

---

## INSPECTION PROCEDURE 89035

---

### RADIOACTIVE WASTE MANAGEMENT AND TRANSPORTATION AT URANIUM RECOVERY AND 11e.(2) BYPRODUCT MATERIAL FACILITIES

PROGRAM APPLICABILITY: 2602 and 2801

#### 89035-01 INSPECTION OBJECTIVES

01.01 To establish the inspection program for radioactive waste management and transportation activities at conventional uranium mills, in situ recovery uranium mills, 11e.(2) byproduct material disposal sites, and other 11e.(2) byproduct material sites licensed and regulated under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 40.

01.02 To ensure that the licensee effectively manages radioactive wastes and safely transports radioactive material.

01.03 To ensure that radioactive waste management and transportation programs comply with U.S. Nuclear Regulatory Commission (NRC) license and regulatory requirements.

#### 89035-02 INSPECTION REQUIREMENTS

This Inspection Procedure (IP) provides the requirements and guidance for inspections of radioactive waste (radwaste) and transportation activities at sites licensed under 10 CFR Part 40. Because this IP applies to a variety of licensees, some of the inspection requirements and inspection guidance provided in this IP may not be applicable to all sites.

02.01 Inspection Requirements to Meet Objectives. To meet the objectives of this IP, the inspector shall conduct the following minimum inspection activities:

- a. Prepare for the inspection in the office before the onsite inspection. This effort should include a review of the site's license and license application requirements for radwaste management and transportation activities. The inspector should also be familiar with U.S. Department of Transportation (DOT) requirements for the uranium recovery industry. Appendix A to this IP provides a summary of DOT requirements applicable to the uranium recovery and 11e.(2) byproduct material industries. Review any written reports of radioactive waste spills or transportation incidents that were reported since the last inspection. If the inspection is an announced inspection, the inspector should consider requesting electronic copies of the licensee's manuals or procedures prior to the onsite inspection. The inspector should also request that the licensee provide documentation of any significant changes that have been made to the radwaste and transportation programs since the last inspection.
- b. Conduct one or more site tours to verify that the licensee is managing solid radwaste and transportation activities in accordance with license and regulatory requirements.

The observed activities could include storage of radwaste, shipments of radioactive material, and movement of contaminated material from one restricted area to another.

- c. Observe one or more critical activities such as licensee survey of equipment or package for shipment, staging or sorting of radwaste for disposal, or transferring contaminated material from one restricted area to another. The inspector should conduct independent radiological surveys to verify the licensee's radiological measurements.
- d. Review any unplanned solid radwaste spills or transportation incidents that have occurred since the last inspection to ensure that the licensee responded to the events in accordance with commitments made in the license and site procedures. Ensure the licensee reported the events to the NRC as required by the license and regulations.
- e. Verify through a limited records review that the licensee continues to maintain the solid radwaste and transportation programs in accordance with license and procedural requirements. For example, the inspector shall ensure that the licensee continues to maintain waste disposal agreements for disposal of wastes and licensee staff continue to develop shipping papers and receive training in accordance with DOT regulations.
- f. If there have been significant changes in the solid radwaste and transportation programs since the last inspection, ensure that the changes have been appropriately evaluated and implemented by the licensee.

02.02 Performance-based/Risk-informed Inspections. In accordance with Commission policy (SECY-98-144), inspectors must conduct performance-based inspections with an emphasis on risk-significant activities that have an impact on safety and the environment. A performance-based inspection emphasizes the observation of activities and results of the licensees' programs over the review of procedures or records. The risk-informed inspection approach considers risk insights together with other factors to focus inspection activities commensurate with the risks associated with the implementation of the licensee's NRC-approved programs.

The higher risk activities that impact radwaste management and transportation activities include spill response, radiological emergencies, transportation incidents, and the implementation of procedures and training for these risks.

In summary, the inspector shall verify compliance primarily through observations of site conditions, observations of work activities, interviews with workers, demonstrations by workers, and reviews of critical records. The inspector shall focus attention on the most important, risk-significant activities and the results of the licensee's efforts.

## 89035-03 INSPECTION GUIDANCE

This IP applies to the management of solid radwaste and shipments of radioactive waste. This IP does not apply to management and disposal of potentially radioactive liquids using processes such as land application, deep disposal wells, and evaporation ponds. The inspection guidance for water management activities is provided in IP 89020, "Groundwater and Water Management Activities at Uranium Recovery and 11e.(2) Byproduct Material Facilities." Although uncommon in the uranium recovery industry, this IP would apply to the shipment of radioactive liquids.

The emphasis of this inspection effort is to ensure that the licensee has established and implemented critical programs and procedures to manage the solid radwaste and transportation programs. The inspection should include direct observations of activities as much as possible but may include documentation reviews as needed. This section includes guidance for inspection of the following program areas:

- Regulatory requirements applicable to radioactive wastes and transportation activities
- Programs and procedures review
- Radwaste management
- Transportation activities
- Routine and non-routine reports
- Routine audits and program reviews

With regards to solid radwaste, the licensee's program may include: (1) in-plant storage of trash, spent filters, sludges; (2) management of large waste disposal containers (roll-offs); and (3) maintaining an up-to-date waste disposal agreement. With regards to transportation, the licensee's shipments may include uranium-laden resins, yellowcake product, and wastes for disposal. Transportation activities may also include movement of contaminated material from one restricted area to another within the owner-controlled area.

03.01 Regulatory Requirements. The following regulatory requirements apply to sites that manage radwaste and transport radioactive materials:

- 10 CFR 20.1801 states that the licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.
- 10 CFR 20.1802 states that the licensee shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.
- 10 CFR 20.1904(a) states that the licensee shall ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL." Exceptions are provided in 10 CFR 20.1905 including the exception when containers are in transport.
- 10 CFR 20.2001(a) states, in part, that a licensee shall dispose of licensed material only by transfer to an authorized recipient.
- 10 CFR 20.2006 provides additional requirements for transfers for disposal; additional manifest requirements are provided in Appendix G to 10 CFR Part 20.
- 10 CFR 40.32(c) states, in part, that an application for a specific license will be approved if the applicant's proposed equipment, facilities, and procedures are adequate to protect health and minimize danger to life or property. For uranium recovery and 11e.(2) byproduct material sites, these proposed equipment, facilities, and procedures include those needed to manage radioactive wastes prior to offsite shipment.
- 10 CFR 40.51(a) and (b) state, in part, that no licensee shall transfer source or 11e.(2) byproduct material, including for disposal, except to any person authorized to

receive such source or byproduct material under terms of a specific license or a general license.

- 10 CFR 71.5(a) states that each licensee who transports licensed material outside the site of usage, as specified in the NRC license, or where transport is on public highways, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of U.S. Department of Transportation (DOT) regulations in 49 CFR Parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport.

03.02 Programs and Procedures Review. The goal of this inspection effort is to determine if the licensee continues to implement the solid radwaste management and transportation programs in accordance with license and regulatory requirements. The inspector should:

- Verify that site procedures have been developed for all aspects of the programs
- Verify that changes to the programs were made in accordance with the performance-based license. Also verify that site staff were trained on the program changes
- Observe licensee staff implementing procedures during routine activities such as radiological surveys of packages for transportation or non-routine maintenance activity that results in solid radwaste. Ensure procedures are usable by site staff, equipment specified in the procedure is available, and updated copies of the procedures are available in the field for licensee staff use
- Review any events that have occurred since the last inspection involving the solid radwaste management or transportation programs. Ensure that the licensee evaluated each event, reported the event as necessary, and took corrective actions appropriate to the significance of the event

03.03 Radwaste Management. Uranium recovery and 11e.(2) byproduct material sites typically conduct operations that result in solid radwaste. Depending on site activities, the radwaste may include dry active wastes (contaminated gloves, rags, protective clothing), spent filters, filter press sludge, contaminated equipment, and contaminated piping. The material may be staged or stored in heavy duty plastic bags, barrels, drums, intermodal containers, or roll-off (open top) containers. In some situations, the licensee will maintain records of material placed in these containers for development of shipping papers.

With some exceptions, the radwaste is commonly designated as 11e.(2) byproduct material that must be disposed at facilities authorized to accept this type of material. The NRC typically issues licenses with conditions that require the licensee to maintain waste disposal agreements with authorized recipients to ensure that the licensee can dispose of this material.

As part of the inspection program for solid radwaste, through observations of site activities, discussions with licensee staff, reviews of documentation, and using a risk-informed approach, the inspector should verify that:

- Licensee is storing radwaste in designated locations and containers. Ensure areas or containers are posted as required by license or regulation. Some uranium recovery

licenses may have license conditions that allow radioactive material postings at the entrances of the facility in lieu of posting each location within the facility

- Radwaste is stored in labeled containers per 10 CFR 20.1904(a) with exceptions provided in 10 CFR 20.1905; some licensees may place radwaste directly into containers staged and labeled for shipment
- Containers are protected from the elements and area is properly vented to atmosphere
- Containers do not demonstrate signs of swelling, leakage, deformation, or deterioration due to rust or corrosive action
- Liquid wastes are not added to solid radwastes, unless authorized by the disposal site
- Radwaste is controlled from unauthorized removal or access per 10 CFR 20.1801, or if not in storage, radwaste remains under constant surveillance per 10 CFR 20.1802
- During site tours, independently radiologically survey radwaste in storage to verify that the area has been properly posted if it meets the definition of a radiation area. At uranium recovery sites, the radwaste that may result in radiation areas includes sludge material, filter press material, and used sock filters
- Combustible radwaste material is being managed in accordance with fire protection program requirements for combustible material

03.04 Transportation Activities. At uranium recovery and 11e.(2) byproduct material sites, the most common transportation activities include shipments of yellowcake product to the conversion facility, shipments of radwaste to a processor or directly to a disposal site, and transfers of uranium-bearing resins within a facility or between facilities. Licensees also may transport contaminated material from one restricted area to another area within a site, and to offsite locations. These short-duration equipment transfers may have to comply with DOT requirements if the shipments use or cross publicly accessible roads. In the uranium recovery and 11e.(2) byproduct material industry, most shipments are categorized as exclusive-use shipments.

In accordance with 10 CFR 71.5(a), the licensee is required to comply with DOT regulations when shipping licensed material. Thus, the inspector is expected to have a working knowledge of pertinent DOT requirements. Appendix A to this IP provides a brief overview of DOT requirements that are commonly applicable to the uranium recovery and 11e.(2) byproduct material industry. As an additional resource, generic transportation inspection requirements are provided in IP 86740, "Inspection of Transportation Activities."

As part of the transportation inspection program, through observations of site activities, discussions with licensee staff, and reviews of documentation, the inspector should verify that:

- Wastes have been properly quantified and characterized, prior to development of shipping papers
- Shipments have been properly manifested per NRC (Appendix G to 10 CFR Part 20), DOT, and site procedure requirements

- Shipments have been properly marked, labeled, and placarded, and the licensee has conducted surveys to verify the radiological limits for that type of shipment
- Package was the correct receptacle for the material being shipped
- Recipient is authorized to receive the material
- Licensee maintains records of package testing/safety analysis (for example, for Type A packages), quality control, and completed shipments as required by DOT regulations and procedural requirements
- Licensee confirms that shipments have been received by the destination facility
- Function-specific training has been provided and documented, and the training is up to date for all licensee staff who conduct transportation activities

03.05 Routine and Non-routine Reports. Depending on site-specific license requirements and application commitments, some licensees may be required to report quantities of radwaste material shipped offsite for disposal. This information may be presented in either semi-annual or annual reports to the NRC. Otherwise, routine reports of radwaste storage or transportation shipments are not required to be submitted to the NRC. However, DOT requirements specify that certain transportation records must be maintained for certain periods of time. These records include package, shipment, and training records. The inspector should review some of these records during the inspection.

Non-routine reports may be necessary in response to events that occur during shipment of radioactive material. Per DOT requirements, some events must be reported to the National Response Center. The NRC may receive notification of these events from the licensee, National Response Center, or State representatives. Further, licensees are expected to establish and implement procedures for emergency response which include transportation events.

The inspector should verify that the licensee has reported all transportation-related incidents as required by license or regulatory requirements. The inspector should ensure that the licensee took corrective actions as appropriate and modified the transportation program as required to prevent recurrence of the event.

03.06 Routine Audits and Program Reviews. The audit and program review requirements vary by site. At a minimum, licensees are required to conduct annual reviews of the radwaste and transportation programs as part of the comprehensive annual radiation protection program review specified in 10 CFR 20.1101(c). Some licensees may commit to additional audits and reviews, such as quality assurance program or management reviews. The inspector should verify that the radwaste and transportations programs are being routinely reviewed as required by regulation, license condition, and license application commitments.

89035-04 RESOURCE ESTIMATE

The level of technical expertise needed to conduct the inspection will depend on the complexity of the licensee's radwaste and transportation programs. Most inspections can be conducted by regional inspectors. Inspections of this program typically would involve one inspector and would require about two-thirds of a day to one day (about 5 to 9 hours) to complete, depending on the complexity of the program.

89035-05 PROCEDURE COMPLETION

This IP is complete when the inspection staff observe the activities, interview site staff, and review records as needed to satisfy the objectives of this IP. This IP should be completed at least once per year, or at other frequencies as established in the Master Inspection Schedule.

89035-06 REFERENCES

Inspection Manual Chapter 2801, "Uranium Recovery and 11e.(2) Byproduct Material Facility Inspection Program," October 8, 2021

Inspection Procedure 86740, "Inspection of Transportation Activities," December 14, 2020

Inspection Procedure 89020, "Groundwater and Water Management Activities at Uranium Recovery and 11e.(2) Byproduct Material Facilities," October 8, 2021

Staff Requirements SECY-98-144, "White Paper on Risk-informed and Performance-based Regulation," March 1, 1999

END

Appendix A: Transportation Requirements Applicable to Uranium Recovery and 11e.(2) Byproduct Material Industry

Attachment 1: Revision History for IP 89035

---

## INSPECTION PROCEDURE 89035 APPENDIX A

---

### TRANSPORTATION REQUIREMENTS APPLICABLE TO URANIUM RECOVERY AND 11e.(2) BYPRODUCT MATERIAL INDUSTRY

PROGRAM APPLICABILITY: 2602 and 2801

#### 89035-01 PURPOSE

This appendix provides a summary of transportation regulations for consideration during U.S. Nuclear Regulatory Commission (NRC) inspections of transportation activities at uranium recovery and 11e.(2) byproduct material sites. The information provided in this appendix can be used to support the inspection, but the information is not meant to replace U.S. Department of Transportation (DOT) regulatory requirements. The inspector should always refer to the applicable regulatory requirements if questions or non-compliances are identified.

#### 89035-02 INSPECTION GUIDANCE

02.01 Regulatory Requirements. 10 CFR 71.5(a) states that each licensee who transports licensed material outside the site of usage, as specified in the NRC license, or where transport is on public highways, or who delivers licensed material to a carrier for transport, shall comply with applicable requirements of DOT regulations in 49 CFR Parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport.

To be considered a radioactive material under DOT Hazardous Materials Regulations, the shipped material must exceed both nuclide-specific exemption concentration limit and consignment exemption activity limit. These radionuclide-specific values are provided in §173.436. The two most commonly shipped radioactive materials in the uranium recovery and 11e.(2) byproduct material industries are natural uranium ( $U_{nat}$ ) and radium-226 (Ra-226). The nuclide specific exemption concentration limit and consignment exemption activity limit (respectively) for Ra-226 and  $U_{nat}$  include:

- Ra-226: 270 picocuries per gram (pCi/g) and 0.27 microcurie ( $\mu$ Ci) (includes progeny)
- $U_{nat}$ : 27 pCi/g and 0.027  $\mu$ Ci (includes progeny)

Any shipped material that exceeds the radionuclide-specific values is referred to as DOT Class 7 (radioactive) material.

02.02  $A_1$  and  $A_2$  Values. By definition,  $A_1$  and  $A_2$  values refer to the maximum activity of Class 7 (radioactive) material permitted in Type A packages:

- $A_1$  applies to special form material (uncommon in uranium recovery industry), and  $A_2$  applies to normal form material
- $A_1$  and  $A_2$  values for common radionuclides are listed in §173.435



- $A_2$  value for  $U_{\text{nat}}$  is unlimited
- $A_2$  value for Ra-226 is 0.081 curie (Ci)

The  $A_1$  and  $A_2$  values are used to determine the type of package required for shipment.

02.03 Packages and Packaging. "Package" means the packaging together with its radioactive contents as presented for transport. The categories of packages and packaging used in the uranium recovery industry include:

- General design requirement packages (sometimes called "strong tight containers")
- Excepted packages for limited quantity material
- Empty materials packaging
- Industrial packages (Types IP-1, IP-2, IP-3)

"Packaging" is the assembly of components necessary to ensure compliance with packaging requirements. Packaging includes:

- The receptacle itself
- Absorbent material
- Spacing structures and tie-down system
- Thermal insulation and radiation shielding
- Vents and pressure relief valves

02.04 Bulk Packaging. Bulk packaging means a packaging, other than a vessel or a barge, including a transport vehicle or freight container, in which hazardous materials are loaded with no intermediate form of containment. Additionally, a bulk packaging has:

- a maximum capacity greater than 450 liters (119 gallons) as a receptacle for a liquid;
- a maximum net mass greater than 400 kilograms (882 pounds) and a maximum capacity greater than 450 liters (119 gallons) as a receptacle for a solid; or
- a water capacity greater than 454 kilograms (1,000 pounds) as a receptacle for a gas as defined in §173.115 of this subchapter.

02.05 DOT Package Requirements. DOT packages must meet the following regulatory requirements:

- General package requirements - §173.24
- Additional requirements for non-bulk packages - §173.24(a)
- Additional requirements for bulk packages - §173.24(b)
- General design requirements for radioactive materials packages - §173.410
- All valves through which contents of the package could escape must be protected against unauthorized operation - §173.410(h)
- Additional requirements for industrial packages - §173.411
- Per §173.411(c), for Type IP-2 and IP-3 packages (not IP-1), records must be maintained for 2 years of tests, evaluations, or data showing that the package complies with specifications

02.06 Common Packages in Uranium Recovery Industry. Bulk packages (general design package or Type IP-1):

- Roll-off containers with covers
- Intermodals
- Resin tankers (cannot be filled >90%)

Other package types:

- 55-gallon drums (Type IP-1)
- Type A packages may be used as general design packages, Type IP-1 or IP-2 package
- For all package types, leakage is not allowed

02.07 Low Specific Activity (LSA) Shipments. LSA material is radioactive material that has a low activity per unit mass. LSA material is divided into three groups of increasing specific activities:

- LSA-I, LSA-II, and LSA-III
- For waste containing mixtures of radionuclides, licensees must use mixture rule to determine correct LSA group (usually LSA-I or LSA-II)

By definition, LSA-I includes:

- Uranium and thorium ores and concentrated ores
- Unirradiated natural uranium in solid form
- Radioactive material with unlimited  $A_2$  value such as  $U_{nat}$
- Other radioactive material evenly distributed throughout, and average specific activity does not exceed 30 times the value listed in §173.436

LSA-II includes:

- Other radioactive material evenly distributed throughout, and average specific activity does not exceed  $10^{-4} A_2/\text{gram}$  for solids

For example, resin and yellowcake shipments are commonly categorized as LSA-I. Shipments of radium-bearing sludge material are commonly categorized as LSA-II. Uranium recovery licensees typically use Type IP-1 packages for LSA-I shipments and Type IP-2 packages for LSA-II shipments.

02.08 Reportable Quantity (RQ). RQ refers to a "Reportable Quantity" of a hazardous substance listed or designated under Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act, also known as Superfund:

- RQ values are listed in Appendix A, Table 2 to 49 CFR 172.101
- RQ value for Ra-226 is 0.1 Ci; If in secular equilibrium with daughters, RQ is 0.053 Ci
- RQ value for  $U_{nat}$  is 0.1 Ci; If in secular equilibrium with daughters, RQ is 0.052 Ci
- RQ value for uranium-238 is 0.1 Ci

02.09 Marking and Labeling Requirements.

- §172.301 provides general marking requirements for non-bulk packages

- Includes proper shipping name, UN number
- §172.302 provides general marking requirements for bulk packages
- §172.310 provides additional requirements for Class 7 (radioactive) materials
  - Includes weight, package type (IP-1), USA
- §173.427 provides exception for domestic shipments of LSA material
  - Includes radioactive-LSA (2 sides), UN number (4 sides), RQ (2 sides)
- §172.403 provides labeling requirements for Class 7 (radioactive materials):
  - Includes White-I, Yellow-II, or Yellow-III based on external radiation levels
  - Includes Empty labels
  - Applicable to drums of yellowcake and some LSA shipments

02.10 Common Marking, Labeling, and Placarding in Uranium Recovery Industry. LSA-I and LSA-II packages (bulk):

- UN hazard ID number: UN2912 (LSA-I); UN3321 (LSA-II)
- Placard: Radioactive-7

55-gallon drums (non-bulk packages):

- Gross weight if > 50 kilograms (110 pounds)
- Radioactive-LSA, UN2912, RQ
- Yellow-II label if yellowcake is shipped internationally

Transport trailer of yellowcake drums:

- Placard: Radioactive-7

02.11 Radiological Limits for Packages. The contamination limits for packages are provided in §173.443:

- Non-fixed contamination levels must be kept As Low As is Reasonably Achievable (ALARA)
- Non-fixed external limits - 240 disintegrations per minute per square centimeter (dpm/cm<sup>2</sup>) for beta gamma & low toxicity alpha emitters, 24 dpm/cm<sup>2</sup> for all other alpha emitters (limits changed in 2014)
- For exclusive use shipments only, non-fixed contamination on external surfaces at the beginning of transport cannot exceed the above limits; at any time during transport the non-fixed contamination may not exceed 10 times the limits
- Non-fixed contamination limits are per cm<sup>2</sup> (not 100 cm<sup>2</sup>), wiping area is 300 cm<sup>2</sup>, and wipe efficiency is assumed to be 10 percent, unless determined otherwise by licensee
- As allowed by 173.443(a)(1)(ii), some licensees use hand-held friskers to measure total surface activity in lieu of measuring removable contamination

The radiation level limits are provided in §173.441:

- 200 millirem per hour (mrem/hr) at any point on external surface of package (uranium recovery shipments rarely meet or exceed this limit)
- Transport Index of 10 (maximum radiation level in mrem/hr at 1 meter, rounded up to next tenth)

- Some licensees adopt a limit of 2 mrem/hr in any normally-occupied vehicle space, although this limit formally applies to certain exclusive-use shipments of packages that exceed 200 mrem/hr and Transport Index of 10

Most licensees use fill-in radiation survey forms to demonstrate compliance with the above limits.

02.12 Excepted Packages. When small fractions of A<sub>2</sub> activities are shipped, shipments may be excepted from some DOT requirements; for example, packages may be shipped as “excepted packages” if they involve:

- Limited quantity of radioactive material ( $10^{-3}$  A<sub>2</sub> value)
- Empty packages

Excepted package requirements for limited quantities of Class 7 (radioactive) materials are provided in §173.421 and 422:

- Outside of each package must be marked with the four-digit UN identification number for the material preceded by the letters UN, as shown in Column 4 of Table in §172.101
- Non-fixed contamination limits on package surfaces must not exceed the limits specified in §173.443(a)
- Radiation level at any point on the surface of the package must not exceed 0.5 mrem/hr
- Outside of inner packaging, or if there is no inner packaging, the outside of the package itself must bear the marking “Radioactive”

Uranium recovery licensees typically use excepted packages to move contaminated material from one restricted area to another, for example, in a barrel situated in the back of a truck

- An advantage of excepted packages – shipping paper is not required
- Before transfer, a survey should be performed and documented
- Package must always remain under licensee control
- Licensee must use designated company trucks
- Truck bed, plastic bag, wrapped equipment, toolbox, or bucket is considered the package
- Material must be transported by trained company employees

02.13 Empty Packages. Uranium recovery licensees commonly ship empty packages, for example, when an intermodal or roll-off container is returned to the site after disposal of the package contents. The empty package requirements for Class 7 (radioactive) materials are provided in §173.428:

- Packaging has been emptied of its radioactive contents as far as practicable, but still contains residual radioactivity
- Internal contamination limit is 100 times the removable (non-fixed) contamination limits for an exterior package surface
- For empty packages, use “Empty” label
- Wipe contamination sampling techniques are often not practical or feasible for the interior of the containment system of some radioactive material packages; if total surface contamination (fixed and non-fixed) can be measured and is below the limit, then the non-fixed component would be below the limit

- If the licensee cannot demonstrate that non-fixed contamination is less than 100 times the limits in §173.443, the Empty classification cannot be used
- Empty packages are excepted from shipping paper and marking requirements, except for UN identification number marking

02.14 Shipping Papers. 49 CFR Part 172, Subpart C, provides the requirements for shipping papers:

- §172.201(d) requires emergency response telephone number
- §172.201(e) provides record retention requirements: 3 years for hazardous wastes and 2 years for all other hazardous materials
- §172.202 provides general requirements: UN number, proper shipping name, hazard class (7), activity, weight/volume, number, and type of packages
- §172.203(d) includes additional requirements: RQ, name of radionuclides (such as Ra-226), category of labels (such as Yellow-II), Transport Index value, and exclusive use
- §172.204 discusses shipper's certification
- §177.817(a) states that a person may not accept a hazardous material for transportation or transport a hazardous material by highway unless that person has received a shipping paper prepared in accordance with/to Part 172 of this subchapter

02.15 Training Requirements.

- §172.704(a) lists the training requirements – general, function-specific, safety, and security awareness
- §172.704(c) requires recurrent training every 3 years
- §172.704(d) provides recordkeeping requirements for training records

02.16 Additional Requirements.

- §177.816 requires additional driver training for carriage by public highway. This includes safety inspections, vehicle operations, and commercial driver's license for transport of cargo and large portable tanks.
- §177.834(e) requires setting of the parking/handbrake and 834(i) requires a qualified person to be present during loading and unloading.
- 172.600-606 provide emergency response requirements:
  - Not applicable to shipments without shipping papers (excepted quantity and empty packages)
  - Includes immediate instructions for accidents, fires, and spills
  - Must be immediately available to the driver
  - Must include emergency response phone number that is monitored at all times while material is being transported; monitored by an individual who is knowledgeable or has immediate access to a knowledgeable person
- §171.15 and 171.16 provide the incident reporting requirements (immediate telephone, written reports):
  - By telephone, notify National Response Center for fire, breakage, spillage, or suspected radioactive contamination as soon as practical but no later than 12 hours after occurrence
- §173.475 provides quality control requirements prior to each use of a packaging (some licensees have used checklists to demonstrate compliance):

- Packaging is proper for the contents to be shipped
- Packaging is in unimpaired physical condition
- Each closure device, including gaskets, is properly installed, secured, and free of defects
- Special instructions have been followed (includes tightening of lids for drums shipped as Type A packages)
- Each closure, valve, and/or opening is closed and sealed
- Internal pressure will not exceed design pressure
- Radiation and contamination levels are within allowed limits
- Per 10 CFR 40.64, licensees may have to report transfers of uranium source material in certain circumstances (such as shipments of yellowcake to Canada) by submitting Nuclear Materials Transaction Reports to NRC.
- To export yellowcake to Canada, the carrier must have an export license issued by the NRC.

END

Attachment 1: Revision History for IP 89035

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number
n/a	ML21196A352 10/08/21 CN 21-034	Initial issuance	n/a	ML21196A354