§ 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 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.

§ 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 calendar 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.

§ 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.