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 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;
(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
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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) Repeat volume measurements of bulk process batches;
   (iv) Repeat weight measurements of process items and bulk batches, or alternatively, the use of data generated from the replicate weighings of control.
§ 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...