

# NRC INSPECTION MANUAL

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## INSPECTION PROCEDURE 85211

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### PHYSICAL INVENTORY

PROGRAM APPLICABILITY: 2681

#### 85211-01 INSPECTION OBJECTIVE

Confirm that the licensee's program for inventorying special nuclear material is conducted in accordance with required procedures, instructions, and frequencies and is adequate to accurately detect and account for losses, thefts or diversions of SNM.

#### 85211-02 INSPECTION REQUIREMENTS

Physical inventories must comply with all applicable NRC regulations and license conditions. The FNMC Plan contains general commitments relative to the taking of physical inventories. By inspection determine whether:

02.01 Inventory procedures sufficient to account for all SNM possessed by the licensee are established, maintained and followed which provide for: [70.51(c); 70.51(e)(1)(i), (ii), (iii), (iv); 70.51(e)(2); 70.51(f)(1), (2), (3); 70.58(j); 70.58(k)(4), (5)]

- a. Records of the identity, location and quantity of SNM contained in all material and items in process and in storage.
- b. Records of the quantities of SNM added to or removed from the process.
- c. Assurance that all items and material on inventory are listed only once.
- d. Verification of the correctness of inventory records.
- e. Measurement or reverification of the quantities of element and fissile isotope in all material and items for which measured values do not exist or the validity of prior measurements has not been assured by tamper-safing.
- f. Reconciliation of subsidiary accounts to centralized control accounts, and reconciliation of subsidiary and control accounts to the results of physical inventories.

02.02 Physical inventories are conducted according to written instructions which: [70.51(f)(4)]

- a. Assign inventory duties and responsibilities.
- b. Specify the extent to which process equipment will be shut down and/or cleaned out and the extent to which movement of material will remain static.
- c. Identify the basis for accepting prior measurements and for performing measurements for inventory purposes.
- d. Identify the means by which material will be listed to assure that all material is inventoried without duplication.

02.03 Physical inventories are conducted in accordance with the following frequencies: [70.51(e)(3)]

- a. At intervals not to exceed six calendar months for licensees authorized to possess more than one effective kilogram of LEU or plutonium containing 80 weight percent or more Pu-238.
- b. At intervals not to exceed two calendar months for licensees authorized to possess more than one effective kilogram of plutonium (except as noted above), U-233, or HEU.

02.04 Within 30 calendar days after the start of each physical inventory, book records of the quantities of element and isotope are reconciled and adjusted to the results of the physical inventory, and MUF/ID and LEMUF/LEID are calculated for each element and the fissile isotope for uranium. [70.51(e)(4)(i), (ii); 70.51(f)(1)(v)]

02.05 Independent testing of the physical inventory listing and an evaluation of the inventory reconciliation indicate that acceptable physical inventories are being conducted by the licensee.

### 85211-03 INSPECTION GUIDANCE

03.01 Regulations. 70.51(c); 70.51(e)(1)(i), (ii), (iii), (iv); 70.51(e)(2), (3); 70.51(e)(4)(i), (ii); 70.51(f)(1), (2), (3), (4); 70.58(j); 70.58(k)(4), (5).

### 03.02 Regulatory Guides and Reports

Regulatory Guide 5.13 - Conduct of Physical Inventories (11/73)  
NUREG/CR -1283 - Accounting Systems for SNM (5/80)  
DOE/ET/47912-6 - SNM Accountability for Rod Storage (9/81)  
NUSAC Report No. 772 - Accounting Data Storage/Analysis (11/82)

03.03 Criteria. The responsibility for planning, organizing, and conducting physical inventories should be assigned to one primary individual and an alternate who are both familiar with the overall operation of the facility and independent of material control and accounting management. The inventory of each plant area should be assigned to individuals who are familiar with but who have no direct responsibility for the material and operations conducted in that area. As a general rule, inventories should be conducted by teams consisting of a minimum of two people who are managerially

assigned for the duration of the inventory to the individual primarily responsible for the physical inventory.

Prior to the inventory, the person with overall inventory responsibility should perform a preliminary inspection of the plant areas to be inventoried, review the inventory procedures and instructions with key individuals, and supervise any needed additional training of inventory personnel. The inspection of plant areas should focus on assuring that material is measured and properly tamper-safed, packaged, labeled, stored, or otherwise prepared for the inventory, and that process equipment is dealt with according to those written procedures and instructions which have been established.

Inventory quantities should either be based on measurements performed at inventory time or on prior measurements whose integrity are assured by tamper-safing or other equivalent means. Use of inventory factors is permissible provided the factors are based on measurements with acceptable limits of error and are monitored through the quality assurance program. Residual holdup may be considered insignificant if its effect on MUF/ID can be demonstrated to be insignificant.

Before an inventory is completed, a check should be made by the licensee to see if all material in the plant has been inventoried. This may be accomplished by checking all material for current inventory tags or markings. Cutoffs should be double checked. Once this is accomplished, the inventory records should be checked for correctness and the book records reconciled and adjusted to the results of the inventory. This reconciliation should include both the central accounting records and the subsidiary MBA/ICA journals.

Inspection effort for this procedure should include the evaluation of physical inventory (PI) procedures and instructions, audit of PI records, direct observation of PI-related activities, testing of the PI listing, and an evaluation of the PI reconciliation. For the purposes of this procedure, a mistake on a physical inventory listing is considered to be a defect if it involves incorrect or missing data which could affect the material balance. The inspector shall test the inventory listing by selecting a random sample of the items recorded thereon for an independent check. The sample size shall be determined using an appropriate attribute sampling plan that has at least a 90 percent power of detecting if defects exceed 1 percent of the total items listed and a 90 percent or higher probability of accepting a listing that contains less than 0.2 percent defects. If this test rejects the listing, the inspector shall evaluate the significance and, if possible, isolate the source of the errors found. In addition, an expansion of the original test or a retest of all or portions of the listing could be performed to reinforce previous results and conclusions. However, if this evaluation and/or retest of the listing confirms that the level of errors is unacceptable, the licensee shall be notified of this result and asked to resolve the problem during the reconciliation period. The results and conclusions of all tests and evaluations must be documented in an inspection report.

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