide the license number of an NRC or Agreement State license that approves a well logging source that is not included in an SSD registration certificate.

Sealed Sources & Devices Well Logging

- Identify any sealed sources and/or corresponding devices not used in well logging that contain byproduct, special nuclear, or source material and specify the manufacturer's name, model number, and radionuclide.
- Identify the manufacturer's name and model number of depleted uranium sinker bars.
- OR

Sealed Sources & Devices

Well Logging

- **Complete the table in Appendix C to support the request for byproduct, source, or special nuclear material used in well logging operations and radioactive materials used for purposes other than well logging.**

Sealed Sources & Devices

Well Logging

- Any sealed source used for well logging > 3.7 MBq (100 microcuries) of byproduct or SNM and is used downhole in well bores of gas wells, oil wells, or in mineral deposits, must satisfy one of the following criteria:
 - Sealed sources that were manufactured before July 14, 1989, may use either the design and performance criteria from the USASI N5 10-1968 or the criteria specified in 10 CFR 39.41.
 - Sealed sources are required to satisfy the requirements of 10 CFR 39.41.

UNSEALED (TRACER) RADIOACTIVE MATERIAL - WELL LOGGING

- For unsealed nonvolatile and volatile (e.g. I-125, I-131, H-3, Br-82) tracer materials:
 - Specify the radionuclide.
 - Identify each chemical and/or physical form requested for each type of tracer study.
 - Specify the maximum amount of each radioisotope tracer material that will be possessed at any one time.
 - Specify the maximum amount of each radioisotope tracer that you will use in each type of tracer study by its physical or chemical form.

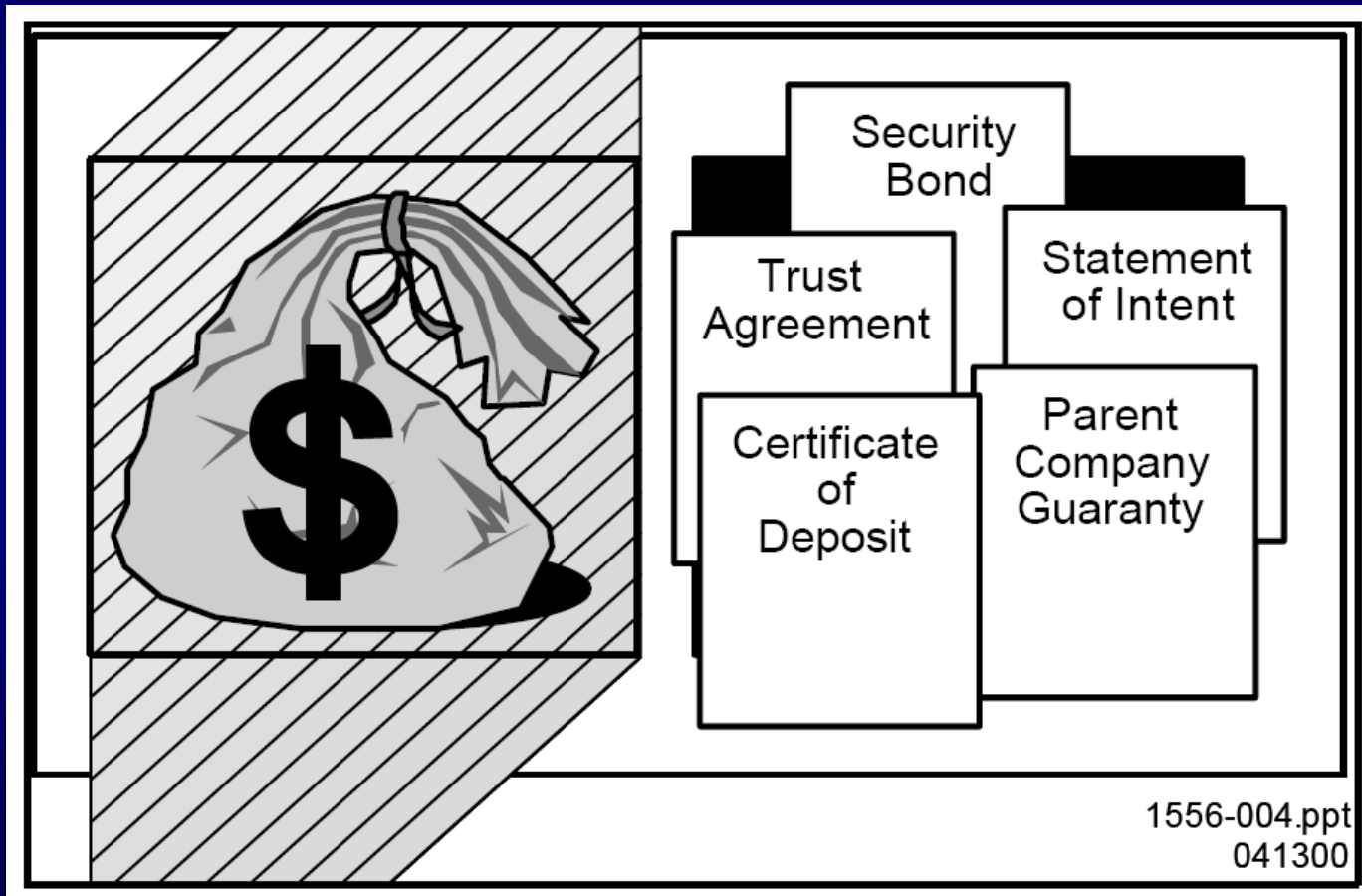
Financial Assurance

Radionuclide	Activity (Curies)	
Americium-241	100	(sealed)
Hydrogen-3	1	(unsealed)
Carbon-14	0.1	(unsealed)
Silver-110m	0.001	(unsealed)

Example License Condition limitation:

The licensee shall restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d), 40.36(b) [40.36(b) optional if known applicant/licensee will not be using SM] , and 70.25(d) for establishing financial assurance for decommissioning.

Financial Assurance Methods



Decommissioning Records



Recordkeeping Requirements for Decommissioning

- **Identified location**
- **As-built drawings showing modifications to structures and equipment**
- **Sketch of rooms, buildings, or narrative description of the area**
- **Unusual occurrences (leaking source or other incidents that involve contamination)**
- **Does not apply to temporary jobsites**

Purpose For Which Licensed Material Will Be Used

- **Authorization to perform hazardous operations as follows:**
 - **Removing a sealed source from a source holder of a logging tool and maintenance on sealed sources or holders**
 - **Using destructive techniques to remove a stuck sealed source from a source holder**
 - **Opening, repairing, or modifying any sealed source**
 - **Knowingly injecting licensed radioactive tracer material into a fresh water aquifer**
 - **Using a sealed source in a well without a surface casing to protect fresh water aquifers.**

Purpose For Which Licensed Material Will Be Used

- **Sample format for providing information about requested radioisotopes**

Radioisotope	Chemical/Physical Form	Maximum Possession Limit	Proposed Use
Americium-241	Sealed neutron source (XYZ Inc., Model 10)	Not to exceed 5 curies per source	Oil, gas, and/or mineral logging.
Cesium-137	Sealed source (Okko Inc., Model 36)	Not to exceed 3 curies per source	Oil, gas, and/or mineral logging.
Hydrogen-3	Gas, titanium tritide neutron generator tube (Cols Inc., Model 3)	Not to exceed 3 curies per tube	Neutron activation logging in oil and gas wells in downhole accelerator

Purpose For Which Licensed Material Will Be Used

Radioisotope	Chemical/Physical Form	Maximum Possession Limit	Proposed Use
Iodine-131	Gas	100 millicuries total, not to exceed 20 millicuries per injection	Subsurface Tracer Operations
Iodine-131	Liquid	50 millicuries total, not to exceed 10 millicuries per injection	Subsurface Tracer Operations
Iridium-192	"Labeled" frac sand	200 millicuries total, not to exceed 15 millicuries per injection	Subsurface Tracer Operations
Cobalt-60	Metal wire	3 millicuries total, not to exceed 1 microcurie per individual unit	Pipe Joint Collar Markers, Subsidence Markers, Depth Determination
Silver-110m	Liquid	200 millicuries total, not to exceed 20 millicuries per injection	Field Flood Tracer Studies
Depleted Uranium	Sinker Bars	225 kilograms	Sinker Weights (Concentrated Mass)

Environmental Assessment (EA)

- **May be needed if licensed material used in field flood studies where licensed material intentionally released into the environment.**

Radiation Safety Officer Well Logging

- The person responsible for the radiation protection program; the key to overseeing and ensuring safe operation of the licensee's well logging, tracer, or field flood study program.

Radiation Safety Officer Qualifications

- **Minimum one year actual experience as a logging supervisor**
- **Formal training in establishing and maintaining a radiation safety program**
(basic radiation safety course is NOT acceptable)

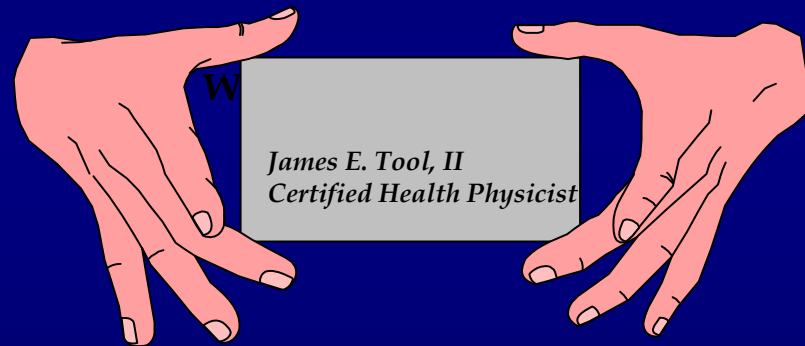
Radiation Safety Officer Alternate Qualifications

- **Certified
Health Physicist**

or

- **BS and/or MS w/1 yr
experience in radiation
safety program of
comparable size and
scope**

or



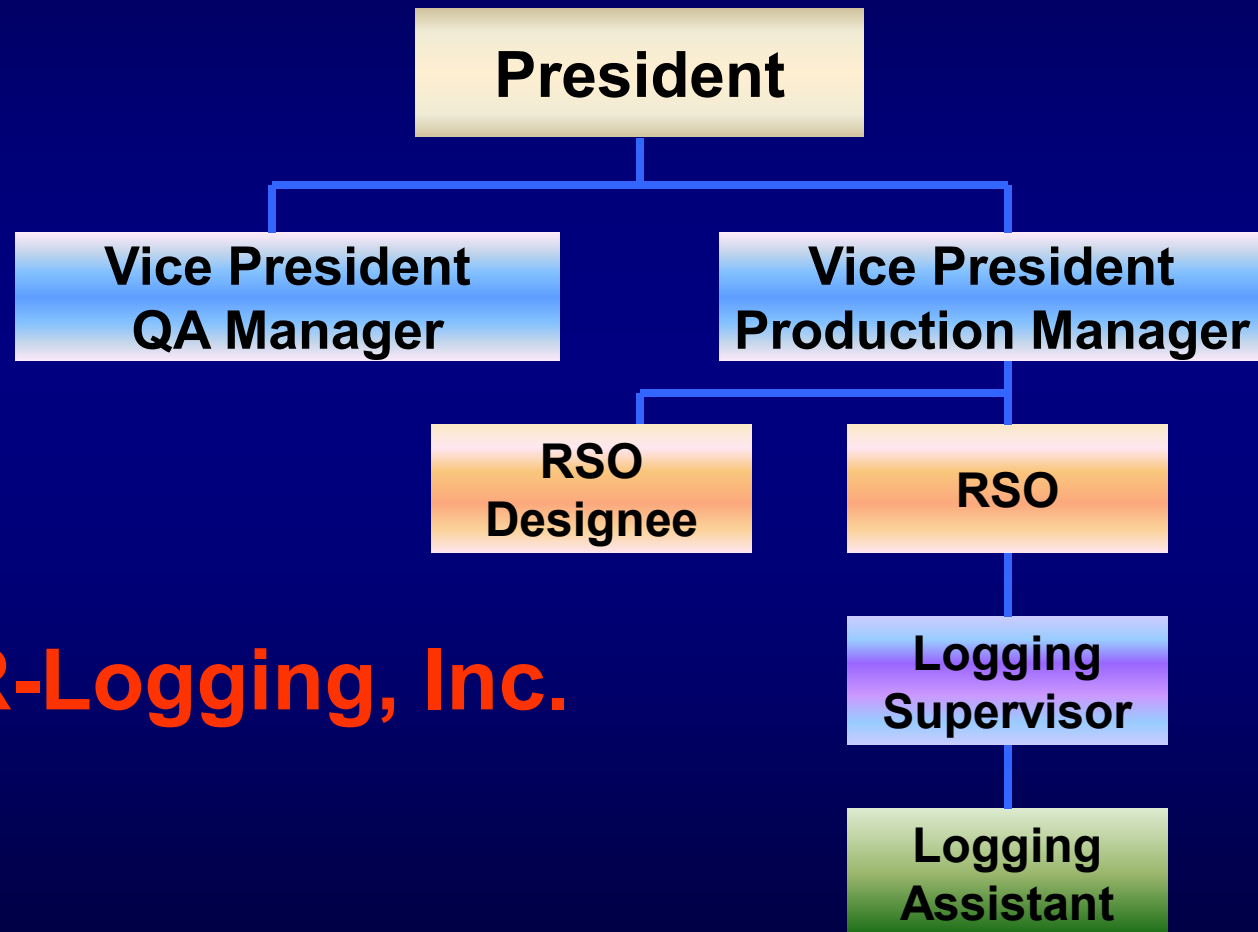
Radiation Safety Officer Alternate Qualifications

- **Alternative information demonstrating that the proposed RSO is qualified by training and experience.**

Radiation Safety Officer Effectiveness

- Sufficient time & commitment from management
- May delegate certain day-to-day tasks w/o delegating their responsibilities of the radiation safety program.
- Provide a copy of an organizational chart by position, demonstrating sufficient independence and direct communication with responsible management officials.

Radiation Safety Organization Chart



We-R-Logging, Inc.

RSO Duties & Responsibilities



Stop Unsafe Licensed Activities



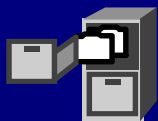
Monitor Emergency Events



Proper Use and Maintenance of Approved Sources and Devices



Device Security



Records Maintenance



Personnel Training



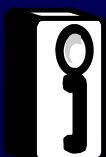
Annual Worker Audits



**Interaction with NRC,
Other Authorities**



Material Disposal



Survey Meter



**Source and/or Device
Transport**

Logging Supervisor

- **A person who performs or personally supervises well logging operations, tracer/field flood study applications and is responsible for ensuring compliance with NRC regulations and the safe use of radioactive materials.**

Appendix L

- **Ensure training in 10 CFR 39.61(e) topics**
- **On-the-Job Training (sealed sources) – 160 hrs; 3 months or 520 hrs**
- **On-the-Job Training (unsealed sources) – 3 months or 520 hrs**
- **Receive copies of and instructions in NRC Regulations, the NRC license, and the licensee's operating and emergency procedures (approximately 8 hours training)**
 - **Applicable parts of 10 CFR 19, 20, and 30 [30.7, 30.9, & 30.10], all of 10 CFR Parts 39**
 - **The NRC License**
 - **Licensee's Operating and Emergency Procedures required by 10 CFR 39.63**

Appendix L

- **Written Examination**
 - **80% Minimum Passing Grade**
- **Receive Equipment Training**
- **Demonstrate understanding by passing Practical Exam**
- **Annual Refresher Training**
- **Records**

Logging Assistant

- An individual, who under the direct supervision and in the physical presence of the logging supervisor uses well logging equipment (sealed sources containing byproduct material, related handling tools, unsealed sources of byproduct material, well logging devices, and radiation survey instruments) in performing well logging operations.

Appendix L

- **Receive copies of and instructions in NRC Regulations and the licensee's Operating and Emergency procedures**
 - **Applicable parts of 10 CFR 19 and 20**
 - **Operating and Emergency Procedures required by 10 CFR 39.63**

Appendix L

- **Written or Oral Examination**
 - **80% Minimum Passing Grade**
- **Receive Equipment Training**
- **Demonstrate understanding by passing Practical Exam**
- **Annual Refresher Training**
- **Records**

Facilities & Equipment

- **Drawing/sketch of places of use and storage.**
- **Drawing/sketch of proposed tracer material storage facilities.**
- **Describe protective clothing, auxiliary shielding, absorbent materials, injection equipment, secondary containers for waste water storage for decon purposes, plastic bags for storing contaminated items.**
- **Describe proposed laundry facilities (if applicable).**

Facilities & Equipment

- **Describe proposed decontamination facilities (if applicable).**
- **Describe equipment for “repackaging” gaseous, volatile, or finely divided tracer material.**

Radiation Safety Program

- **ALARA program**
- **Equipment and facilities adequate to protect personnel, public, and environment**
- **Licensed activities are conducted only by individuals qualified by training and experience**

Radiation Safety Program

- **Written Operating and Emergency procedures**
- **Audit program**
- **Organization structure**
- **Radiation safety and decommissioning records system**

Well Owner/Operator Agreements

- Well logging only performed if written agreement with employing well owner or operator executed prior to the start of well logging operations.
- Written agreements:
 - Identify a responsible party
 - Ensure the following steps, if source becomes lodged in a hole:
 - Reasonable effort to recover the source
 - **Not** attempt to recover a lodged sealed source that could result in rupture

Well Owner/Operator Agreements

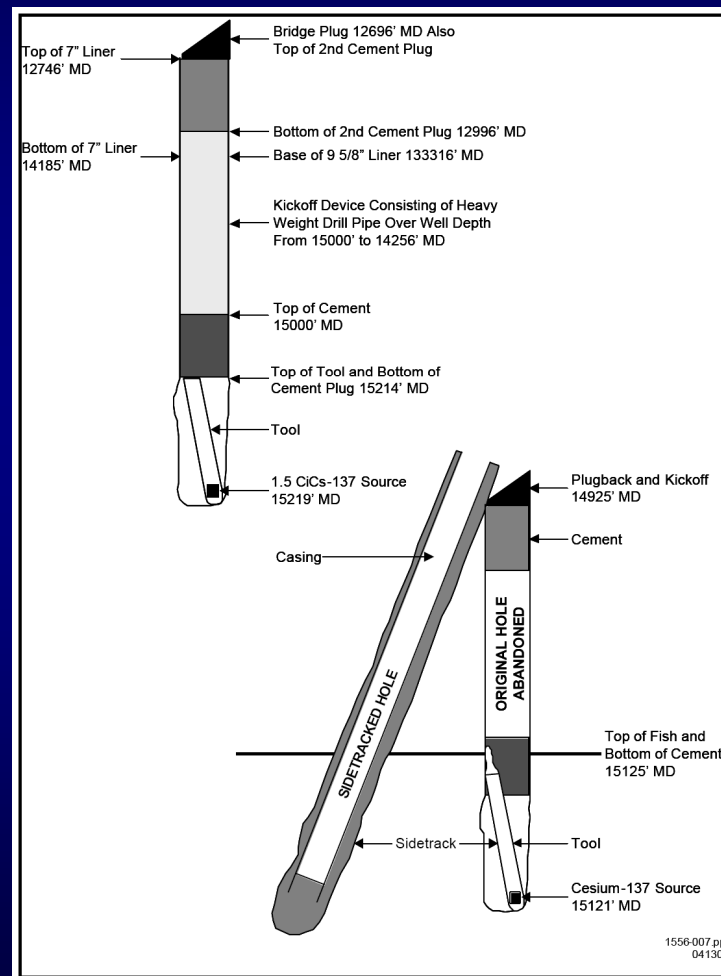
- **Ensure the following steps if source becomes lodged in a hole (cont'd):**
 - **Continuously monitor the circulating fluids in the well bore during recovery efforts**
 - **Decontaminate contaminated equipment, personnel, or environment prior to release**

Well Owner/Operator Agreements

- **If sealed source classified as irretrievable, implement the following within 30 days:**
 - **Immobilize source and seal in place with cement plug**
 - **Provide a means to prevent inadvertent intrusion on the source**
 - **Install a permanent identification plaque at the surface of the well**
 - **Notify the appropriate NRC Regional Office by telephone**
 - **Submit copy of abandonment report within 30 days**

Well Owner/Operator Agreements

Features of a Typical Source Abandonment



Well Owner/Operator Agreements

- **Written agreement not required if the licensee and well owner or operator are part of the same corporate structure or similarly affiliated.**
- **All other requirements must still be met.**

Annual Radiation Safety Audit

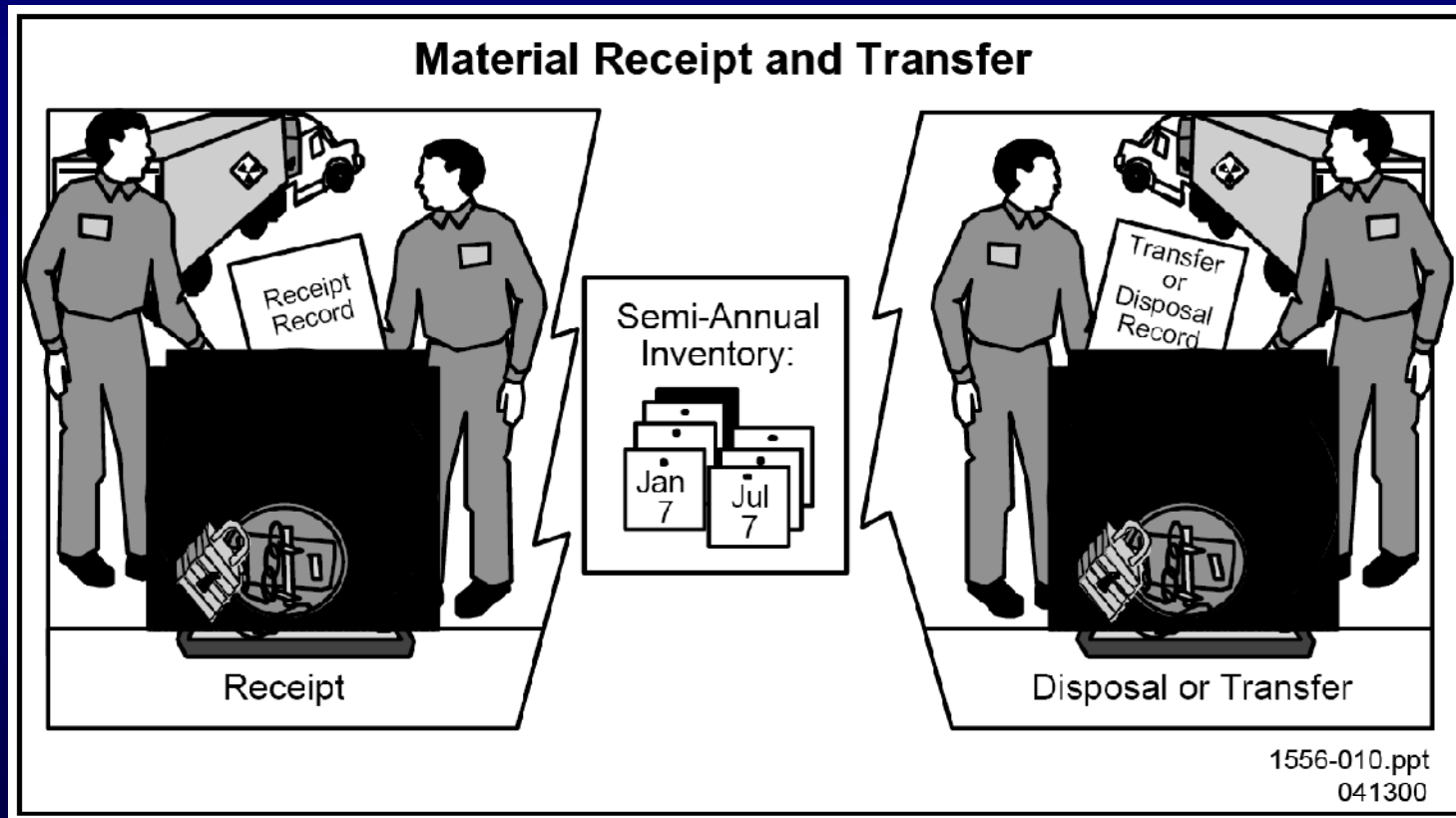
- **10 CFR 20.1101(c)**
- **The licensee shall periodically (at least annually) review the radiation protection program content and implementation**
- **Guidance may be found in Appendix G of NUREG-1556, Volume 14**
- **No response is required during the licensing phase**

Radiation Monitoring Instruments

- Describe the instrumentation used to perform required surveys
- Calibration performed by NRC or Agreement State Licensee
- In-house calibration in accordance with Appendix N or describe alternative procedures

Material Receipt & Accountability

“Cradle to Grave” Accountability



Material Receipt & Accountability

- **Maintain records of receipt, transfer, and disposal of licensed material.**
- **Conduct physical inventories at least every 6 months to account for all sealed sources, tracer materials, and depleted uranium.**

Occupational Dosimetry

- **Film badge**
- **TLD**
- **OSL**
- **NVLAP - Approved**
- **Exchange Frequency**

Occupational Dosimetry

- **Bioassay program for unsealed material**
 - **Regulatory Guide 8.20**
 - **Use < 50 mCi I-131, no bioassay program necessary**

Public Dose

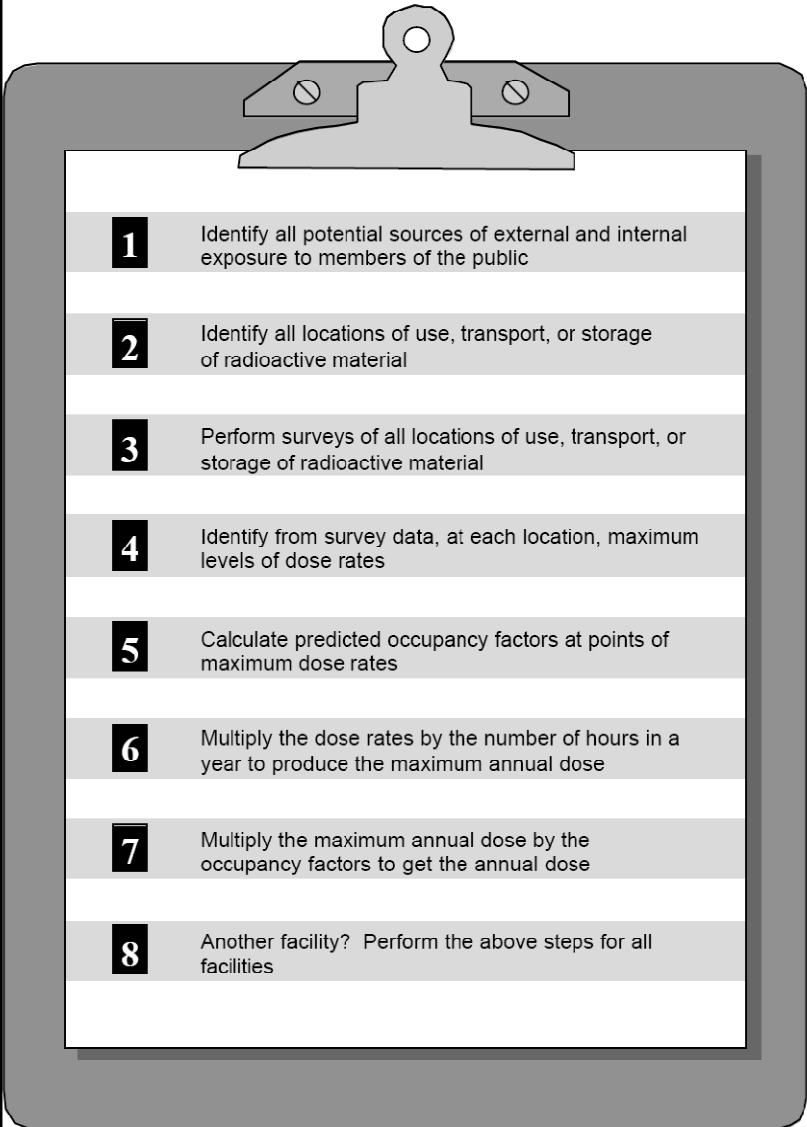
- **10 CFR 20.1301**
- **Ensure that licensed material will be used, transported, stored, and disposed of in such a way that members of the public will not receive more than 100 mrem in any one year, and the dose in any unrestricted area will not exceed 2 mrem in any one hour**
- **Control and maintain constant surveillance when in use.**
- **Secure stored licensed material from access, removal, or use by unauthorized personnel.**

Public Dose

- **Examples of methods to demonstrate compliance may be found in Appendix P of NUREG-1556, Volume 14**
- **No response is required during the licensing phase**

Public Dose

Calculating the Annual Dose to an Individual Member of the Public

- 
- 1** Identify all potential sources of external and internal exposure to members of the public
 - 2** Identify all locations of use, transport, or storage of radioactive material
 - 3** Perform surveys of all locations of use, transport, or storage of radioactive material
 - 4** Identify from survey data, at each location, maximum levels of dose rates
 - 5** Calculate predicted occupancy factors at points of maximum dose rates
 - 6** Multiply the dose rates by the number of hours in a year to produce the maximum annual dose
 - 7** Multiply the maximum annual dose by the occupancy factors to get the annual dose
 - 8** Another facility? Perform the above steps for all facilities

Operating & Emergency Procedures

- **Elements must include important items outlined in 10 CFR 39.63:**
 - **Handling and using licensed materials without surface casing for protecting fresh water aquifers**
 - **Maintaining security during storage and transportation**
 - **Keep licensed material under control and immediate surveillance during use**
 - **Keep radiation exposures ALARA**
 - **Maintain accountability during use**

Operating & Emergency Procedures

- **Elements must include important items outlined in 10 CFR 39.63:**
 - **Control access to work sites**
 - **Emergency contact**
 - **Use of remote handling tools**
 - **Methods and occasions for conducting radiation surveys**
 - **Procedures to minimize personnel exposure during routine use and in the event of an incident**

Operating & Emergency Procedures

- **Elements must include important items outlined in 10 CFR 39.63:**
 - **Methods and occasions for locking and securing stored license materials**
 - **Use of personnel monitoring equipment, including bioassays**
 - **Transportation of licensed materials**
 - **Procedures for picking up, receiving, and opening packages**

Operating & Emergency Procedures

- **Elements must include important items outlined in 10 CFR 39.63:**
 - **Use of tracer materials including decontamination procedures**
 - **Maintaining records**
 - **Use, inspection, and maintenance as required by 10 CFR 39.43**
 - **Identifying and reporting to NRC defects and noncompliance**

Operating & Emergency Procedures

- **Elements must include important items outlined in 10 CFR 39.63:**
 - **Actions to be taken if sealed source lodged in well**
 - **Actions to be taken if sealed source ruptures**
 - **Proper storage and disposal of radioactive waste**
 - **Laundering and decontaminating**
 - **Uncontrolled release of radioactive tracer material to the environment**

Leak Test

- **Performed by organization authorized by NRC or Agreement State to perform this service**
OR
- **Use of leak test kit provided by an organization licensed by NRC or an Agreement State**
OR
- **In house by applicant using procedures in Appendix R or describe alternatives**
- **Authorized by License Condition**

Daily Maintenance of Well Logging Equipment

- **Submit a description of procedure(s) for conducting daily visual inspection**

OR

- **Commit to statement**

Semi-Annual Visual Inspection and Routine Maintenance

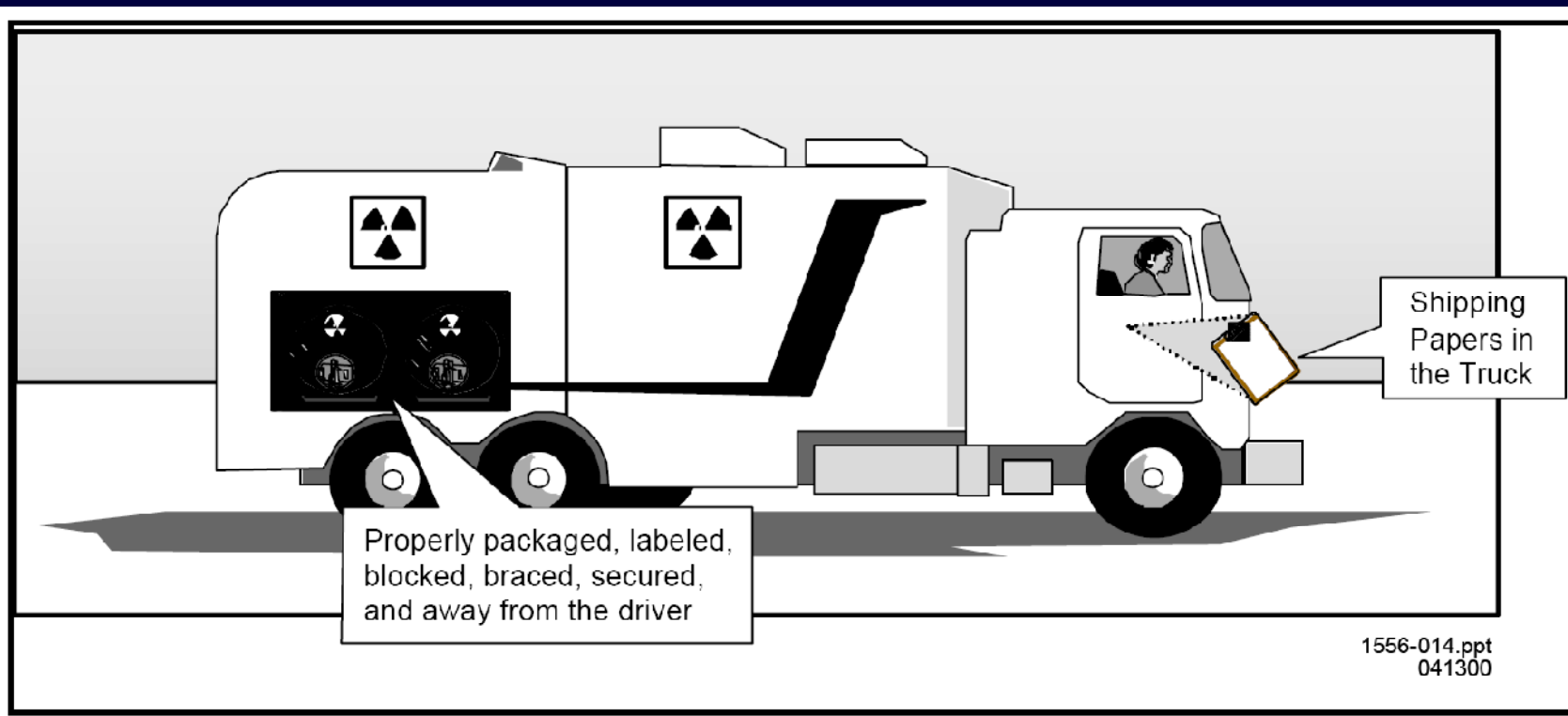
- **Submit a description of procedure(s) for conducting semiannual inspections and routine maintenance**

OR

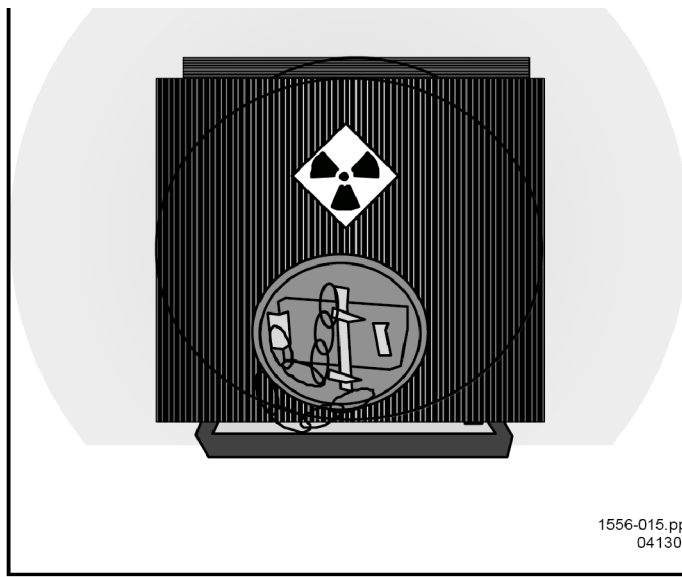
- **Commit to statement**

Maintenance Requiring Special Authorization

- **Prohibited activities:**
 - **Removing a sealed source from a source holder or logging tool**
 - **Preventive maintenance activities (i.e. O ring removal or replacement)**
 - **Removing a sealed source stuck in a source holder or logging tool**
 - **Use of sealed sources or neutron generators in fresh water aquifers**
- **Written procedures for above must be reviewed and approved by NRC**



Transportation



Transportation

- **Compliance with NRC and DOT regulations**
- **No response is required during the licensing phase**

Minimization of Contamination

- **No response is required during the licensing phase under certain conditions**
- **Decontamination of facility and/or sealed sources requires special authorization from NRC**

OR

- **Submit in house procedures to perform major decontamination activities**

Drill To Stop (DTS) Well Logging Operations

- **Require that all drilling operations cease and that parts of the drilling apparatus, be removed to provide access to the well bore.**
- **Submit O & E procedures for conducting DTS well logging operations**

OR

- **Submit an outline or summary that addresses important radiation safety aspects of O & E procedures when conducting DTS well logging operations**

Measurement While Drilling (MWD) Logging While Drilling (LWD)

- Occur during the drilling of the well bore and do not require that the drills stem or other equipment be removed from the well.
- Can be conducted at the same time drilling operations are occurring.
- Submit O & E procedures for conducting MWD and LWD well logging activities
OR
- Submit an outline or summary that addresses important radiation safety aspects of O & E procedures when conducting MWD and LWD well logging activities.

Energy Compensation Sources (ECSs)

- **Low-activity special form singly or doubly encapsulated sources containing less than or equal to 3.7 MBq (100 microcuries) of byproduct material.**
- **Used as reference or calibration standards**
- **Not considered well logging sealed sources; not required to satisfy the requirement for well logging sealed sources.**

Energy Compensation Sources (ECSs) - Exemptions

- Leak testing
- Abandonment requirements
- Performance requirements
- Monitoring requirements



Energy Compensation Sources (ECSs) - Exemptions

- **Most requirements in 10 CFR Part 39**
 - **Exceptions – physical inventory & records of use**
- **Requirements in other parts of NRC regulations still apply**



Energy Compensation Sources (ECSs)

- **Submit O & E procedures for using and handling ECSs**
- OR**
- **Submit an outline or summary that addresses important radiation safety aspects of O & E procedures when using or handling ECS.**
 - **Instructions for testing ECSs requiring leak tests**
 - **Instructions for conducting physical inventories of ECSs**
 - **Record system for maintaining inventory records**

Energy Compensation Sources (ECSs)

- **Submit an outline or summary that addresses important radiation safety aspects of O & E procedures when using or handling ECS.**
- **Record system for maintaining records of use for ECSs**

OR

- **Submit alternative procedures for NRC review**

Use of Sealed Sources or Neutron Generators in Fresh Water Aquifers

- **Prohibited activity**
- **Authorization requires that O & E procedures include the following:**
 - **Obtaining specific knowledge of the borehole conditions from the drilling team or company**
 - **First running a caliper log to show the hole is open or to find problem areas**
 - **First running a tool without a radioactive source to show it can be freely removed**
 - **Placing a temporary casing in sections of the hole giving problems.**

Tracer Studies in Single Well Applications

- **O & E procedures should address the following concerns:**
 - **Methods and occasions for conducting radiation surveys**
 - **Methods and occasions for locking and securing tracer materials**
 - **Personnel monitoring/personnel monitoring equipment**
 - **Transportation to temporary job sites and field stations**
 - **Procedures for minimizing exposure to members of the public and occupationally exposed individuals in the event of an accident**
 - **Maintenance of records at field stations and temporary job sites**

Tracer Studies in Single Well Applications

- **O & E procedures should address the following concerns:**
 - **Use, inspection, and maintenance of equipment**
 - **Procedures to be used for picking up, receiving, and opening packages**
 - **Decontamination of the environment, equipment, and personnel**
 - **Notifications of proper personnel in the event of an accident**

Field Flood and Secondary Recovery Applications

- **The following should be addressed:**
 - **Agreement with well operator or owner**
 - **Field flood study project design**
 - **Pre-injection phase of the field flood project**
 - **Injection phase**
 - **Post-injection phase**
 - **Emergency procedures**
 - **Reporting and record keeping requirements**
 - **Waste management**
 - **Methods and occasions for conducting radiation surveys**

Field Flood and Secondary Recovery Applications

- The following should be addressed:
 - Methods and occasions for locking and securing tracer materials
 - Personnel monitoring and the use of personnel monitoring equipment
 - Transportation to temporary job sites and field stations
 - Procedures for minimizing exposure to members of the public and occupationally exposed individuals
 - Maintenance of records at field stations and temporary job sites
 - Use, inspection and maintenance of equipment

Field Flood and Secondary Recovery Applications

- The following should be addressed:
 - Procedures to be used for picking up, receiving, and opening packages containing radioactive material
 - Decontamination of the environment, equipment, and personnel
 - Notifications of proper personnel in the event of an accident
- Authorization specifically by license condition

Tracer Studies in Fresh Water Aquifers

- **Prohibited activity in accordance with 10 CFR 39.45(b)**
- **Specific authorization by the NRC**

Radioactive Collar and Subsidence or Depth Control Markers

- Only used when quantities do not exceed the quantities identified in 10 CFR 30.71, Schedule B.
- Physical inventory at intervals not to exceed 6 months.

Neutron Accelerators

Using Licensed Material

- **Used as a source of neutrons (~ 14 MeV neutron)**
- **Contain less than 30 Curies of tritium**
- **Not considered well logging sealed sources; not required to satisfy the requirement for well logging sealed sources.**

Neutron Generator Tubes Exemptions

- Abandonment requirements
- Leak test requirements
- Performance requirements



Neutron Generator Tubes

Not Exempt

- Tritium neutron generator for target source is > 30 Curies
- Used in a well without a surface casing to protect fresh water aquifers.

Depleted Uranium Sinker Bars

- Both generally and specifically licensed.
- General license –
 - Acquired under 10 CFR 40.25
 - File Form NRC 244
 - Not introduce uranium sinker bars into a chemical, physical or metallurgical treatment or process
 - Not abandon uranium sinker bars
 - Transfer only to individuals authorized under 10 CFR 40.51
 - Notify NRC within 30 days of the transfer of depleted uranium sinker bars

Depleted Uranium Sinker Bars

- **Specific license –**
 - **Physically inventory the uranium sinker bars at intervals not to exceed 6 months**
 - **Visually inspect before use for proper labeling and at intervals not to exceed 6 months**
 - **Visually inspect for physical damage and conduct routine maintenance at intervals not to exceed 6 months**
 - **Remove bars from use if found defective, until repaired or disposed**
 - **Record information specified in 10 CFR 39.43(b).**

Increased Controls

- Issued November 14, 2005.
- Implementation by May 13, 2006 - 1st set of orders sent out.
- Implementation by June 20, 2006 - 2nd set of orders sent out.
- Orders are Publicly Available except the list of licensees who received the orders.
- Well logging licensees received the orders.

Increased Controls

- **Ensure new well logging licensees receive the Order, until Part 73 is updated, and complete implementation before taking possession of the Table 1 Quantities of Concern.**
- **Must attend Security Training to inspect the licensees who received Increased Controls (ICs).**

Quantities of Concern

Radionuclide	Activity (Curies)
Am-241	16
Cs-137	27
Pu-238	16

- The aggregate activity of multiple, co-located sources (unity rule) can not exceed one.
- Breaching one common physical security barrier to allow access to the material ~ then all material in that one location is considered co-located.

Waste Management

- **Tracer Material with $T_{1/2} \leq 120$ d:**
 - **Decay-in-storage (DIS)**
 - **Transfer to authorized recipient**
 - **Release into sanitary sewerage**
 - **Obtaining prior approval of NRC of any alternate method**
 - **Release in effluents to unrestricted areas, other than into sanitary sewerage**
 - **Incineration**

Waste Management

- **Tracer Material with $T_{1/2} \geq 120$ d:**
 - **Transfer to authorized recipient**
 - **Release into sanitary sewerage**
 - **Extended interim storage**
 - **Obtaining prior approval of NRC of any alternate method**
 - **Release in effluents to unrestricted areas, other than into sanitary sewerage**
 - **Incineration**

Waste Management

- **Sealed sources with $T_{1/2} \leq 120$ d:**
 - **Transfer to an authorized recipient**
 - **DIS**
 - **Extended interim storage**
- **Sealed sources with $T_{1/2} \geq 120$ d:**
 - **Transfer to an authorized recipient**

Transfer of Control

- **10 CFR 30.34(b)**
- **Mergers**
- **Contractual Agreements**
- **Buyouts**
- **Majority Stock Transfer**
- **NUREG 1556, Vol. 15, Appendix F**



THE END