

## Nuclear Regulatory Commission

## § 74.2

### PART 74—MATERIAL CONTROL AND ACCOUNTING OF SPECIAL NUCLEAR MATERIAL

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AUTHORITY: Atomic Energy Act of 1954, secs. 53, 57, 161, 182, 223, 234, 1701 (42 U.S.C. 2073, 2077, 2201, 2232, 2273, 2282, 2297f); Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); 44 U.S.C. 3504 note.

SOURCE: 50 FR 7579, Feb. 25, 1985, unless otherwise noted.

#### Subpart A—General Provisions

##### § 74.1 Purpose.

(a) This part has been established to contain the requirements for the control and accounting of special nuclear material at fixed sites and for documenting the transfer of special nuclear material. General reporting requirements as well as specific requirements for certain licensees possessing special nuclear material of low strategic significance, special nuclear material of moderate strategic significance, and formula quantities of strategic special nuclear material are included. Requirements for the control and accounting of source material at enrichment facilities are also included.

(b) The general conditions and procedures for the submittal of a license application for the activities covered in this part are detailed in § 70.22 of this chapter.

[50 FR 7579, Feb. 25, 1985, as amended at 56 FR 55998, Oct. 31, 1991; 67 FR 78144, Dec. 23, 2002]

##### § 74.2 Scope.

(a) The general reporting and recordkeeping requirements of subpart B of this part apply to each person licensed under this chapter who possesses special nuclear material in a quantity of one gram or more of contained uranium-235, uranium-233, or plutonium; or who transfers or receives a quantity of special nuclear material of one gram or more of contained uranium-235, uranium-233, or plutonium. The general reporting and recordkeeping requirements of subpart B of this part do not apply to licensees whose MC&A reporting and recordkeeping requirements are covered by §§ 72.72, 72.76, and 72.78 of this chapter.

(b) In addition, specific control and accounting requirements are included in subparts C, D, and E for certain licensees who:

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(1) Possess and use formula quantities of strategic special nuclear material;

(2) Possess and use special nuclear material of moderate strategic significance;

(3) Possess and use special nuclear material of low strategic significance; or

(4) Possess uranium source material and equipment capable of producing enriched uranium.

(c) As provided in part 76 of this chapter, the regulations of this part establish procedures and criteria for material control and accounting for the issuance of a certificate of compliance or the approval of a compliance plan.

[67 FR 78144, Dec. 23, 2002, as amended at 73 FR 32463, June 9, 2008]

### § 74.4 Definitions.

As used in this part:

*Abrupt loss* means a loss occurring in the time interval between consecutive sequential performances of a material control test which is designed to detect anomalies potentially indicative of a loss of strategic special nuclear material from a specific unit of SSNM (*i.e.*, a quantity characterized by a unique measurement) introduced into a process.

*Accessible location* means a process location at which SSNM could be acquired without leaving evidence of the acquisition, *i.e.*, without tools or other equipment to obviously violate the integrity of the containment.

*Act* means the Atomic Energy Act of 1954 (68 Stat. 919), including any amendments thereto.

*Active inventory* means the sum of additions to inventory, beginning inventory, ending inventory, and removals from inventory, after all common terms have been excluded. Common terms are any material values which appear in the active inventory calculation more than once and come from the same measurement.

*Additions to material in process* means:

(1) Receipts that are opened, except for receipts opened only for sampling and subsequently maintained under tamper-safing; (2) opened sealed sources; and (3) material removed from process for nonconformance with chemical or physical specifications that is subse-

quently reprocessed, measured for contained SSNM, and reintroduced to process.

*Alarm Threshold* means a predetermined quantity of SSNM calculated from the specified probability of detection for a given loss and the standard deviation associated with a material control test. An alarm threshold serves to trigger a response action.

*Batch* means a portion of source material or special nuclear material handled as a unit for accounting purposes at a key measurement point and for which the composition and quantity are defined by a single set of measurements. The source material or special nuclear material may be in bulk form or contained in a number of separate items.

*Beginning inventory (BI)* means the book inventory quantity at the beginning of an inventory period, and is the reconciled physical inventory entered into the books as an adjusted inventory at the completion of the prior inventory period.

*Bias* means the deviation of the expected value of a random variable from the corresponding correct or assigned value.

*Calibration* means the process of determining the numerical relationship between the observed output of a measurement system and the value, based upon reference standards, of the characteristic being measured.

*Category 1A material* means SSNM directly useable in the manufacture of a nuclear explosive device, except if:

(1) The dimensions are large enough (at least two meters in one dimension, greater than one meter in each of two dimensions, or greater than 25cm in each of three dimensions) to preclude hiding the item on an individual;

(2) The total weight of an encapsulated item of SSNM is such that it cannot be carried inconspicuously by one person (*i.e.*, at least 50 kilograms gross weight); or

(3) The quantity of SSNM (less than 0.05 formula kilograms) in each container requires protracted diversions to accumulate five formula kilograms.

*Category 1B material* means all SSNM material other than Category 1A.

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*Commission* means the Nuclear Regulatory Commission or its duly authorized representatives.

*Continuous process* means a unit process in which feed material must be introduced in a systematic manner in order to maintain equilibrium conditions.

*Controlled access area* means any temporarily or permanently established area which is clearly demarcated, access to which is controlled, and which affords isolation of the material or persons within it.

*DOE* means the U.S. Department of Energy or its duly authorized representatives.

*Effective kilograms of special nuclear material* means:

(1) For plutonium and uranium-233 their weight in kilograms;

(2) For uranium with an enrichment in the isotope  $U^{235}$  of 0.01 (1 percent) and above, its element weight in kilograms multiplied by the square of its enrichment expressed as a decimal weight fraction; and

(3) For uranium with an enrichment in the isotope  $U^{235}$  below 0.01 (1 percent), its element weight in kilograms multiplied by 0.0001.

*Element* means uranium or plutonium.

*Estimate* means a specific numerical value arrived at by the application of an estimator.

*Estimator* means a function of a sample measurement used to estimate a population parameter.

*Fissile isotope* means: (1) Uranium U-233, or (2) uranium-235 by enrichment category, (3) plutonium-239, and (4) plutonium-241.

*Formula kilogram* means SSNM in any combination in a quantity of 1000 grams computed by the formula, grams = (grams contained U-235) + 2.5 (grams U-233 + grams plutonium).

*Formula quantity* means strategic special nuclear material in any combination in a quantity of 5,000 grams or more computed by the formula, grams = (grams contained  $U^{235}$ ) + 2.5 (grams  $U^{233}$  + grams plutonium).

*Government agency* means any executive department, commission, independent establishment, corporation, wholly or partly owned by the United States of America, which is an instru-

mentality of the United States, or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the Government.

*High enriched uranium* means uranium enriched to 20 percent or greater in the isotope uranium-235.

*Inventory difference (ID)* means the arithmetic difference obtained by subtracting the quantity of SNM tabulated from a physical inventory from the book inventory quantity. Book inventory quantity is equivalent to the beginning inventory (BI) plus additions to inventory (A) minus removals from inventory (R), while the physical inventory quantity is the ending inventory (EI) for the material balance period in question (as physically determined). Thus mathematically,  $ID = (BI + A - R) - EI$  or  $ID = BI + A - R - EI$

*Item* means any discrete quantity or container of special nuclear material or source material, not undergoing processing, having a unique identity and also having an assigned element and isotope quantity.

*License*, except where otherwise specified, means a license issued pursuant to part 70 of this chapter.

*Low enriched uranium* means uranium enriched below 20 percent in the isotope uranium-235.

*Material* means special nuclear material.

*Material access area* means any location which contains special nuclear material, within a vault or a building, the roof, walls, and floor of which constitute a physical barrier.

*Material balance* means the determination of an inventory difference (ID).

*MC&A alarm* means a situation in which there is: (1) an out-of-location item or an item whose integrity has been violated, (2) an indication of a flow of SSNM where there should be none, or (3) a difference between a measured or observed amount or property of material and its corresponding predicted or property value that exceeds a threshold established to provide the detection capability required by § 74.53.

*Material control test* means a comparison of a pre-established alarm threshold with the results of a process difference or process yield performed on a unit process.

*Material in process* means any special nuclear material possessed by the licensee except in unopened receipts, sealed sources, measured waste discards, and ultimate product maintained under tamper-safing.

*Measurement* includes sampling and means the determination of mass, volume, quantity, composition or other property of a material where such determinations are used for special nuclear material control and accounting purposes.

*Measurement system* means all of the apparatus, equipment, instruments and procedures used in performing a measurement.

*Person* means:

(1) Any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission or the Department of Energy, except that the Department of Energy shall be considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244), any state or any political subdivision of or any political entity within a state, any foreign government or nation or political subdivision of any such government or nation, or other entity; and

(2) Any legal successor, representative, agent, or agency of the foregoing.

*Physical inventory* means determination on a measured basis of the quantity of special nuclear material on hand at a given time. The methods of physical inventory and associated measurements will vary depending on the material to be inventoried and the process involved.

*Plant* means a set of processes or operations (on the same site, but not necessarily all in the same building) coordinated into a single manufacturing, R&D, or testing effort. A scrap recovery operation, or an analytical laboratory, serving both onsite and offsite

customers (or more than one onsite manufacturing effort) should be treated as a separate plant.

*Power of detection* means the probability that the critical value of a statistical test will be exceeded when there is an actual loss of a specific SSNM quantity.

*Process difference* (PD) means the determination of an ID on a unit process level with the additional qualification that difficult to measure components may be modeled.

*Process yield* means the quantity of SSNM actually removed from a unit process compared with the quantity predicted (based on a measured input) to be available for removal. Process yield differs from a process difference in that holdup and sidestreams are not measured or modeled.

*Produce* when used in relation to special nuclear material, means: (1) To manufacture, make, produce, or refine special nuclear material; (2) to separate special nuclear material from other substances in which such material may be contained; or (3) to make or to produce new special nuclear material.

*Random error* means the deviation of a random variable from its expected value.

*Receipt* means special nuclear material received by a licensee from an off-site source.

*Reconciliation* means the process of evaluating and comparing licensee reports required under this part to the projected material balances generated by the Nuclear Materials Management and Safeguards System. This process is considered complete when the licensee resolves any differences between the reported and projected balances, including those listed for foreign obligated materials.

*Reference standard* means a material, device, or instrument whose assigned value is known relative to national standards or nationally accepted measurement systems. This is also commonly referred to as a traceable standard.

*Removals from inventory* means measured quantities of special nuclear material contained in:

(1) Shipments;

(2) Waste materials transferred to an onsite holding account via a DOE/NRC Form 741 transaction;

(3) Measured discards transported off-site; and

(4) Effluents released to the environment.

*Removals of material from process* (or *removals from process*) means measured quantities of special nuclear material contained in:

(1) Effluents released to the environment;

(2) Previously unencapsulated materials that have been encapsulated as sealed sources;

(3) Waste materials that will not be subject to further onsite processing and which are under tamper-safing;

(4) Ultimate product placed under tamper-safing; and

(5) Any materials (not previously designated as removals from process) shipped offsite.

*Research and development* means: (1) Theoretical analysis, exploration, or experimentation; or (2) the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes.

*Scrap* means the various forms of special nuclear material generated during chemical and mechanical processing, other than recycle material and normal process intermediates, which are unsuitable for continued processing, but all or part of which will be converted to useable material by appropriate recovery operations.

*Sealed source* means any special nuclear material that is physically encased in a capsule, rod, element, etc. that prevents the leakage or escape of the special nuclear material and that prevents removal of the special nuclear material without penetration of the casing.

*Source material* means source material as defined in section 11z. of the Act and in the regulations contained in part 40 of this chapter.

*Special nuclear material* means:

(1) Plutonium, uranium-233, uranium enriched in the isotope  $U^{233}$  or in the isotope  $U^{235}$ , and any other material

which the Commission, pursuant to the provisions of section 51 of the Atomic Energy Act of 1954, as amended, determines to be special nuclear material, but does not include source material; or

(2) Any material artificially enriched by any of the foregoing, but does not include source material.

*Special nuclear material of low strategic significance* means:

(1) Less than an amount of special nuclear material of moderate strategic significance, but more than 15 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the  $U^{235}$  isotope) or 15 grams of uranium-233 or 15 grams of plutonium or the combination of 15 grams when computed by the equation, grams = grams contained  $U^{235}$  + grams plutonium + grams  $U^{233}$ ; or

(2) Less than 10,000 grams but more than 1,000 grams of uranium-235 (contained in uranium enriched to 10 percent or more, but less than 20 percent in the  $U^{235}$  isotope); or

(3) 10,000 grams or more of uranium-235 contained in uranium enriched above natural, but less than 10 percent in the  $U^{235}$  isotope.

*Special nuclear material of moderate strategic significance* means:

(1) Less than a formula quantity of strategic special nuclear material but more than 1,000 grams of uranium-235 (contained in uranium enriched to 20 percent or more in the  $U^{235}$  isotope) or more than 500 grams of uranium-233 or plutonium or in a combined quantity of more than 1,000 grams when computed by the equation, grams = (grams contained  $U^{235}$ ) + 2 (grams  $U^{233}$  + grams plutonium); or

(2) 10,000 grams or more of uranium-235 (contained in uranium enriched to 10 percent or more but less than 20 percent in the  $U^{235}$  isotope).

*Standard Error of the Inventory Difference* (SEID) means the standard deviation of an inventory difference that takes into account all measurement error contributions to the components of the ID.

*Standard Error of the Process Difference* means the standard deviation of a process difference value that takes into account both measurement and nonmeasurement contributions to the components of PD.

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*Strategic special nuclear material* means uranium-235 (contained in uranium enriched to 20 percent or more in the U<sup>235</sup> isotope), uranium-233, or plutonium.

*Tamper-safing* means the use of devices on containers or vaults in a manner and at a time that ensures a clear indication of any violation of the integrity of previously made measurements of special nuclear material within the container or vault.

*Traceability* means the ability to relate individual measurement results to national standards or nationally accepted measurement systems through an unbroken chain of comparisons.

*Ultimate product* means any special nuclear material in the form of a product that would not be further processed at that licensed location.

*Unit process* means an identifiable segment or segments of processing activities for which the amounts of input and output SSNM are based on measurements.

*Unopened receipts* means receipts not opened by the licensee, including receipts of sealed sources, and receipts opened only for sampling and subsequently maintained under tamper-safing.

*Vault* means a windowless enclosure with walls, floor, roof and door(s) designed and constructed to delay penetration from forced entry.

[50 FR 7579, Feb. 25, 1985, as amended at 52 FR 10039, Mar. 30, 1987; 56 FR 55998, Oct. 31, 1991; 67 FR 78144, Dec. 23, 2002; 73 FR 32463, June 9, 2008; 80 FR 45844, Aug. 3, 2015]

### § 74.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretations of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized as binding on the Commission.

### § 74.6 Communications.

Any communication or report concerning the regulations in this part and any application filed under these regulations may be submitted to the Commission as follows:

(a) By mail addressed to: ATTN: Document Control Desk, Director of Nu-

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clear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001.

(b) By hand delivery to the NRC's offices at 11555 Rockville Pike, Rockville, Maryland.

(c) Where practicable, by electronic submission, for example, via Electronic Information Exchange, or CD-ROM. Electronic submissions must be made in a manner that enables the NRC to receive, read, authenticate, distribute, and archive the submission, and process and retrieve it a single page at a time. Detailed guidance on making electronic submissions can be obtained by visiting the NRC's Web site at <http://www.nrc.gov/site-help/e-submittals.html>; by e-mail to [MSHD.Resource@nrc.gov](mailto:MSHD.Resource@nrc.gov); or by writing the Office of the Chief Information Officer, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001. The guidance discusses, among other topics, the formats the NRC can accept, the use of electronic signatures, and the treatment of non-public information.

[50 FR 7579, Feb. 25, 1985, as amended at 53 FR 4112, Feb. 12, 1988; 53 FR 43422, Oct. 27, 1988; 68 FR 58821, Oct. 10, 2003; 74 FR 62685, Dec. 1, 2009; 80 FR 74981, Dec. 1, 2015]

### § 74.7 Specific exemptions.

The Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security, and are otherwise in the public interest.

### § 74.8 Information collection requirements: OMB approval.

(a) The Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information if it does not display a currently valid OMB control number. OMB has approved the information collection requirements contained in this part under control number 3150–0123.

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(b) The approved information collection requirements contained in this part appear in §§ 74.7, 74.11, 74.13, 74.15, 74.17, 74.19, 74.31, 74.33, 74.41, 74.43, 74.45, 74.51, 74.57, and 74.59.

(c) This part contains information collection requirements in addition to those approved under the control number specified in paragraph (a) of this section. These information collection requirements and the control numbers under which they are approved are as follows:

(1) In § 74.15, DOE/NRC Form-741 is approved under Control No. 3150-0003.

(2) In § 74.13, DOE/NRC Form-742 is approved under Control No. 3150-0004.

(3) In § 74.13, DOE/NRC Form-742C is approved under Control No. 3150-0058.

(4) In § 74.17, NRC Form 327 is approved under Control No. 3150-0139.

[50 FR 7579, Feb. 25, 1985, as amended at 52 FR 10040, Mar. 30, 1987; 52 FR 19305, May 22, 1987; 56 FR 55998, Oct. 31, 1991; 62 FR 52189, Oct. 6, 1997; 67 FR 78144, Dec. 23, 2002; 85 FR 65664, Oct. 16, 2020]

### Subpart B—General Reporting and Recordkeeping Requirements

#### § 74.11 Reports of loss or theft or attempted theft or unauthorized production of special nuclear material.

(a) Each licensee who possesses one gram or more of contained uranium-235, uranium-233, or plutonium shall notify the NRC Operations Center within 1 hour of discovery of any loss or theft or other unlawful diversion of special nuclear material which the licensee is licensed to possess, or any incident in which an attempt has been made to commit a theft or unlawful diversion of special nuclear material. The requirement to report within 1 hour of discovery does not pertain to measured quantities of special nuclear material disposed of as discards or inventory difference quantities. Each licensee who operates an uranium enrichment facility shall notify the NRC Operations Center within 1 hour of discovery of any unauthorized production of enriched uranium. For centrifuge enrichment facilities the requirement to report enrichment levels greater than that authorized by license within 1 hour does not apply to each cascade

during its start-up process, not to exceed the first 24 hours.

(b) This notification must be made to the NRC Operations Center via the Emergency Notification System if the licensee is party to that system. If the Emergency Notification System is inoperative or unavailable, the licensee shall make the required notification via commercial telephonic service or other dedicated telephonic system or any other method that will ensure that a report is received by the NRC Operations Center within one hour. The exemption of § 73.22(f)(3) applies to all telephonic reports required by this section.

(c) Reports required under § 73.71 need not be duplicated under requirements of this section.

[52 FR 21659, June 9, 1987; 52 FR 23257, June 18, 1987, as amended at 56 FR 55998, Oct. 31, 1991, 81 FR 86910, Dec. 2, 2016]

#### § 74.13 Material status reports.

(a) Each licensee, including nuclear reactor licensees as defined in §§ 50.21 and 50.22 of this chapter, possessing, or who had possessed in the previous reporting period, at any one time and location, special nuclear material in a quantity totaling one gram or more of contained uranium-235, uranium-233, or plutonium shall complete and submit, in computer-readable format Material Balance Reports concerning special nuclear material that the licensee has received, produced, possessed, transferred, consumed, disposed, or lost. This prescribed computer-readable report replaces the DOE/NRC form 742 which has been previously submitted in paper form. The Physical Inventory Listing Report must be submitted with each Material Balance Report. This prescribed computer-readable report replaces the DOE/NRC Form 742C which has been previously submitted in paper form. Reports must be submitted for each Reporting Identification Symbol (RIS) account including all holding accounts. Each licensee shall prepare and submit the reports described in this paragraph as specified in the instructions in NUREG/BR-0007 and NMMS Report D-24 "Personal Computer Data Input for NRC Licensees."

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Copies of these instructions may be obtained from the U.S. Nuclear Regulatory Commission, Division of Fuel Management, Washington, DC 20555–0001, or by e-mail to *RidsNmssFcass@nrc.gov*. Each licensee subject to the requirements of § 74.51 shall compile a report as of March 31 and September 30 of each year and file it within 30 days after the end of the period covered by the report. Licensees subject to the requirements of §§ 74.19(c), 74.31(c)(5), 74.33(c)(4), or 74.43(c)(6) shall submit a report within 60 calendar days of the beginning of the physical inventory. All other licensees shall submit a report no later than March 31 of each year. The Commission may permit a licensee to submit the reports at other times for good cause. Each licensee required to report material balance, and inventory information, as detailed in this part, shall resolve any discrepancies identified during the report review and reconciliation process within 30 calendar days of notification of a discrepancy identified by NRC.

(b) Any licensee who is required to submit routine Material Status Reports pursuant to § 75.35 of this chapter (pertaining to implementation of the US/IAEA Safeguards Agreement) shall prepare and submit these reports only as provided in that section (instead of as provided in paragraph (a) of this section).

[67 FR 78144, Dec. 23, 2002, as amended at 73 FR 32463, June 9, 2008; 79 FR 75741, Dec. 19, 2014; 84 FR 65646, Nov. 29, 2019]

### § 74.15 Nuclear material transaction reports.

(a) Each licensee who transfers or receives special nuclear material in a quantity of one gram or more of contained uranium-235, uranium-233, or plutonium shall complete in computer-readable format a Nuclear Material Transaction Report. In addition, each licensee who adjusts the inventory in any manner, other than for transfers and receipts, shall submit a Nuclear Material Transaction Report, in computer-readable format, to coincide with the submission of the Material Balance report. This shall be done as specified in the instructions in NUREG/BR-0006 and NMMSS Report D-24, “Personal

Computer Data Input for NRC Licensees.” Copies of these instructions NUREG/BR-0006 and NMMSS Report D-24, “Personal Computer Data Input for NRC Licensees” may be obtained either by writing the U.S. Nuclear Regulatory Commission, Division of Fuel Management, Washington, DC 20555–0001, or by e-mail to *RidsNmssFcass@nrc.gov*. Each licensee who transfers the material shall submit a Nuclear Material Transaction Report in computer-readable format as specified in the instructions no later than the close of business the next working day. Each licensee who receives the material shall submit a Nuclear Material Transaction Report in computer-readable format in accordance with instructions within ten (10) days after the material is received. This prescribed computer-readable format replaces the DOE/NRC Form 741 which has been previously submitted in paper form.

(b) Each licensee who receives 1 gram or more of contained uranium-235, uranium-233, or plutonium from a foreign source shall:

(1) Complete in computer-readable format both the supplier’s and receiver’s portion of the Nuclear Material Transaction Report;

(2) Perform independent tests to assure the accurate identification and measurement of the material received, including its weight and enrichment; and

(3) Indicate the results of these tests on the receiver’s portion of the form.

(c) Each licensee who ships special nuclear material in a quantity of one gram or more of contained uranium-235, uranium-233, or plutonium to foreign recipient shall complete in computer-readable format the supplier’s portion of the Nuclear Material Transaction Report. The licensee shall complete the receiver’s portion of the Nuclear Material Transaction Report only if a significant shipper-receiver difference as described in §§ 74.31, 74.43, or 74.59, as applicable, is identified.

(d) Any licensee who is required to submit inventory change reports pursuant to § 75.34 of this chapter (pertaining to implementation of the US/International Atomic Energy Agency (IAEA) Safeguards Agreement) shall



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prepare and submit these reports only as provided in that section (instead of as provided in paragraphs (a) and (b) of this section).

[59 FR 35621, July 13, 1994, as amended at 68 FR 58821, Oct. 10, 2003; 73 FR 32464, June 9, 2008; 79 FR 75741, Dec. 19, 2014; 84 FR 65646, Nov. 29, 2019]

### § 74.17 Special nuclear material physical inventory summary report.

(a) Each licensee subject to the requirements of §§74.31 or 74.33 of this part shall submit a completed Special Nuclear Material Physical Inventory Summary Report on NRC Form 327 not later than 60 calendar days from the start of each physical inventory required by §§74.31(c)(5) or 74.33(c)(4). Using an appropriate method listed in §74.6, the licensee shall report the inventory results by plant and total facility to the Director of the NRC's Office of Nuclear Material Safety and Safeguards.

(b) Each licensee subject to the requirements of §74.41(a) of this part shall submit a completed Special Nuclear Material Physical Inventory Summary Report on NRC form 327 not later than 60 calendar days from the start of each physical inventory required by §74.43(c)(7). Using an appropriate method listed in §74.6, the licensee shall report the inventory results by plant and total facility to the Director of the NRC's Office of Nuclear Material Safety and Safeguards.

(c) Each licensee subject to the requirements of §74.51 shall submit a completed Special Nuclear Material Physical Inventory Summary Report on NRC form 327 not later than 45 calendar days from the start of each physical inventory required by §74.59(f). The licensee shall report the physical inventory results by plant and total facility to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

[67 FR 78145, Dec. 23, 2002, as amended at 68 FR 58821, Oct. 10, 2003]

### § 74.19 Recordkeeping

(a) Licensees subject to the recordkeeping requirements of §§74.31, 74.33, 74.43, or 74.59 of this part are exempt from the requirements of paragraphs

(a)(1) through (4) of this section. Otherwise:

(1) Each licensee shall keep records showing the receipt, inventory (including location and unique identity), acquisition, transfer, and disposal of all special nuclear material in its possession regardless of its origin or method of acquisition.

(2) Each record relating to material control or material accounting that is required by the regulations in this chapter or by license condition must be maintained and retained for the period specified by the appropriate regulation or license condition. If a retention period is not otherwise specified by regulation or license condition, the licensee shall retain the record until the Commission terminates the license that authorizes the activity that is subject to the recordkeeping requirement.

(3) Each record of receipt, acquisition, or physical inventory of special nuclear material that must be maintained pursuant to paragraph (a)(1) of this section must be retained as long as the licensee retains possession of the material and for 3 years following transfer or disposal of the material.

(4) Each record of transfer of special nuclear material to other persons must be retained by the licensee who transferred the material until the Commission terminates the license authorizing the licensee's possession of the material.

(b) Each licensee that is authorized to possess special nuclear material in a quantity exceeding one effective kilogram at any one time shall establish, maintain, and follow written material control and accounting procedures that are sufficient to enable the licensee to account for the special nuclear material in its possession under license. The licensee shall retain these procedures until the Commission terminates the license that authorizes possession of the material and retain any superseded portion of the procedures for 3 years after the portion is superseded.

(c) Other than licensees subject to §§74.31, 74.33, 74.41, or 74.51, each licensee who is authorized to possess special nuclear material, at any one time and site location, in a quantity greater than 350 grams of contained

uranium-235, uranium-233, or plutonium, or any combination thereof, shall conduct a physical inventory of all special nuclear material in its possession under license at intervals not to exceed 12 months. The results of these physical inventories need not be reported to the Commission, but the licensee shall retain the records associated with each physical inventory until the Commission terminates the license that authorized the possession of special nuclear material.

(d) Records that must be maintained pursuant to this part may be the original or a reproduced copy or a microform if the reproduced copy or microform is duly authenticated by authorized personnel and the microform is capable of producing a clear and legible copy after storage for the period specified by Commission regulations. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention period. Records such as letters, drawings, or specifications must include all pertinent information such as stamps, initials, and signatures. The licensee shall maintain adequate safeguards against tampering with and loss of records.

[67 FR 78145, Dec. 23, 2002]

### **Subpart C—Special Nuclear Material of Low Strategic Significance**

#### **§ 74.31 Nuclear material control and accounting for special nuclear material of low strategic significance.**

(a) *General performance objectives.* Each licensee who is authorized to possess and use more than one effective kilogram of special nuclear material of low strategic significance, excluding sealed sources, at any site or contiguous sites subject to control by the licensee, other than a production or utilization facility licensed pursuant to part 50 or 70 of this chapter, or operations involved in waste disposal, shall implement and maintain a Commission approved material control and accounting system that will achieve the following objectives:

(1) Confirm the presence of special nuclear material;

(2) Resolve indications of missing material; and

(3) Aid in the investigation and recovery of missing material.

(b) *Implementation.* Each applicant for a license, and each licensee that, upon application for modification of its license, would become newly subject to the performance objectives of paragraph (a) of this section, shall submit a fundamental nuclear material control (FNMC) plan describing how the requirements of paragraph (c) of this section will be met. The FNMC plan shall be implemented when a license is issued or modified to authorize the activities being addressed in paragraph (a) of this section, or by the date specified in a license condition.

(c) *System capabilities.* To meet the general performance objectives of paragraph (a) of this section, the material control and accounting system must include the capabilities described in paragraph (c) (1) through (8) of this section. The licensee shall:

(1) Establish, document, and maintain a management structure which assures clear overall responsibility for material control and accounting functions, independence from production responsibilities, separation of key responsibilities, and adequate review and use of critical material control and accounting procedures;

(2) Establish and maintain a measurement system which assures that all quantities in the material accounting records are based on measured values;

(3) Follow a measurement control program which assures that measurement bias is estimated and significant biases are eliminated from inventory difference values of record;

(4) In each inventory period, control total material control and accounting measurement uncertainty so that twice its standard error is less than the greater of 9,000 grams of U-235 or 0.25 percent of the active inventory, and assure that any measurement performed under contract is controlled so that the licensee can satisfy this requirement;

(5) Unless otherwise required to satisfy part 75 of this chapter, perform a physical inventory at least every 12 months and, within 60 days after the

start of the inventory, reconcile and adjust the book inventory to the results of the physical inventory, and resolve, or report an inability to resolve, any inventory difference which is rejected by a statistical test which has a 90 percent power of detecting a discrepancy of a quantity of uranium-235 established by NRC on a site-specific basis;

(6) Maintain current knowledge of items when the sum of the time of existence of an item, the time to make a record of the item, and the time necessary to locate the item exceeds 14 days. Store and handle, or subsequently measure, items in a manner so that unauthorized removals of substantial quantities of material from items will be detected. Exempted are items individually containing less than 500 grams of U<sup>235</sup> up to a total of 50 kilograms of U<sup>235</sup>, solutions with a concentration of less than 5 grams of U<sup>235</sup> per liter, and items of waste destined for burial or incineration;

(7) Resolve, on a shipment basis and when required to satisfy part 75 of this chapter, on a batch basis, shipper/receiver differences that exceed both twice the combined measurement standard error for that shipment and 500 grams of U<sup>235</sup>; and

(8) Independently assess the effectiveness of the material control and accounting system at least every 24 months, and document management's action on prior assessment recommendations.

(d) *Recordkeeping.* (1) Each licensee shall establish records that will demonstrate that the requirements of paragraph (c) of this section have been met and maintain these records for at least 3 years, unless a longer retention time is required by part 75 of this chapter.

(2) Records which must be maintained pursuant to this part may be the original or a reproduced copy or a microform if such reproduced copy or microform is duly authenticated by authorized personnel and the microform is capable of producing a clear and legible copy after storage for the period specified by Commission regulations. The record may also be stored in electronic media with the capability for producing legible, accurate, and complete records during the required retention

period. Records such as letters, drawings, specifications, must include all pertinent information such as stamps, initials, and signatures.

The licensee shall maintain adequate safeguards against tampering with and loss of records.

[50 FR 7579, Feb. 25, 1985, as amended at 53 FR 19262, May 27, 1988; 56 FR 55998, Oct. 31, 1991; 67 FR 78145, Dec. 23, 2002]

**§ 74.33 Nuclear material control and accounting for uranium enrichment facilities authorized to produce special nuclear material of low strategic significance.**

(a) *General performance objectives.* Each licensee who is authorized by this chapter to possess equipment capable of enriching uranium or operate an enrichment facility, and produce, possess, or use more than one effective kilogram of special nuclear material of low strategic significance at any site or contiguous sites, subject to control by the licensee, shall establish, implement, and maintain a NRC-approved material control and accounting system that will achieve the following objectives:

(1) Maintain accurate, current, and reliable information of and periodically confirm the quantities and locations of source material and special nuclear material in the licensee's possession;

(2) Protect against and detect production of uranium enriched to 10 percent or more in the isotope U<sup>235</sup>;

(3) Protect against and detect unauthorized production of uranium of low strategic significance;

(4) Resolve indications of missing uranium;

(5) Resolve indications of production of uranium enriched to 10 percent or more in the isotope U<sup>235</sup> (for centrifuge enrichment facilities this requirement does not apply to each cascade during its start-up process, not to exceed the first 24 hours);

(6) Resolve indications of unauthorized production of uranium of low strategic significance;

(7) Provide information to aid in the investigation of missing uranium;

(8) Provide information to aid in the investigation of the production of uranium enriched to 10 percent or more in the isotope U<sup>235</sup>; and

(9) Provide information to aid in the investigation of unauthorized production of uranium of low strategic significance.

(b) *Implementation dates.* Each applicant for a license who would, upon issuance of a license pursuant to any part of this chapter, be subject to the requirements of paragraph (a) of this section shall:

(1) Submit a fundamental nuclear material control plan describing how the performance objectives of § 74.33(a), the system features and capabilities of § 74.33(c), and the recordkeeping requirements of § 74.33(d) will be met; and

(2) Implement the NRC approved plan submitted pursuant to paragraph (b)(1) of this section prior to:

(i) The cumulative receipt of 5,000 grams of  $U^{235}$  contained in any combination of natural, depleted, or enriched uranium or

(ii) NRC's issuance of a license to test or operate the enrichment facility; whichever occurs first.

(c) *System features and capabilities.* To meet the general performance objectives of paragraph (a) of this section, the Material Control and Accounting (MC&A) system must include the features and capabilities described in paragraphs (c) (1) through (8) of this section. The licensee shall establish, document, and maintain:

(1) A management structure that ensures:

(i) Clear overall responsibility for MC&A functions;

(ii) Independence of MC&A management from production responsibilities;

(iii) Separation of key MC&A responsibilities from each other; and

(iv) Use of approved written MC&A procedures and periodic review of those procedures;

(2) A measurement program that ensures that all quantities of source material and special nuclear material in the accounting records are based on measured values;

(3) A measurement control program that ensures that:

(i) Measurement bias is estimated and minimized through the measurement control program, and any significant biases are eliminated from inventory difference values of record;

(ii) All MC&A measurement systems are controlled so that twice the standard error of the inventory difference, based on all measurement error contributions, is less than the greater of 5,000 grams of  $U^{235}$  or 0.25 percent of the  $U^{235}$  of the active inventory for each total plant material balance; and

(iii) Any measurements performed under contract are controlled so that the licensee can satisfy the requirements of paragraphs (c)(3) (i) and (ii) of this section;

(4) A physical inventory program that provides for:

(i) Performing, unless otherwise required to satisfy part 75 of this chapter, a dynamic (nonshutdown) physical inventory of in-process (e.g., in the enrichment equipment) uranium and  $U^{235}$  at least every 65 days, and performing a static physical inventory of all other uranium and total  $U^{235}$  contained in natural, depleted, and enriched uranium located outside of the enrichment processing equipment at least every 370 calendar days, with static physical inventories being conducted in conjunction with a dynamic physical inventory of in-process uranium and  $U^{235}$  so as to provide a total plant material balance at least every 370 calendar days; and

(ii) Reconciling and adjusting the book inventory to the results of the static physical inventory and resolving, or reporting an inability to resolve, any inventory difference that is rejected by a statistical test which has a 90 percent power of detecting a discrepancy of a quantity of  $U^{235}$ , established by NRC on a site-specific basis, within 60 days after the start of each static physical inventory;

(5) A detection program, independent of production, that provides high assurance of detecting:

(i) Production of uranium enriched to 10 percent or more in the  $U^{235}$  isotope, to the extent that SNM of moderate strategic significance could be produced within any 370 calendar day period;

(ii) Production of uranium enriched to 20 percent or more in the  $U^{235}$  isotope; and

(iii) Unauthorized production of uranium of low strategic significance;

(6) An item control program that ensures that:

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(i) Current knowledge is maintained of items with respect to identity, uranium and  $U^{235}$  content, and stored location; and

(ii) Items are stored and handled, or subsequently measured, in a manner so that unauthorized removal of 500 grams or more of  $U^{235}$ , as individual items or as uranium contained in items, will be detected. Exempted from the requirements of paragraph (c)(6) (i) and (ii) of this section are licensed-identified items each containing less than 500 grams  $U^{235}$  up to a cumulative total of 50 kilograms of  $U^{235}$  and items that exist for less than 14 calendar days;

(7) A resolution program that ensures that any shipper-receiver differences are resolved that are statistically significant and exceed 500 grams  $U^{235}$  on:

(i) An individual batch basis; and

(ii) A total shipment basis for all source material and special nuclear material;

(8) An assessment program that:

(i) Independently assesses the effectiveness of the MC&A system at least every 24 months;

(ii) Documents the results of the above assessment;

(iii) Documents management's findings on whether the MC&A system is currently effective; and

(iv) Documents any actions taken on recommendations from prior assessments.

(d) *Recordkeeping.* (1) Each licensee shall establish records that will demonstrate that the performance objectives of paragraph (a) of this section and the system features and capabilities of paragraph (c) of this section have been met and maintain these records in an auditable form, available for inspection, for at least 3 years, unless a longer retention time is required by part 75 of this chapter.

(2) Records that must be maintained pursuant to this part may be the original or a reproduced copy or a microform if such reproduced copy or microform is duly authenticated by authorized personnel and the microform is capable of producing a clear and legible copy after storage for the period specified by Commission regulations. The record may also be stored in electronic media with the capability for producing, on demand, legible, accu-

rate, and complete records during the required retention period. Records such as letters, drawings, and specifications must include all pertinent information such as stamps, initials, and signatures.

(3) The licensee shall maintain adequate safeguards against tampering with and loss of records.

[56 FR 55999, Oct. 31, 1991]

### Subpart D—Special Nuclear Material of Moderate Strategic Significance

#### § 74.41 Nuclear material control and accounting for special nuclear material of moderate strategic significance.

(a) *General performance objectives.* Each licensee who is authorized to possess special nuclear material (SNM) of moderate strategic significance or SNM in a quantity exceeding one effective kilogram of strategic special nuclear material in irradiated fuel reprocessing operations other than as sealed sources and to use this material at any site other than a nuclear reactor licensed pursuant to part 50 of this chapter; or as reactor irradiated fuels involved in research, development, and evaluation programs in facilities other than irradiated fuel reprocessing plants; or an operation involved with waste disposal, shall establish, implement, and maintain a Commission-approved material control and accounting (MC&A) system that will achieve the following performance objectives:

(1) Maintain accurate, current, and reliable information on, and confirm, the quantities and locations of SNM in the licensee's possession;

(2) Conduct investigations and resolve any anomalies indicating a possible loss of special nuclear material;

(3) Permit rapid determination of whether an actual loss of a significant quantity of SNM has occurred, with significant quantity being either:

(i) More than one formula kilogram of strategic SNM; or

(ii) 10,000 grams or more of uranium-235 contained in uranium enriched up to 20.00 percent.

(4) Generate information to aid in the investigation and recovery of missing SNM in the event of an actual loss.

(b) *Implementation schedule.* Each applicant for a license, and each licensee that, upon application for modification of its license, would become newly subject to the requirements of paragraph (a) of this section shall:

(1) Submit a fundamental nuclear material control (FNMC) plan describing how the performance objectives of § 74.41(a) will be achieved, and how the system capabilities required by § 74.41(c) will be met; and

(2) Implement the NRC-approved FNMC plan submitted pursuant to paragraph (b)(1) of this section upon the Commission's issuance or modification of a license or by the date specified in a license condition.

(c) *System capabilities.* To achieve the performance objectives specified in § 74.41(a), the MC&A system must include the capabilities described in §§ 74.43 and 74.45, and must incorporate checks and balances that are sufficient to detect falsification of data and reports that could conceal diversion of SNM by:

(1) A single individual, including an employee in any position; or

(2) Collusion between two individuals, one or both of whom have authorized access to SNM.

[67 FR 78146, Dec. 23, 2002]

**§ 74.43 Internal controls, inventory, and records.**

(a) *General.* Licensees subject to § 74.41 shall maintain the internal control, inventory, and recordkeeping capabilities required in paragraphs (b), (c), and (d) of this section.

(b) *Internal controls.*

(1) A management structure shall be established, documented, and maintained that assures:

(i) Clear overall responsibility for material control and accounting (MC&A) functions;

(ii) Independence from production and manufacturing responsibilities; and

(iii) Separation of key responsibilities.

(2) The overall planning, coordination, and administration of the MC&A functions for special nuclear material (SNM) shall be vested in a single individual at an organizational level sufficient

to assure independence of action and objectiveness of decisions.

(3) The licensee shall provide for the adequate review, approval, and use of written MC&A procedures that are identified in the approved FNMC plan as being critical to the effectiveness of the described system.

(4) The licensee shall assure that personnel who work in key positions where mistakes could degrade the effectiveness of the MC&A system are trained to maintain a high level of safeguards awareness and are qualified to perform their duties and/or responsibilities.

(5) The licensee shall establish, document, and maintain an item control program that:

(i) Provides current knowledge of SNM items with respect to identity, element and isotope content, and stored location; and

(ii) Assures that SNM items are stored and handled, or subsequently measured, in a manner such that unauthorized removal of 200 grams or more of plutonium or uranium-233 or 300 grams or more of uranium-235, as one or more whole items and/or as SNM removed from containers, will be detected.

(6) Exempted from the requirements of paragraph (b)(5) of this section are items that exist for less than 14 calendar days and licensee-identified items each containing less than 200 grams of plutonium or uranium-233 or 300 grams or more of uranium-235 up to a cumulative total of one formula kilogram of strategic SNM or 17 kilograms of uranium-235 contained in uranium enriched to 10.00 percent or more but less than 20.00 percent in the uranium-235 isotope.

(7) Conduct and document shipper-receiver comparisons for all SNM receipts, both on an individual batch basis and a total shipment basis, and ensure that any shipper-receiver difference that is statistically significant and exceeds twice the estimated standard deviation of the difference estimator and 200 grams of plutonium or uranium-233 or 300 grams of uranium-235 is investigated and resolved; and

(8) Perform independent assessments of the total MC&A system, at intervals not to exceed 18 months, that assess

the performance of the system, review its effectiveness, and document management's action on prior assessment recommendations and identified deficiencies. These assessments must include a review and evaluation of any contractor who performs SNM accountability measurements for the licensee.

(c) *Inventory control and physical inventories.* The licensee shall:

(1) Provide unique identification for each item on inventory and maintain inventory records showing the identity, location, and quantity of SNM for these items;

(2) Document all transfers of SNM between designated internal control areas within the licensee's site;

(3) Maintain and follow procedures for tamper-safing of containers or vaults containing SNM, if tamper-safe seals are to be used for assuring the validity of prior measurements, which include control of access to, and distribution of, unused seals and to records showing the date and time of seal application;

(4) Maintain and follow procedures for confirming the validity of prior measurements associated with unencapsulated and unsealed items on ending inventory;

(5) Maintain and follow physical inventory procedures to assure that:

(i) The quantity of SNM associated with each item on ending inventory is a measured value;

(ii) Each item on ending inventory is listed and identified to assure that all items are listed and no item is listed more than once;

(iii) Cutoff procedures for transfers and processing are established so that all quantities are inventoried and none are inventoried more than once;

(iv) Cutoff procedures for records and reports are established so that only transfers for the inventory and material balance interval are included in the records for the material balance period in question;

(v) Upon completion of the physical inventory, all book and inventory records, for total plant and individual internal control areas, are reconciled with and adjusted to the results of the physical inventory; and

(vi) Measurements will be performed for element and isotope content on all

quantities of SNM not previously measured.

(6) Conduct physical inventories according to written instructions for each physical inventory which:

(i) Assign inventory duties and responsibilities;

(ii) Specify the extent to which each internal control area and process is to be shut down, cleaned out, and/or remain static;

(iii) Identify the basis for accepting previously made measurements and their limits of error; and

(iv) Designate measurements to be made for physical inventory purposes and the procedures for making these measurements.

(7) Conduct physical inventories of all possessed SNM for each plant at intervals not to exceed 9 calendar months; and

(8) Within 60 calendar days after the start of each physical inventory required by paragraph (c)(7) of this section:

(i) Calculate, for the material balance period terminated by the physical inventory, the inventory difference (ID) and its associated standard error of inventory difference (SEID) for both element and isotope;

(ii) Reconcile and adjust the book record of quantity of element and isotope content, as appropriate, to the results of the physical inventory; and

(iii) Investigate and report to the Director, Office of Nuclear Material Safety and Safeguards, any occurrence of SEID exceeding 0.125 percent of active inventory, and any occurrence of ID exceeding both three times SEID and 200 grams of plutonium or uranium-233 or 300 grams of uranium-235 contained in high enriched uranium, or 9000 grams of uranium-235 contained in low enriched uranium. The report shall include a statement of the probable reasons for the excessive inventory difference and the corrective actions taken or planned.

(d) *Recordkeeping.* The licensee shall:

(1) Maintain records of the receipt, shipment, disposal, and current inventory associated with all possessed SNM;

(2) Maintain records of the quantities of SNM added to and removed from process;

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(3) Maintain records of all shipper-receiver evaluations associated with SNM receipts;

(4) Retain each record pertaining to receipt and disposal of SNM until the Commission terminates the license; and

(5) Establish records that will demonstrate that the performance objectives of § 74.41(a)(1) through (4), the system capabilities of paragraphs (b) and (c) of this section and § 74.45(b) and (c) have been met, and maintain these records in an auditable form, available for inspection, for at least 3 years, unless a longer retention time is specified by § 74.19(b), part 75 of this chapter, or by a specific license condition.

[67 FR 78146, Dec. 23, 2002]

### § 74.45 Measurements and measurement control.

(a) *General.* Licensees subject to § 74.41 of this part shall establish and maintain the measurement and measurement control capabilities required by paragraphs (b) and (c) of this section.

(b) *Measurements.* The licensee shall:

(1) Establish, maintain, and use a program for the measurement of all SNM received, produced, transferred between internal control areas, on inventory, or shipped, discarded, or otherwise removed from inventory, except for:

(i) Sealed sources that have been determined by other means to contain less than 10 grams of uranium-235, uranium-233, or plutonium each;

(ii) Samples received, transferred between internal control areas, or on inventory that have been determined by other means to contain less than 10 grams of uranium-235, uranium-233, or plutonium each;

(iii) Receipt of sealed sources, of any quantity, previously manufactured and shipped by the licensee and which are returned to the licensee, provided the unique identity and encapsulation integrity have not been compromised, and the booked receipt quantity equals the previously shipped quantity for the involved sealed sources; and

(iv) Heterogeneous scrap that cannot be accurately measured in its as received form, provided this scrap is measured after dissolution within 18

months of receipt. The after dissolution measurement must include measurement of both the resulting solution and any undissolved residues, before any co-mingling with other scrap solutions or residues.

(2) Maintain and follow a program for the development and use of written procedures that includes documented review and approval of these procedures, and any revisions thereof, before use, for:

(i) Preparing or acquiring, maintaining, storing, and using reference standards;

(ii) Calibrating measurement systems, performing bulk mass and volume measurements, conducting non-destructive assay measurements, obtaining samples, and performing laboratory analyses for element concentration and isotope abundance; and

(iii) Recording, reviewing, and reporting measurements.

(c) *Measurement control.* To maintain measurement quality and to estimate measurement uncertainty values, the licensee shall:

(1) Assign responsibility for planning, developing, coordinating, and administering a measurement control program to an individual who has no direct responsibility for performing measurements or for SNM processing or handling, and who holds a position at an organizational level which permits independence of action and has adequate authority to obtain all the information required to monitor and evaluate measurement quality as required by this section.

(2) Ensure that any contractor who performs MC&A measurements services conforms with applicable requirements in paragraphs (c)(5), (6), (7), (10) and (11) of this section. Conformance must include reporting by the contractor of sufficient measurement control data to allow the licensee to calculate bias corrections and measurement limits of error.

(3) Ensure that potential sources of sampling error are identified and that samples are representative by performing process sampling tests using well characterized materials to establish or verify the applicability of utilized procedures for sampling SNM and



for maintaining sample integrity during transport and storage. These sampling tests or sample integrity tests, as appropriate, shall be conducted whenever:

(i) A new sampling procedure or technique is used, or new sampling equipment is installed;

(ii) A sampling procedure, technique, or sampling equipment is modified to the extent that a systematic sampling error could be introduced; and

(iii) Sample containers, sample transport methods, or sample storage conditions are changed or modified to the extent that a systematic sampling error could be introduced.

(4) Establish and maintain a measurement control program so that for each inventory period the SEID is less than 0.125 percent of the active inventory, and assure that any MC&A measurements performed under contract are controlled so that the licensee can satisfy this requirement.

(5) Generate current data on the performance of each measurement system used during each material balance period for the establishment of measured values and estimated measurement uncertainties, including estimates of bias, variance components for calibration, sampling, and repeat measurements. The program data must reflect the current process and measurement conditions existing at the time the control measurements are made.

(6) Use standards on an ongoing basis for the calibration and control of all measurement systems used for SNM accountability. Calibrations shall be repeated whenever any significant change occurs in a measurement system or when program data indicate a need for recalibration. Calibrations and control standard measurements shall be based on standards whose assigned values are traceable to certified reference standards or certified standard reference materials. Additionally, control standards shall be representative of the process material or items being measured by the measurement system in question.

(7) Conduct control measurements to provide current data for the determination of random error behavior. On a predetermined schedule, the program shall include, as appropriate:

(i) Replicate analyses of individual samples;

(ii) Analysis of replicate process samples;

(iii) Replicate volume measurements of bulk process batches;

(iv) Replicate weight measurements of process items and bulk batches, or alternatively, the use of data generated from the replicate weighings of control standard weights as derived from the control standard program; and

(v) Replicate NDA measurements of individual process containers (items), or alternatively, the use of data generated from the replicate measurements of NDA control standards as derived from the control standard program.

(8) Use all measurements and measurement controls generated during the current material balance period for the estimation of the SEID.

(9) Evaluate with appropriate statistical methods all measurement system data generated in paragraph (c)(5) of this section to determine significant contributors to the measurement uncertainties associated with inventory differences and shipper-receiver differences, so that if SEID exceeds the limits established in paragraph (c)(4) of this section, the cause of the excessive SEID can be identified for corrective action with respect to controlling the standard error within applicable limits.

(10) Establish and maintain a statistical control system, including control charts and formal statistical procedures, designed to monitor the quality of each measurement device or system. Control chart limits must be established to be equivalent to levels of significance of 0.05 and 0.001.

(11) Promptly investigate and take any appropriate corrective action whenever a control datum exceeds an 0.05 control limit, and whenever a control datum exceeds an 0.001 control limit, the measurement system that generated the datum shall immediately be placed out-of-service with respect to MC&A measurements until the deficiency has been corrected and the system brought into control within the 0.05 control limits.

[67 FR 78146, Dec. 23, 2002]

### Subpart E—Formula Quantities of Strategic Special Nuclear Material

SOURCE: 52 FR 10040, Mar. 30, 1987, unless otherwise noted.

#### § 74.51 Nuclear material control and accounting for strategic special nuclear material.

(a) *General performance objectives.* Each licensee who is authorized to possess five or more formula kilograms of strategic special nuclear material (SSNM) and to use such material at any site, other than a nuclear reactor licensed pursuant to part 50 of this chapter, an irradiated fuel reprocessing plant, an operation involved with waste disposal, or an independent spent fuel storage facility licensed pursuant to part 72 of this chapter shall establish, implement, and maintain a Commission-approved material control and accounting (MC&A) system that will achieve the following objectives:

- (1) Prompt investigation of anomalies potentially indicative of SSNM losses;
- (2) Timely detection of the possible abrupt loss of five or more formula kilograms of SSNM from an individual unit process;
- (3) Rapid determination of whether an actual loss of five or more formula kilograms occurred;
- (4) Ongoing confirmation of the presence of SSNM in assigned locations; and
- (5) Timely generation of information to aid in the recovery of SSNM in the event of an actual loss.

(b) *System capabilities.* To achieve the general performance objectives specified in § 74.51(a), the MC&A system must provide the capabilities described in §§ 74.53, 74.55, 74.57 and 74.59 and must incorporate checks and balances that are sufficient to detect falsification of data and reports that could conceal diversion by:

- (1) An individual, including an employee in any position; or
  - (2) Collusion between an individual with MC&A responsibilities and another individual who has responsibility or control within both the physical protection and the MC&A systems.
- (c) *Implementation dates.* Each applicant for a license, and each licensee

that, upon application for modification of a license, would become newly subject to paragraph (a) of this section, shall submit a fundamental nuclear material control (FNMC) plan describing how the MC&A system shall satisfy the requirement of paragraph (b) of this section. The FNMC plan shall be implemented when a license is issued or modified to authorize the activities being addressed in paragraph (a) of this section, or by the date specified in a license condition.

(d) *Inventories.* Notwithstanding § 74.59(f)(1), licensees shall perform at least three bimonthly physical inventories after implementation of the NRC approved FNMC Plan and shall continue to perform bimonthly inventories until performance acceptable to the NRC has been demonstrated and the Commission has issued formal approval to perform semiannual inventories. Licensees who have prior experience with process monitoring and/or can demonstrate acceptable performance against all Plan commitments may request authorization to perform semiannual inventories at an earlier date.

[52 FR 10040, Mar. 30, 1987, as amended at 63 FR 26963, May 15, 1998; 67 FR 78148, Dec. 23, 2002]

#### § 74.53 Process monitoring.

(a) Licensees subject to § 74.51 shall monitor internal transfers, storage, and processing of SSNM. The process monitoring must achieve the detection capabilities described in paragraph (b) of this section for all SSNM except:

(1) SSNM that is subject to the item loss detection requirements of § 74.55;

(2) Scrap in the form of small pieces, cuttings, chips, solutions, or in other forms that result from a manufacturing process, held in containers of 30 gallons or larger, with an SSNM content of less than 0.25 grams per liter;

(3) SSNM with an estimated measurement standard deviation greater than five percent that is either input or output material associated with a unit that processes less than five formula kilograms over a consecutive three-month period; and

(4) SSNM involved in research and development operations that process less than five formula kilograms during any seven-consecutive-day period.

(b) *Unit process detection capability.* For each unit process, a licensee shall establish a production quality control program capable of monitoring the status of material in process. The program shall include:

(1) A statistical test that has at least a 95 percent power of detecting an abrupt loss of five formula kilograms within three working days of a loss of Category IA material from any accessible process location and within seven calendar days of a loss of Category IB material from any accessible process location;

(2) A quality control test whereby process differences greater than three times the estimated standard deviation of the process difference estimator and 25 grams of SSNM are investigated; and

(3) A trend analysis for monitoring and evaluating sequences of material control test results from each unit process to determine if they indicate a pattern of losses or gains that are of safeguards significance.

(c) For research and development operations exempt from the requirements of paragraph (b) of this section, the licensee shall:

(1) Perform material balance tests on a lot or a batch basis, as appropriate, or monthly, whichever is sooner, and investigate any difference greater than 200 grams of plutonium or U-233 or 300 grams of U-235 that exceeds three times the estimated standard error of the inventory difference estimator;

(2) Evaluate material balance results generated during an inventory period for indications of measurement biases or unidentified loss streams and investigate, determine the cause(s) of, and institute corrective action for cumulative inventory differences generated during an inventory period that exceed three formula kilograms of SSNM.

#### § 74.55 Item monitoring.

(a) Licensees subject to § 74.51 shall provide the detection capability described in paragraph (b) of this section for laboratory samples containing less than 0.05 formula kilograms of SSNM and any uniquely identified items of SSNM that have been quantitatively measured, the validity of that measurement independently confirmed, and that additionally have been either:

(1) Tamper-safed or placed in a vault or controlled access area that provides protection at least equivalent to tamper-safing; or

(2) Sealed such that removal of SSNM would be readily and permanently apparent (e.g., encapsulated).

(b) The licensee shall verify on a statistical sampling basis, the presence and integrity of SSNM items. The statistical sampling plan must have at least 99 percent power of detecting item losses that total five formula kilograms or more, plant-wide, within:

(1) Thirty calendar days for Category IA items and 60 calendar days for Category IB items contained in a vault or in a permanently controlled access area isolated from the rest of the material access area (MAA);

(2) Three working days for Category IA items and seven calendar days for Category IB items located elsewhere in the MAA, except for reactor components measuring at least one meter in length and weighing in excess of 30 kilograms for which the time interval shall be 30 days;

(3) Sixty calendar days for items in a permanently controlled access area outside of an MAA; or

(4) Sixty calendar days for samples in a vault or permanently controlled access area and 30 calendar days for samples elsewhere in the MAA for samples each containing less than 0.05 formula kilograms of SSNM.

(c) Items containing scrap in the form of small pieces, cuttings, chips, solutions, or in other forms that result from a manufacturing process, held in containers of 30 gallon or larger, with an SSNM concentration of less than 0.25 grams per liter are exempt from the requirements of paragraph (b) of this section.

[52 FR 10040, Mar. 30, 1987, as amended at 80 FR 45844, Aug. 3, 2015]

#### § 74.57 Alarm resolution.

(a) Licensees subject to § 74.51 shall provide the MC&A alarm resolution capabilities described in paragraphs (b) through (f) of this section.

(b) Licensees shall resolve the nature and cause of any MC&A alarm within approved time periods.

(c) Each licensee shall notify the NRC Operations Center by telephone of

any MC&A alarm that remains unresolved beyond the time period specified for its resolution in the licensee's fundamental nuclear material control plan. Notification must occur within 24 hours except when a holiday or weekend intervenes in which case the notification must occur on the next scheduled workday. The licensee may consider an alarm to be resolved if:

(1) Clerical or computational error is found that clearly was the cause for the alarm; or

(2) An assignable cause for the alarm is identified or it is substantiated that no material loss has occurred.

(d) If a material loss has occurred, the licensee shall determine the amount of SSNM lost and take corrective action to:

(1) Return out-of-place SSNM, if possible, to its appropriate place;

(2) Update and correct associated records; and

(3) Modify the MC&A system, if appropriate, to prevent similar future occurrences.

(e) The licensee shall provide an ability to rapidly assess the validity of alleged thefts.

(f) If an abrupt loss detection estimate exceeds five formula kilograms of SSNM:

(1) Material processing operations related to the alarm must be suspended until completion of planned alarm resolution activities, unless the suspension of operations will adversely affect the ability to resolve the alarm. Operation of continuous processes may continue for 24 hours from the time of the occurrence of the alarm during which time checks shall be made for mistakes in records or calculations that could have caused the alarm.

(2) Within 24 hours, the licensee shall notify the NRC Operations Center by telephone that an MC&A alarm resolution procedure has been initiated.

[52 FR 10040, Mar. 30, 1987, as amended at 54 FR 6877, Feb. 15, 1989; 55 FR 5979, Feb. 21, 1990; 60 FR 24553, May 9, 1995; 67 FR 78148, Dec. 23, 2002]

#### § 74.59 Quality assurance and accounting requirements.

(a) Licensees subject to § 74.51 shall provide the quality assurance and ac-

counting capabilities described in paragraphs (b) through (h) of this section.

(b) *Management structure.* The licensee shall:

(1) Establish and maintain a management structure that includes clear overall responsibility for planning, coordinating, and administering material control and accounting functions, independence of material control and accounting functions from production responsibilities, and separation of functions such that the activities of one individual or organizational unit serve as controls over and checks of the activities of others; and

(2) Provide for the adequate review, approval, and use of those material control and accounting procedures that are identified in the approved FNMC plan as being critical to the effectiveness of the described system.

(c) *Personnel qualification and training.* The licensee shall assure that personnel who work in key positions where mistakes could degrade the effectiveness of the material control and accounting system are trained to maintain a high level of safeguards awareness and are qualified to perform their duties and/or responsibilities.

(d) *Measurements.* The licensee shall establish and maintain a system of measurements sufficient to:

(1) Substantiate the plutonium element and uranium element and isotope content of all SSNM received, produced, transferred between areas of custodial responsibility, on inventory, or shipped, discarded, or otherwise removed from inventory;

(2) Enable the estimation of the standard deviation associated with each measured quantity; and

(3) Provide the data necessary for performance of the material control tests required by § 74.53(b).

(e) *Measurement control.* The licensee shall assure that the quality of SSNM measurement systems and material processing practices is continually controlled to a level of effectiveness sufficient to satisfy the capabilities required for detection, response, and accounting. To achieve this objective the licensee shall:

(1) Perform engineering analyses and evaluations of the design, installation, preoperational tests, calibration, and

operation of all measurement systems to be used for MC&A purposes;

(2) Perform process and engineering tests using well characterized materials to establish or to verify the applicability of existing procedures for mixing and sampling SSNM and maintaining sample integrity during transport and storage. Tests must be repeated at least every three years, at any time there is a process modification that alters the physical or chemical composition of the SSNM, or whenever there is a change in the sampling technique or equipment; and

(3) Generate current data on the performance of measurement processes, including, as appropriate, values for bias corrections, uncertainties on calibration factors, and random error standard deviations. The program must include:

(i) The ongoing use of standards for calibration and control of all applicable measurement systems. Calibrations must be repeated whenever any change in a measurement system occurs which has the potential to affect a measurement result or when program data, generated by tests performed at a predetermined frequency, indicate a need for recalibration. Calibrations and tests must be based on standards with traceability to national standards or nationally accepted measurement systems; and

(ii) A system of control measurements to provide current data for the estimation of the standard deviations that are significant contributors to the measurement uncertainties associated with shipper/receiver differences, inventory differences, and process differences.

(4) Utilize the data generated during the current material balance period for the estimation of the standard error of the inventory difference (SEID) and the standard error of the process differences. Calibration and measurement error data collected and used during immediately preceding material balance periods may be combined with current data provided that the measurement systems are in statistical control and the combined data are utilized in characterizing the unknowns.

(5) Evaluate all program data and information to assure that measurement

performance is so controlled that the SEID estimator is less than 0.1 percent of active inventory.

(6) Apply bias corrections by an appropriate procedure whereby:

(i) Bias corrections are applied to individual items if for any measurement system the relative bias estimate exceeds twice the standard deviation of its estimator, the absolute bias estimate exceeds 50 grams of SSNM when applied across all affected items, and the absolute bias estimate on an individual item basis exceeds the rounding error of affected items; and

(ii) All biases (regardless of significance) that are not applied as corrections to individual items are applied as a correction to the inventory difference.

(7) Investigate and take corrective action, as appropriate, to identify and reduce associated measurement biases when, for like material types (*i.e.*, measured by the same measurement system), the net cumulative shipper/receiver differences accumulated over a six-month period exceed the larger of one formula kilogram or 0.1 percent of the total amount received.

(8) Establish and maintain a statistical control system designed to monitor the quality of each type of program measurement. Control limits must be established to be equivalent to levels of significance of 0.05 and 0.001. Control data exceeding the 0.05 limits must be investigated and corrective action taken in a timely manner. Whenever a single data point exceeds the 0.001 control limit, the measurement system in question must not be used for material control and accounting purposes until it has been brought into control at the 0.05 level.

(f) *Physical inventory.* The licensee shall:

(1) Except as required by part 75 of this Chapter, perform a physical inventory at least every six calendar months and within 45 days after the start of the ending inventory:

(i) Calculate the inventory difference (ID); estimate the standard error of the inventory difference (SEID); and investigate and report any SEID estimate of 0.1 percent or more of active inventory, and any ID that exceeds both three times SEID and 200 grams of plutonium

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or uranium-233, or 300 grams of uranium-235 contained in high enriched uranium.

(ii) If required to perform an investigation pursuant to paragraph (f)(1)(i) of this section, evaluate the significance of the inventory difference relative to expected performance as determined from an analysis of an appropriate sequence of historical inventory differences;

(iii) Investigate and report, by an appropriate method listed in § 74.6, to the Director, Office of Nuclear Material Safety and Safeguards, any difference that exceeds three times the standard deviation determined from the sequential analysis;

(iv) Perform a reinventory if directed to do so by the Commission; and

(v) Reconcile and adjust the plant and subsidiary book records to the results of the physical inventory.

(2) Implement policies, practices, and procedures designed to ensure the quality of physical inventories. These must include:

(i) Development of procedures for tamper-safing of containers or vaults containing SSNM not in process that include adequate controls to assure the validity of assigned SSNM values;

(ii) Maintenance of records of the quantities of SSNM added to and removed from process;

(iii) Requirements for signed documentation of all SSNM transfers between areas with different custodial responsibility that reflect all quantities of SSNM transferred;

(iv) Means for control of and accounting for internal transfer documents;

(v) Cutoff procedures for transfers and processing so that all quantities of SSNM are inventoried and none are inventoried more than once;

(vi) Cutoff procedures for records and reports so that all transfers for the inventory and material balance interval and no others are included in the records;

(vii) Inventory procedures for sealed sources and containers or vaults containing SSNM that assure reliable identification and quantification of contained SSNM;

(viii) Inventory procedures for in-process SSNM that provide for measurement of quantities not previously

measured for element and isotope, as appropriate, and remeasurement of material previously measured but whose validity has not been assured by tamper-safing or equivalent protection; and

(ix) Written instructions for conducting physical inventories that detail assignments, responsibilities, and preparation for and performance of an inventory.

(g) *Accounting.* The licensee shall establish auditable records sufficient to demonstrate that the requirements of §§ 74.53, 74.55, 74.57, and 74.59 have been met and retain those records for at least three years unless a longer retention period is required by part 75 of this Chapter.

(h) *Internal control.* The licensee shall:

(1) Establish procedures for shipping and receiving SSNM that provide for:

(i) Accurate identification and measurement of the quantities shipped and received;

(ii) Review and evaluation of shipper/receiver differences on an individual container or lot basis, as appropriate, on a shipment basis, and on a batch basis when required by part 75 of this Chapter;

(iii) Investigation and corrective action when shipper/receiver differences exceed twice the estimated standard deviation of the difference estimator and the larger of 0.5 percent of the amount of SSNM in the container, lot, or shipment, as appropriate, or 50 grams of SSNM; and

(iv) Documentation of shipper/receiver difference evaluations, investigations, and corrective actions.

(2) Establish a scrap control program that assures that:

(i) Internally generated scrap and scrap from other licensees or contractors is segregated until accountability is established; and

(ii) Any scrap measured with a standard deviation greater than five percent of the measured amount is recovered so that the results are segregated by inventory period and recovered within six months of the end of the inventory period in which the scrap was generated except where it can be demonstrated that the scrap measurement

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uncertainty will not cause noncompliance with § 74.59(e)(5).

(3) Incorporate checks and balances in the MC&A system sufficient to control the rate of human errors in material control and accounting information.

(4) Perform independent assessments at least every 12 months that assess the performance of the MC&A system, review its effectiveness, and document management's action on prior assessment recommendations. Assessments must include an evaluation of the measurement control program of any outside contractor laboratory performing MC&A measurements for a licensee, unless the contractor is also subject to the requirements of § 74.59(e).

(5) Assign custodial responsibility in a manner that ensures that such responsibility can be effectively executed for all SSNM possessed under license.

[52 FR 10040, Mar. 30, 1987, as amended at 54 FR 6878, Feb. 15, 1989; 55 FR 5979, Feb. 21, 1990; 60 FR 24553, May 9, 1995; 67 FR 78148, Dec. 23, 2002; 68 FR 58822, Oct. 10, 2003]

### Subpart F—Enforcement

#### § 74.81 Inspections.

(a) Each licensee shall afford to the Commission at all reasonable times opportunity to inspect special nuclear material and the premises and facilities wherein special nuclear material is used, produced, or stored.

(b) Each licensee shall make available to the Commission for inspection, upon reasonable notice, records kept by the licensee pertaining to its receipt, possession, use, acquisition, import, export, or transfer of special nuclear material.

(c)(1) In the case of fuel cycle facilities where nuclear reactor fuel is fabricated or processed, each licensee shall upon request by the Director, Office of Nuclear Material Safety and Safeguards or the appropriate NRC Regional Administrator, provide rent-free office space for the exclusive use of Commission inspection personnel. Heat, air conditioning, light, electrical outlets, and janitorial services shall be furnished by each licensee. The office shall be convenient to and have full access to the facility, and shall provide

the inspector both visual and acoustic privacy.

(2) For a site with a single fuel facility licensed pursuant to part 70 of this chapter, the space provided shall be adequate to accommodate a full-time inspector, a part-time secretary, and transient NRC personnel. It will be generally commensurate with other office facilities at the site. A space of 250 square feet either within the site's office complex or in an office trailer or other on-site space is suggested as a guide. For sites containing multiple fuel facilities, additional space may be requested to accommodate additional full-time inspector(s). The office space that is provided shall be subject to the approval of the Director, Office of Nuclear Material Safety and Safeguards or the appropriate NRC Regional Administrator. All furniture, supplies, and communication equipment will be furnished by the Commission.

(3) The licensee shall afford any NRC resident inspector assigned to their site, or other NRC inspectors identified by the Director of the Office of Nuclear Material Safety and Safeguards as likely to inspect the facility, immediate unfettered access, equivalent to access provided regular plant employees, following proper identification and compliance with applicable access control measures for security, radiological protection, and personal safety.

(d) At a facility using and possessing a formula quantity of strategic special nuclear material in unirradiated form, the licensee may not announce or otherwise communicate to its employees or site contractors the arrival or presence of an NRC safeguards inspector unless specifically requested to do so by the safeguards inspector.

[50 FR 7579, Feb. 25, 1985, as amended at 52 FR 31613, Aug. 21, 1987; 54 FR 6878, Feb. 15, 1989; 55 FR 5979, Feb. 21, 1990; 58 FR 29522, May 21, 1993]

#### § 74.82 Tests.

Each licensee shall perform, or permit the Commission to perform, any tests that the Commission deems appropriate or necessary for the administration of the regulations in this part, including tests of:

(a) Special nuclear material;

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(b) Facilities where special nuclear material is utilized, produced, or stored; and

(c) Other equipment and devices used in connection with the production, utilization, or storage of special nuclear material.

## § 74.83 Violations.

(a) The Commission may obtain an injunction or other court order to prevent a violation of the provisions of—

(1) The Atomic Energy Act of 1954, as amended;

(2) Title II of the Energy Reorganization Act of 1974, as amended; or

(3) A regulation or order issued pursuant to those Acts.

(b) The Commission may obtain a court order for the payment of a civil penalty imposed under section 234 of the Atomic Energy Act:

(1) For violations of—

(i) Sections 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Atomic Energy Act of 1954, as amended;

(ii) Section 206 of the Energy Reorganization Act;

(iii) Any rule, regulation, or order issued pursuant to the sections specified in paragraph (b)(1)(i) of this section;

(iv) Any term, condition, or limitation of any license issued under the sections specified in paragraph (b)(1)(i) of this section.

(2) For any violation for which a license may be revoked under section 186 of the Atomic Energy Act of 1954, as amended.

[57 FR 55079, Nov. 24, 1992]

## § 74.84 Criminal penalties.

(a) Section 223 of the Atomic Energy Act of 1954, as amended, provides for criminal sanctions for willful violation of, attempted violation of, or conspiracy to violate, any regulation issued under sections 161b, 161i, or 161o of the Act. For purposes of section 223, all the regulations in part 74 are issued under one or more of sections 161b, 161i, or 161o, except for the sections listed in paragraph (b) of this section.

(b) The regulations in part 74 that are not issued under sections 161b, 161i, or 161o for the purposes of section 223

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are as follows: §§74.1, 74.2, 74.4, 74.5, 74.6, 74.7, 74.8, 74.83 and 74.84.

[57 FR 55079, Nov. 24, 1992]

## PART 75—SAFEGUARDS ON NUCLEAR MATERIAL—IMPLEMENTATION OF SAFEGUARDS AGREEMENTS BETWEEN THE UNITED STATES AND THE INTERNATIONAL ATOMIC ENERGY AGENCY

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