

**U.S. Department of Energy**  
**Washington, D.C.**

**ORDER**

**NE O 231.1**

Approved: August 2025  
Admin Chg 1: October 2025

**SUBJECT:** ENVIRONMENT, SAFETY AND HEALTH REPORTING

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1. **PURPOSE.** This Order establishes requirements to ensure that Department of Energy (DOE) receives timely and accurate information from nuclear facilities authorized by DOE's Office of Nuclear Energy (NE) about events that have affected or could adversely affect the health, safety, and security of the public or workers, the environment, the operations of nuclear facilities authorized by NE, or the credibility of the Department. This will be accomplished through timely collection, reporting, analysis, and dissemination of data pertaining to environment, safety, and health issues as required by law, or regulations, or in support of United States political commitments to the International Atomic Energy Agency (IAEA).
  
2. **CANCELS/SUPERSEDES.**

This Order applies in lieu of DOE O 231.1B (current version) with respect to the facilities and activities covered by Section 3 below. Cancellation of a directive does not, by itself, modify or otherwise affect any contractual or regulatory obligation to comply with the directive. Contractor Requirements Documents (CRDs) that have been incorporated into a contract remain in effect throughout the term of the contract unless and until the contract or regulatory commitment is modified to either eliminate requirements that are no longer applicable or substitute a new set of requirements.

3. **APPLICABILITY.**
  - a. **DOE Elements.** This Order applies to all Departmental elements including NNSA, and their associated field elements,<sup>1</sup> to the extent they are involved with facilities and activities described in paragraph 3.b.
  
  - b. **NE Facilities and Activities.** Except as stated in paragraph 3.d., this Order applies to all facilities and activities under the responsibility of NE, including nuclear facilities and nuclear activities authorized by NE. Such nuclear activities include the design, construction, management, operation, decontamination, decommissioning, or demolition of nuclear facilities.
  
  - c. **Contractors.** Except as stated in paragraph 3.d., this Order sets forth conditions to be applied to contractors performing work that involves facilities and activities described in paragraph 3.b. The CRD must be included in contracts under which the contractor is involved with such facilities and activities.

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<sup>1</sup> Operations offices, service centers, site offices, area offices, field offices, government-owned government-operated facilities, and regional offices of federally-staffed laboratories that report directly to a DOE Headquarters office.

d. Equivalency and Exemptions.

- 1) Exemption. In accordance with the responsibilities and authorities assigned by Executive Order 12344, codified at 50 United States Code (U.S.C.) sections 2406 and 2511, and to ensure consistency throughout the joint Navy/DOE Naval Nuclear Propulsion Program, the Deputy Administrator for Naval Reactors (Director) implements and oversees requirements and practices pertaining to this directive for activities under the Director's cognizance, as deemed appropriate.
- 2) Exemption. This Order does not apply to activities regulated by either the Nuclear Regulatory Commission (NRC) or the authorities of a State under an agreement with the NRC per the Atomic Energy Act of 1954, as amended (AEA).
- 3) Other Equivalencies/Exemptions. Any other equivalency or exemption to this Order requires the approval of NE's Safety Basis Approval Authority (SBAA). Requests for equivalencies/exemptions will be adjudicated by NE's SBAA within 14 calendar days of receipt of a substantially complete request.
- 4) Exemption (Radioactive Sealed Sources) (National Security Exclusion). The requirements of this Directive do not apply to radioactive sealed sources that are classified, or to data and information regarding a radioactive sealed source that would divulge a classified program. National Security Exclusion exemptions beyond that specified above must be processed in accordance with the deviations process as defined in DOE O 470.4B, Safeguards and Security Program, dated 7-26-11.

4. REQUIREMENTS. Reports that potentially contain classified or controlled unclassified information (e.g., Unclassified Controlled Nuclear Information (UCNI) or Controlled Unclassified Information (CUI)) must be reviewed and marked in accordance with appropriate Directives. If a report includes classified information, it must be contained in a separate classified addendum, and an unclassified version of the report must be developed and annotated to indicate the existence, identification, and file location of the classified addendum. Reports must be submitted as follows:

- a. Reporting Annual Site Environmental Information (ASER). Annual site environmental information must be reported in accordance with Attachment 2.
- b. Reporting Occupational Safety and Health Information.
  - (1) Injury and Illness Recordkeeping and Reporting.
    - (a) Work-related fatalities, injuries, and illnesses occurring to Federal employees must be recorded, reported, and maintained in accordance with the requirements contained in the current version of Title 29 C.F.R. Part 1960, Subpart I.

(b) A work-related incident that involves a fatality or hospitalization of three or more Federal employees must be reported to the Chief Health, Safety, and Security Officer in accordance with 29 C.F.R. § 1960.70 and 29 C.F.R. § 1904.39. The designated Federal Employees Occupational Safety and Health (FEOSH) Program Manager for each Headquarters Element must report incidents involving their Federal employees and Federal employees of DOE Field Elements under their cognizance to the Chief Health, Safety and Security Officer.

c. Reporting Ionizing Radiation Exposure Information. Ionizing radiation exposure information must be reported in accordance with Attachment 3.

d. Reporting Safety Basis Information. The status of the safety basis of hazard category 1, 2 and 3 nuclear facilities must be maintained up-to-date in the Safety Basis Information System (SBIS)

e. Reporting of Radioactive Sealed Sources Information.

(1) The Radiological Source Registry and Tracking (RSRT) database serves as DOE's centralized repository for inventory and transaction data to provide reports and information on radioactive sealed sources in support of the *IAEA Code of Conduct on the Safety and Security of Radioactive Sources* and *IAEA Guidance on the Import and Export of Radioactive Sources*, and the NRC National Source Tracking System (NSTS) established in accordance with 10 C.F.R. Parts 20 and 32.

(2) Transaction data must be reported from the DOE RSRT database to the NRC National Source Tracking System (NSTS) in a manner consistent with 10 C.F.R. § 20.1003 and 10 C.F.R. § 20.2207 for transactions involving IAEA Category 1 and 2 radioactive sealed sources between DOE and the commercial sector, and DOE imports and exports of radioactive sealed sources.

(3) IAEA Category 1 and 2 transaction data as described in 4.e. (2) above, must be reconciled annually between the DOE RSRT and the NRC NSTS in a manner consistent with 10 C.F.R. § 20.2207.

(4) Inventory and transaction information for radioactive sealed sources must be reported to the DOE RSRT in accordance with Attachment 5, Reporting of Radioactive Sealed Sources Information.

5. RESPONSIBILITIES.

a. Heads of Headquarters Elements.

(1) Provide program direction to ensure DOE and its contractors implement the injury and illness recordkeeping and meet reporting requirements of this Directive, to include the use of common definitions, consistent recording procedures, and timely reporting.

- (2) Report work-related accidents that involve a fatality or the hospitalization of three or more Federal employees to the Chief Health, Safety and Security Officer. (See requirements in 29 C.F.R. § 1960.70 and 29 C.F.R. § 1904.39.)
- b. Field Element Manager and/or Safety Basis Approval Authority.
  - (1) Identify contracts to which the CRD (Attachment 1) should apply and notify the cognizant contracting officers.
  - (2) Report total hours worked by DOE employees each quarter to the Computerized Accident/Incident Reporting System (CAIRS) database.
  - (3) Ensure the inventory and inventory verification of all accountable radioactive sealed sources that meet the criteria of 10 C.F.R. Part 835, Subpart M, and Appendix E, including sources that meet the criteria of 10 C.F.R. Part 835, Appendix E, that have been identified for disposal but not yet disposed, and radioisotope thermoelectric generators (RTGs), that are under their cognizance are reported to the DOE RSRT in a timely and uniform manner.
  - (4) Ensure transaction reporting and reconciliation of IAEA Category 1 and 2 radioactive sealed sources identified in Appendix A of Attachment 5 of this Directive under their cognizance are reported to the DOE RSRT in accordance with this Directive including Attachment 5.
- c. Heads of Government–Owned/Government-Operated (GOGO) Sites and Sites Not Under the Cognizance of a DOE Field Element. Fulfill the responsibilities of the Heads of DOE Field Elements and Contracting Officers as appropriate.
- d. Office of Management. Submit reports on work-related fatalities, injuries and illnesses of DOE Headquarters employees and hours worked in accordance with 29 C.F.R. Part 1960, Subpart I and the requirements in Attachment 3.
- e. Contracting Officers. Incorporate the CRD into contracts in a timely fashion upon notification of its applicability.

## 6. REFERENCES.

- a. 10 C.F.R. Parts 20, *Standards for Protection Against Radiation*, Subpart A General Provisions (20.1003), Subpart M- Reports (20.2207) and Appendix E to Part 20- Nationally Tracked Source Thresholds, and 10 C.F.R. Part 32, *Specific Domestic Licenses to Manufacture or Transfer Certain Items Containing Byproduct Material*, Definitions (32.2) and Serialization of Nationally Tracked Sources (32.201)- (November 8, 2006 Final Rule amending 10 C.F.R. Parts 20 and 32 entitled: National Source Tracking of Sealed Sources) which amends regulations to implement a National Source Tracking System for certain radioactive sealed sources as part of a comprehensive radioactive source control program for radioactive materials of greatest

concern. The rule defines the list of isotopes with threshold values reported to the NRC NSTS.

- b. 10 C.F.R. Part 110, *Export and Import of Nuclear Equipment and Material* (July 1, 2005, Final Rule amending 10 C.F.R. Part 110), which amended regulations to provide for enhanced tracking of certain exports and imports of radioactive sealed sources and bulk material for certain radionuclides.
- c. 10 C.F.R. Part 824, *Procedural Rules for the Assessment of Civil Penalties for Classified Information Security Violations*, which contains provisions relating to the safeguarding or security of Restricted Data or other classified information that may result in a civil penalty pursuant to subsection a. section 234B of the Atomic Energy Act of 1954 (42 U.S.C. 2282b).
- d. 10 C.F.R. Part 830, *Nuclear Safety Management*, which contains requirements for contractors to categorize DOE nuclear facilities and prepare a documented safety analysis (safety basis) for each facility.
- e. 10 C.F.R. Part 835, *Occupational Radiation Protection*, which establishes radiation protection standards, limits, and program requirements for protecting individuals from ionizing radiation resulting from the conduct of DOE activities, and for managing radioactive sealed sources. Subpart M and Appendix E provide the list of isotopes with threshold values for baseline (initial) inventory reporting and verification to the DOE RSRT.
- f. 10 C.F.R. Part 851, *Worker Safety and Health Program*, which contains occupational injury and illness recording and reporting standards and requirements for DOE contractors.
- g. 29 C.F.R. Part 1904, *Recording and Reporting Occupational Injuries and Illnesses*, which contains requirements for employers to record and report work-related fatalities, injuries and illnesses.
- h. 29 C.F.R. Part 1960, *Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters*, which contains occupational injury and illness recording and reporting standards and requirements for DOE.
- i. NE O 458.1, *Radiation Protection of the Public and the Environment*, which establishes requirements to protect the public and the environment against undue risk from radiation associated with radiological activities conducted under the control of DOE.
- j. NE O 470.1, *Safeguards and Security Program*, which establishes program planning and management requirements and responsibilities for the safeguards and security program.

- k. DOE G 441.1-1C, *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection*, dated 7-8-11, Chapter 15, “Sealed Radioactive Source Accountability and Control,” which provides guidance for implementing the provisions of the functional areas contained in 10 C.F.R. Part 835, including the identification, custodial and inventory responsibilities for sealed radioactive sources.
    - l. IAEA Safety Guide, No. RS-G-1.9, *Categorization of Radioactive Sources*, dated August 2005, which provides the IAEA technical basis and underlying methodology for identifying and categorizing radioactive sources by activity level. [http://www-pub.iaea.org/MTCD/publications/PDF/Pub1227\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Pub1227_web.pdf).
    - m. IAEA/CODEOC/2004, *Code of Conduct on the Safety and Security of Radioactive Sources*, dated January 2004, which provides international guidance on enhancing the safety and security of radioactive sources, including a list of isotopes of greatest concern with threshold values. The Code applies to all radioactive sources that may pose a significant risk to individuals, society and the environment. [http://www-pub.iaea.org/MTCD/publications/PDF/code2004\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/code2004_web.pdf).
    - n. IAEA/CODEOC/IMP-EXP/2005, *Code of Conduct on the Safety and Security of Radioactive Sources - Guidance on the Import and Export of Radioactive Sources*, dated March 2005, which provides international guidance for the transfers of radioactive sealed sources between IAEA Member States, and was developed to support the export and import provisions of The Code. [http://www-pub.iaea.org/MTCD/publications/PDF/Imp-Exp\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Imp-Exp_web.pdf).
7. **CONTACT.** Questions concerning environment, safety and health reporting should be referred to the Office of Nuclear Energy.

BY ORDER OF THE SECRETARY OF ENERGY:



JAMES P. DANLY  
Deputy Secretary

**CONTRACTOR REQUIREMENTS DOCUMENT**  
**NE O 231.1, ENVIRONMENT, SAFETY AND HEALTH REPORTING**

Regardless of the performer of the work, the contractor is responsible for complying with the requirements of this CRD. The contractor is responsible for flowing down the requirements of this CRD to subcontractors at any tier to the extent necessary to ensure the contractor's compliance with the requirements.

In addition to the requirements included in this CRD, contractors are responsible for complying with Attachments 2, 3, and 4 to NE O 231.1 referenced in and made a part of this CRD as set forth below.

Reports that potentially contain classified or controlled unclassified information (e.g., UCNI or CUI) must be reviewed and marked in accordance with the appropriate Directives. If a report includes classified information, it must be contained in a separate classified addendum and an unclassified version of the report must be developed and annotated to indicate the existence, identification, and file location of the classified addendum.

1. Reporting Annual Site Environmental Information. Contractors must comply with the requirements in Attachment 2 that pertain to reporting annual site environmental information.
2. Reporting Ionizing Radiation Exposure Information. Contractors must comply with the requirements in Attachment 4, which pertain to reporting ionizing radiation exposure information.
3. Reporting of Radioactive Sealed Sources Information.
  - a. Contractors who own, possess, use, or maintain in custody those radioactive sealed sources that meet the criteria of 10 C.F.R. Part 835, *Occupational Radiation Protection*, Subpart M and Appendix E, including sources that meet the criteria of 10 C.F.R. Part 835 Appendix E that have been identified for disposal but not yet disposed are responsible for complying with the inventory reporting requirements in Attachment 5 of this Directive.
  - b. Contractors who own, possess, use, or maintain in custody those radioactive sealed sources that meet the criteria for IAEA Categories 1 and 2 radioactive sealed sources as identified in Attachment 4 of this Directive are responsible for complying with the transaction reporting requirements in Attachment 4 of this Directive.
  - c. A violation of the provisions of the CRD relating to the safeguarding or security of Restricted Data (RD) or other classified information may result in a civil penalty pursuant to subsection a. section 234B of the Atomic Energy Act of 1954 (42 U.S.C. § 2282b). The procedures for the assessment of civil penalties are set forth in 10 C.F.R. Part 824, *Procedural Rules for the Assessment of Civil Penalties for Classified Information Security Violations*.



## **REPORTING ANNUAL SITE ENVIRONMENTAL INFORMATION**

This Attachment provides information and/or requirements associated with NE O 231.1 as well as information and/or requirements applicable to contracts in which the associated CRD (Attachment 1 to NE O 231.1) is inserted.

Annual Site Environmental Reporting. The following information must be made available to the public, and submitted to the Office of Nuclear Energy, by October 1 of each year for the preceding calendar year, developed in accordance with the following guidance:

1. Site environmental management performance. Data must include effluent releases, environmental monitoring, and types and quantities of radioactive materials emitted or discharged to the environment, the estimated or calculated total effective dose to a representative person or maximally exposed member(s) of the public and the calculated collective dose to members of the public from exposure to radiation sources identified under NE O 458.1, and, where it is of concern, releases of radon and its decay products from DOE sources and the resultant individual and collective dose from these radionuclides, which need not be combined with dose estimates from other sources.
2. Property clearance activities. Information must include a summary of approved Authorized Limits, results of radiological monitoring and surveys of cleared property, types and quantities of property cleared, and independent verification program results in accordance with NE O 458.1.



## REPORTING IONIZING RADIATION EXPOSURE INFORMATION

This Attachment provides information and/or requirements associated with NE O 231.1 as well as information and/or requirements applicable to contracts in which the associated CRD (Attachment 1 to NE O 231.1) is inserted.

1. Annual Individual Radiation Exposure Records.
  - a. Annual radiation exposure records for the preceding monitoring year, required to be collected by 10 C.F.R. § 835.702, must be reported to the REMS repository by July 1.
  - b. Revisions to radiation exposure records for monitoring periods beginning on or after January 1, 1989, must be reported to the REMS repository. Revised records for prior monitoring years must be submitted annually by March 31. However, if the revised dose record results in a dose exceeding regulatory dose limits defined in 10 C.F.R. § 835.202, revised records must be submitted within 30 days of the revision to the dose record. Revised records must be submitted to the REMS repository in a separate file in the same format as annual records. The transmittal documentation must identify the enclosed records as revised records.
2. Report Format. All occupational radiation exposure reports of records collected and sent to the REMS repository as noted in Attachment 3, paragraph 1 must be prepared in accordance with the REMS Reporting Guide located at [http://www.hss.doe.gov/csa/analysis/remss/REMS\\_Reporting\\_Guide.pdf](http://www.hss.doe.gov/csa/analysis/remss/REMS_Reporting_Guide.pdf) and submitted in electronic format in accordance with the current HSS policy for submitting personally identifiable information (PII) to the REMS repository as posted on the REMS web page at [http://www.hss.doe.gov/csa/analysis/remss/PII\\_reporting\\_requirements\\_F-5-13-09\\_FNL.pdf](http://www.hss.doe.gov/csa/analysis/remss/PII_reporting_requirements_F-5-13-09_FNL.pdf).



## REPORTING RADIOACTIVE SEALED SOURCE INFORMATION

This Attachment provides information and/or requirements associated with NE O 231.1 as well as information and/or requirements applicable to contracts in which the associated CRD (Attachment 1 to NE O 231.1) is inserted. This attachment applies to Federal and contractor elements.

### 1. Planning and Administration.

- a. DOE will maintain a centralized reporting capability, the Radiological Source Registry and Tracking (RSRT) database, which serves as DOE's centralized repository for inventory and transaction data on radioactive sealed sources and is used by DOE to provide appropriate data on IAEA Category 1 and 2 radioactive sealed sources to the NRC National Source Tracking System (NSTS).
- b. Accountable radioactive sealed sources that meet the criteria of 10 C.F.R. Part 835, Subpart M and Appendix E, including sources that meet the criteria of 10 C.F.R. Part 835 Appendix E that have been identified for disposal but not yet disposed must be reported as inventory to the DOE RSRT database per the requirements of this Directive. See also Definitions and Abbreviations.
- c. In addition, radioactive sealed sources that meet the criteria of IAEA Category 1 or 2 radioactive sealed sources (as identified in Appendix A<sup>2</sup>) must be reported as transactions to the RSRT.
- d. All site/facility operators using or storing radioactive sealed sources as referenced above must—
  - (1) Maintain radioactive materials programs that ensure the accountability of radioactive sealed sources identified in this Directive.
  - (2) Ensure that site and facility radioactive sealed source accounting systems are established to provide accurate radioactive sealed source transaction information relating to the manufacture, transfer (shipment), receipt, inventory, disassembly, and disposal of Category 1 and 2 radioactive sealed sources as listed in Appendix A.
  - (3) Ensure that aggregation of individual radioactive sealed sources is taken into account in the protection during transfer (shipment).
  - (4) Ensure that classified data or information that would divulge a classified program is not reported to DOE RSRT, which is maintained as OUO/CUI.

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<sup>2</sup> NOTE: Category 3 radioactive sealed sources are presented in Appendix A for informational purposes only.)

2. General Requirements.

- a. Information regarding specific radioactive sealed sources will remain on the active DOE RSRT inventory until transferred (shipped), disassembled or disposed.
- b. Radioisotope decay will be taken into account in the transaction reporting of Category 1 and 2 radioactive sealed sources.
- c. For Category 1 and 2 radioactive sealed sources, any missed transaction or errors found in previously filed inventory or transaction reports will be corrected or a new report will be filed within five business days of the discovery of the error or missed transaction.

3. Serialization of IAEA Category 1 and 2 Radioactive Sealed Sources (See Appendix A).

After the effective date of this Directive:

- a. A unique alpha-numeric serial number must be assigned to each Category 1 or 2 radioactive sealed source upon manufacture.
- b. If a unique serial number is not available for existing Category 1 or 2 sealed sources, other information to uniquely identify the source must be used.

4. Baseline (Initial) Inventory of Accountable Radioactive Sealed Sources.

- a. Each DOE site/facility operator that possesses accountable radioactive sealed sources that meet the criteria of 10 C.F.R. Part 835 Subpart M and Appendix E, including sources that meet the criteria of 10 C.F.R. Part 835 Appendix E that have been identified for disposal but not yet disposed must report its initial inventory, if initial inventory was not already reported with baseline inventory in 2008, or verify previously reported inventory to the RSRT.
- b. The information may be submitted by using any of the methods identified in paragraph 6(e.) of this Directive.
- c. If multiple isotopes are in an individual source, a record for each isotope must be submitted. (See also Appendix B, *Required Fields for Inventory and Transaction Reporting*).
- d. The baseline (initial) inventory must include the data fields as identified in Appendix B, *Required Fields for Inventory and Transaction Reporting*, under "Inventory Reporting."

5. Verification of Book Inventory Records.

The book inventory of radioactive sealed sources must be verified annually against the site/facility operator's listing in the RSRT.

6. Transaction Reporting to the RSRT of IAEA Category 1 and 2 Radioactive Sealed Sources.

- a. A Sealed Source Transaction Report must be completed and submitted to

the RSRT database for IAEA Categories 1 and 2 solid radioactive sealed sources as identified in Appendix A for each of the following types of transactions:<sup>3</sup>

- (1) Manufacture (a new or initially identified source).
- (2) Transfer (shipment).
- (3) Receipt.
- (4) Disassembly.
- (5) Disposal (e.g., final end-of-life action).

- b. For shipments, disassembly and disposal, it is assumed that the baseline (initial) information for the sources has already been reported to the RSRT database.
- c. For each DOE site/facility operator that manufactures (or initially identifies), ships, receives, disassembles, or disposes of a Category 1 or 2 radioactive sealed sources, the transaction report must include the data fields as specified in Appendix B, *Required Fields for Inventory and Transaction Reporting*.
- d. The transaction reports discussed in paragraphs 6 a-c must be submitted to the RSRT within five business days after the transaction.
- e. The reports must be submitted to the RSRT by using one of the following modes, in accordance with site and DOE data transmission requirements for the protection of the information:
  - (1) the online system at such time as established and available to the DOE sites; or
  - (2) electronic format, pre-defined, computer-readable format; or
  - (3) facsimile or e-mail using a pre-defined format.

7. Annual Reconciliation of Category 1 and 2 Radioactive Sealed Source Information.

- a. Each DOE site/facility operator must reconcile and verify Categories 1 and 2 radioactive sealed source physical inventories annually against the site/facility operator's data in the DOE RSRT.
- b. Modifications made to the RSRT inventory must be submitted as transactions via the reports identified in paragraphs 6 a-c or as inventory correction as defined below.

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<sup>3</sup> See also "Regenerated (Radioactive Sealed Source)" under the Definitions and Abbreviations section.

- (1) Inventory corrections for Category 1 or 2 radioactive sealed sources will be made within five business days of the discovery of the error or missed inventory.
- (2) Reconciliation and verification must be based upon December 31 inventories and submitted to the RSRT within 3 weeks after the end of the calendar year.

8. Verification of Authorities for Receipt of Accountable Radioactive Sealed Sources.

- a. Accountable radioactive sealed sources must not be transferred from a DOE organization or from a DOE contractor except as authorized.
- b. Except as otherwise provided in this section and subject to the provisions of paragraphs 8(c) of this section, an accountable radioactive sealed source may be transferred—
  - (1) to another authorized DOE organization or DOE contractor;
  - (2) to the agency in any NRC agreement state, which regulates radioactive material pursuant to an agreement under section 274(b) of the Atomic Energy Act of 1954 (as amended);
  - (3) to any person authorized to receive such radioactive material under terms of a specific license or a general license or their equivalents issued by the NRC or an Agreement State;
  - (4) to a person abroad pursuant to an export license issued under Departmental requirements or NRC regulations as applicable; or
  - (5) as otherwise authorized by the Department in writing.
- c. Before transferring an accountable radioactive sealed source to a DOE organization or contractor, a specific licensee of the NRC or an agreement state, or a general licensee who is required to register with the NRC or with an agreement state prior to receipt of the material, the transferor of the material will obtain written verification that the transferee's DOE approved radiation protection program or license encompasses or authorizes the receipt of the type, form, and quantity of material to be transferred. Verification methods include:
  - (1) Current copy of the transferee's specific license or registration certificate, or DOE authorization;
  - (2) The transferor may obtain other sources of information compiled by a reporting service from official records of the NRC, the licensing agency of an Agreement State, or the Department.

9. Records.

- a. Inventory and accountability reporting procedures must be documented for all accountable radioactive sealed sources as defined by this Directive.

- b. See 10 CFR Part 835 for additional documentation and record keeping requirements for accountable radioactive sealed sources (<http://www.hss.energy.gov/healthsafety/wsdp/radiation/> ).
- c. See DOE Record Retention Scheduling for information about DOE records retention and disposition requirements (<http://www.cio.energy.gov/records-management.htm>).

## **DEFINITIONS AND ABBREVIATIONS.**

- a. **Accountable Sealed Radioactive Source.** As defined in 10 C.F.R. Part 835, a sealed radioactive source having a half-life equal to or greater than 30 days and an isotopic activity equal to or greater than the corresponding value provided in Appendix E of 10 C.F.R. Part 835. Also referred to as an accountable radioactive sealed source.
- b. **Book Inventory.** The number of radioactive sealed sources and their activity present at a given time as reflected by accounting records.
- c. **Categorization of Radioactive Sealed Sources.** A designation of radioactive sealed sources determined by the quantity and type of radioactive source, as well as any deterministic health effects. The IAEA Basic Safety Guide RS-G-1.9 establishes this categorization and it is used in the IAEA Code of Conduct.
  - (1) Category 1. As defined by the IAEA, an amount of radioactive material which, if not safely managed or securely protected, would be likely to cause permanent injury to a person who handled or were otherwise in contact with it, for more than a few minutes. It would probably be fatal to be close to this amount of unshielded material for a period of a few minutes to an hour.
  - (2) Category 2. As defined by the IAEA, an amount of radioactive material which, if not safely managed or securely protected, could cause permanent injury to a person who handled it, or were otherwise in contact with it for a short time (minutes or hours). It could possibly be fatal to be close to this amount of unshielded radioactive material for a period of hours to days.
  - (3) Category 3. As defined by the IAEA, an amount of radioactive material which, if not safely managed or securely protected, could cause permanent injury to a person who handled it, or were otherwise in contact with it for some hours. It could possibly, although it is unlikely, be fatal to be close to this amount of unshielded radioactive material for a period of days to weeks.
- d. **Disassembly (of a radioactive sealed source).** As defined by the NRC, the source is taken apart, the radioactive material is removed, and the material may be used for manufacture of new sources or sent for disposal. The unique serial number of the source is destroyed. This is a permanent endpoint. Endpoints for a source include export, disassembly, disposal, decay, loss, theft, and destruction of the source. (NSTS Final Rule, Section I.)
- e. **Radioactive Sealed Source.** A radioactive material that is permanently sealed in a capsule or closely bonded to a non-radioactive substrate designed to prevent leakage or escape of the radioactive material. It is a solid form of radioactive material which is not exempt from regulatory control and may be subject to transaction reporting, depending on the activity level of the source. For the purpose of this Directive, the term radioactive sealed source does not include material encapsulated solely for disposal; or nuclear material contained in a nuclear

weapon; or in any nuclear reactor fuel assembly, subassembly, fuel rod, or fuel pellet.

- f. Regenerated (Radioactive Sealed Source). The activity of the radioactive sealed source in the sealed source device is increased by neutron activation in a nuclear reactor or by other means to restore the desired radioactivity level. The identity and unique serial number of the sealed source may or may not remain with the original source throughout regeneration. Regeneration is treated as a shipment or receipt when the identity and serial number are retained.
- g. Reporting Identification Symbol (RIS). A unique combination of three or four letters assigned to each reporting organization by DOE for the purpose of identification in the Nuclear Materials Management and Safeguards System database. Each contractor and facility RIS is associated with a specific DOE element. RIS codes can be obtained through the RSRT database administrator (DOE O 474.2, Chg 1).
- h. Site/Facility Operator. The corporate or governmental entity responsible for the day-to-day operations involving storage, processing, or use of nuclear materials at the site/facility. For contractor-operated facilities, this refers to the site/facility contractor. For the DOE-operated facilities, this refers to the DOE organization operating the facility. (DOE O 474.2, Chg 1)
- i. Transactions.<sup>4</sup>Category 1 or 2 radioactive sealed sources as identified in Appendix A that are:
  - (1) Transferred (shipped) or received:
    - (a) Between DOE RISs.
    - (b) From a DOE RIS to an NRC or Agreement State licensee.
    - (c) Exported from or imported to a DOE RIS.
  - (2) Manufactured (new or initially identified source).
  - (3) Disassembled.
  - (4) Sent for disposal (e.g. final end-of-life action).

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<sup>4</sup> See also “Regenerated (Radioactive Sealed Source)” under the Definitions and Abbreviations section.



**TABLE OF RADIOACTIVE SEALED SOURCES\***

Radionuclide	Category 1 <sup>1</sup> [1000 x D] <sup>2</sup>		Category 2 [10 x D]		Category 3 [1 x D]	
	(TBq) <sup>3</sup>	(Ci) <sup>4</sup>	(TBq)	(Ci)	(TBq)	(Ci)
Ac-227	2.E+01	5.4E+02	2.E-01	5.4E+00	2.E-02	5.4E-01
Am-241	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Am-241/Be	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Cf-252	2.E+01	5.4E+02	2.E-01	5.4E+00	2.E-02	5.4E-01
Cm-244	5.E+01	1.4E+03	5.E-01	1.4E+01	5.E-02	1.4E+00
Co-60	3.E+01	8.1E+02	3.E-01	8.1E+00	3.E-02	8.1E-01
Cs-137	1.E+02	2.7E+03	1.E+00	2.7E+01	1.E-01	2.7E+00
Gd-153	1.E+03	2.7E+04	1.E+01	2.7E+02	1.E+00	2.7E+01
Ir-192	8.E+01	2.2E+03	8.E-01	2.2E+01	8.E-02	2.2E+00
Pm-147	4.E+04	1.1E+06	4.E+02	1.1E+04	4.E+01	1.1E+03
Po-210	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Pu-236 <sup>5</sup>	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Pu-238	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Pu-239	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Pu-239/Be	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Pu-240 <sup>5</sup>	6.E+01	1.6E+03	6.E-01	1.6E+01	6.E-02	1.6E+00
Ra-226	4.E+01	1.1E+03	4.E-01	1.1E+01	4.E-02	1.1E+00
Se-75	2.E+02	5.4E+03	2.E+00	5.4E+01	2.E-01	5.4E+00
Sr-90 (Y-90)	1.E+03	2.7E+04	1.E+01	2.7E+02	1.E+00	2.7E+01
Th-228	2.E+01	5.4E+02	2.E-01	5.4E+00	2.E-02	5.4E-01
Th-229	2.E+01	5.4E+02	2.E-01	5.4E+00	2.E-02	5.4E-01
Tm-170	2.E+04	5.4E+05	2.E+02	5.4E+03	2.E+01	5.4E+02
Yb-169	3.E+02	8.1E+03	3.E+00	8.1E+01	3.E-01	8.1E+00

(\*Ac-227, Th-228, and Th-229 are not in the *IAEA Code of Conduct on the Safety and Security of Radioactive Sources*, IAEA, January 2004. DOE and NRC have determined they will be included in the National System.)

1 Designates IAEA Category 1, 2, and 3 radioactive sealed sources [IAEA Basic Safety Guide RS-G-1.9]

2 “D” designates a dangerous source as defined in the NRC Final Rule for National Source Tracking of Sealed Sources and the IAEA Code of Conduct.

3 “TBq” designates Terabecquerel, a unit of radioactivity.

4 “Ci” designates Curie, a unit of radioactivity.

5 Inventory and transaction data on Pu-236 and Pu-240 will not be reported in the NSTS and are included for DOE purposes only

Data Field	Inventory Reporting	Transaction Reporting for Category 1 and 2 Sources				
		Manufacture	Shipment	Receipt	Disassemble	Dispose
Site Source ID(unique source identification)	√	√	√	√	√	√
Radionuclide(s) in the source (single or multiple)	√	√	√	√	√	√
Initial, if known, or current source strength (activity) in Terabecquerels (TBq) or Curies (Ci).	√	√	√	√	√	√
Activity Date (the date for which the source strength is reported)	√	√	√	√	√	√
Neutron component (Yes/No)	√	√	√	√	√	√
Manufacturer date of source (if known)	√	√	√	√	√	√
The Reporting Identification Symbol (RIS Code)	√	√	√	√	√	√
Facility/building name <sup>1</sup>	√	√	√	√	√	√
Description of the source	√	√	√	√	√	√
Physical Form (solid/liquid)	√	√	√	√	N/A	√
Manufacturer, model, serial number or other unique identifier <sup>2</sup>	√	√	√	√	√	√
Name and phone number for Individual preparing the report	√	√	√	√	√	√
Name/address of shipping and/or recipient facilities and NRC License number (if appropriate)			√	√	N/A	N/A
Date of shipment or receipt			√	√	N/A	N/A
Estimated arrival date			√	N/A	N/A	N/A
Waste manifest number (if applicable)			√	√	N/A	√
Container ID			√	√	N/A	√
Import/Export License number, or DOE authorization, as appropriate			√	√	N/A	√
Disposal / disassembly date					√	√
Method of Disposal					N/A	√
Container ID for final disposition					N/A	√

<sup>1</sup> Information in this field is for DOE purposes only and will not be reported to the NSTS.

<sup>2</sup> Other information to uniquely identify the source may be utilized if the manufacturer, model or serial number(s) are not available.