
INSPECTION PROCEDURE 75100 ATTACHMENT 11

MATERIAL CONTROL AND ACCOUNTING (MC&A) DURING CONSTRUCTION OF ADVANCED REACTORS

Effective Date: 10/20/2026

PROGRAM APPLICABILITY: IMC 2203

STRATEGIC PERFORMANCE AREA: Security and Safeguards

75100.11-01 INSPECTION OBJECTIVES

- 01.01 To verify the permit or license holder has developed and is properly implementing or is prepared to implement an adequate and effective program to control and account for the special nuclear material (SNM) in its possession.
- 01.02 To verify the permit or license holder has developed and is properly implementing or is prepared to implement an MC&A program to detect loss, theft, or diversion of SNM in a timely manner.

75100.11-02 INSPECTION REQUIREMENTS

General Guidance

This inspection is conducted as a permit or license holder activates their MC&A program in accordance with their approved security plan and may be conducted prior to or after the receipt of fuel at the site. This IP is applicable to all advanced reactors under construction that are subject to oversight under the NRC's Advanced Reactor Construction Oversight Program (ARCOP). Verification through observation of activities may not be possible for all requirements. In such cases, the inspector(s) may review the appropriate permit or license holder's procedures and records.

Since advanced reactors will vary in design and licensing approaches, inspections will also be tailored to each site. The scope of inspections for advanced reactors will depend on the specific licensing framework and licensing basis selected by each permit or license holder. Therefore, some elements of this inspection procedure (IP) may be omitted when appropriate. Additionally, many advanced reactors may be co-located with existing, operating reactors. Inspections of new reactors that use elements of existing site security plans do not need to include those elements that are the same as the operating reactors. For example, fitness-for-duty, access authorization (AA), and safeguards information are areas where the NRC staff expects security plans to be essentially unchanged from the operating reactors' security plan.

Any inspection activities that do not align with the permit or license holder's licensing and design basis should not be inspected.

MC&A and physical protection are complementary measures taken by the licensee to ensure that nuclear material is not lost, stolen, or diverted. Physical protection is a set of activities for protecting SNM and the facilities in which it is used. MC&A is a set of activities that enable the licensee and the NRC to confirm in a timely manner that SNM has not been lost, stolen, or diverted.

MC&A programs at power reactors have three components: records, procedures, and inventory. The requirements for each of these components are specified in 10 CFR 74.19. Complete records are required of all SNM transactions. Without complete and accurate records, detecting loss or theft would not be possible. Written procedures are required, which are sufficient to control and account for the SNM possessed. Written procedures describe the methods of control and instruct permit or license holder staff about the documentation of transactions. A physical inventory of all SNM is required at least once every 12 months. Physical inventory confirms that the records are correct. Discrepancies that are discovered within 12 months are more likely to be resolved than those discovered later, because the information is more recent, and personnel involved in the SNM activity, or the recording of the activity are more likely to be available to respond during an investigation. Additionally, certain reports are required by 10 CFR 74.13 and 10 CFR 74.15. Should questions arise regarding procedural requirements or guidance, the inspector(s) should consult with the Office of Advanced Reactor, Advanced Reactor Oversight Branch, (OAR/AROB) or the Office of Nuclear Material Safety and Safeguards (NMSS) for clarification.

MC&A inspections at power reactors under construction primarily involve a review of the licensee's programs and procedures for controlling and accounting for discrete items, and a program for physical verification of the inventory. The review should address the adequacy and completeness of the physical inventory program.

02.01 MC&A Procedures

- a. **Verify the licensee has developed, implemented, or is prepared to implement procedures for MC&A that are sufficient to enable the licensee to account for the SNM in its possession. (10 CFR 74.19(b))**

Specific Guidance

Review the permit or license holder's MC&A procedures. The MC&A procedures should be approved by permit or license holder's management. SNM duties and responsibilities should be clearly documented.

The permit or license holder is required to establish and maintain written MC&A procedures to ensure that current knowledge of the identity, quantity, and location of all items containing SNM in its possession is maintained. Other procedures in addition to the general MC&A procedure should include procedures for fuel handling, fuel receipt, receipt of other non-fuel SNM such as instruments, movement of SNM (fuel and non-fuel items), fuel shipment, instrument replacement, and other MC&A instructions.

Procedures should clearly identify who in the organization has responsibility for each aspect of the site's activities for control and accounting of SNM, both fuel and non-fuel SNM. Movements of SNM are conducted in accordance with approved procedures. All

personnel and contractors with potential for access to SNM should be trained on pertinent MC&A procedures.

Additional guidance can be found in American National Standards, Inc. (ANSI) N15.8- 2009, "Special Nuclear Material Control and Accounting Systems for Nuclear Power Reactors,".

02.02 SNM Records

- a. **Verify the licensee has developed, implemented, or is prepared to implement a record retention process showing the receipt, inventory, acquisition, transfer, and disposal of all SNM in its possession. (10 CFR 74.19(a)(1) and 10 CFR 74.19(a)(3))**

Specific Guidance

Review records and procedures to ensure that MC&A related activities involving fuel and non-fuel SNM (instruments) are documented. The permit or license holder is required to document all SNM transactions. MC&A related transactions include, but are not limited to, receipt of new fuel, physical inventory including location and unique identity, acquisitions, shipments including items off site, movement within and between item control areas, transfer of irradiated fuel to spent fuel storage, losses and disposal, fuel failures, and reconstitution.

SNM items involved in transactions include fuel containers, samples, and non-fuel SNM instruments, such as sealed sources and fission chambers. Records typically include transfer forms, computer records for each fuel container, and physical inventory records.

The permit or license holder is required to account for all SNM and promptly report any losses. SNM records are required to be retained as long as the permit or license holder possesses the SNM and for 3 years following transfer or disposal of the SNM. For additional guidance, the inspector(s) should reference ANSI N15.8-2009, section 7.6.

02.03 Physical Inventory

- a. **Verify the licensee has developed, implemented, or is prepared to implement a physical inventory program and the licensee conducts a physical inventory of all SNM in its possession at intervals not to exceed 12 months. (10 CFR 74.19(c))**

Specific Guidance

Review the permit or license holder's procedures and practices to ensure the physical inventory includes physical observation of all SNM and that the permit or license holder is not merely conducting a records review.

The results of the physical inventory should be compared with the book inventory on an item-by-item basis. The reconciliation should be adequate to reveal if an item is missing from either the physical or book inventory. Documents should be updated to reflect the results of the physical inventory. Failure to identify discrepancies between the physical inventory and the book inventory (generally the spent fuel pool map) increases the risk

of failing to identify an item is missing. Every discrepancy should be investigated thoroughly and explained satisfactorily.

02.04 SNM Material Status and Transaction Reports

- a. **Verify the licensee has developed, implemented, or is prepared to implement a process to distribute the required SNM material status and transaction reports to the National Nuclear Materials Management and Safeguards System (NMMSS). (10 CFR 74.13(a) and 10 CFR 74.15)**

Specific Guidance

Interview licensee personnel and conduct a records review to determine if the permit or license holder has a process in place to make or has made the required material status and transaction reports to the NMMSS in accordance with NUREG/BR-0006, "Instructions for Completing Nuclear Material Transaction Reports (Department of Energy/Nuclear Regulatory Commission (DOE/NRC) Forms 741 and 740M)," and NUREG/BR-007, "Instructions for the Preparation and Distribution of Material Status Reports (DOE/NRC Forms 742 and 742C)."

Permit or license holders that possess SNM are required to submit periodic reports to NMMSS. DOE/NRC Form 741 is used to report transfers and receipts of SNM greater than 1 gram between licensees. Records of plutonium production and nuclear consumption (burn-up) are also reported on transaction reports. To support the required reports and possible transfer off-site or to an Independent Spent Fuel Storage Installation, the permit or license holder should have developed, implemented or is prepared to implement procedures for calculation burn-up, washout, and production of SNM. Records should be updated assigning current SNM estimates to all items containing SNM. The inspector(s) do not need to verify the calculations, just verify that the calculations are being made and reported as required.

Form 742 is used to report the material balance of SNM that the licensee has received, produced, possessed transferred, consumed, disposed of, or lost.

02.05 Reviews

- a. **Events and Logs. Review and evaluate licensee event reports, safeguard log entries, and corrective action documents for events associated with MC&A, and follow-up as appropriate. Review any written follow-up reports of MC&A events. (10 CFR 74.11 and 10 CFR 73.1200)**

Identification and Resolution of Problems. Verify that the licensee is identifying issues related to the MC&A program at an appropriate threshold and entering them into the licensee's problem identification and resolution program. Verify that the licensee has appropriately resolved the issues regarding regulatory requirements for a selected sample of problems associated with the MC&A program.

Specific Guidance

Before the inspection, the inspector(s) should determine if a licensee event report (LER), in accordance with 10 CFR 74.11 and 10 CFR 73.1200 has been submitted to the NRC by the licensee. Assess if additional follow up under this IP is warranted for the conditions or corrective actions associated with the LER.

Before the inspection, the inspector(s) should review and evaluate safeguards log entries that are associated with the MC&A program. If discrepancies or deficiencies are identified during this review, the inspector(s) should follow up as necessary.

The inspector(s) should review a sample of entries in the licensee's problem identification and resolution program associated with the MC&A program. The intent of this review is to verify that the licensee is identifying deficiencies at the appropriate threshold, tracking deficiencies for trending, and correcting deficiencies commensurate with their significance.

75100.11-03 RESOURCE ESTIMATE

Approximately 6 hours of inspection effort are allocated for this IP. This estimate may vary depending on site-specific considerations.

75100.11-04 PROCEDURE COMPLETION

This IP is complete when sufficient inspection activities are performed to accomplish the IP objectives. Consult with the Chief, Advanced Reactor Oversight Branch if needed to determine IP completion.

75100.11-05 REFERENCES

ANSI N15.8-2009, "Special Nuclear Material Control and Accounting Systems for Nuclear Power Reactors"

Bulletin 2005-01, "Material Control and Accounting at Reactors and Wet Spent Fuel Storage Facilities," dated February 11, 2005 (ML050390228)

"Material Control and Accounting at Nuclear Power Plants and Wet Storage Sites," Report of results of inspection conducted under TI 2515/154 (ML072841277)

NUREG/BR-0006, "Instructions for Completing Nuclear Material Transaction Reports (DOE/NRC Forms 741 and 740M)"

NUREG/BR-0007, "Instructions for the Preparation and Distribution of Material Status Reports (DOE/NRC Forms 742 and 742C)"

Regulatory Guide (RG) 5.29, "Nuclear Material Control Systems for Nuclear Power Plants"

SECY-08-0005, "Results of Material Control and Accounting Baseline Inspections Conducted at Nuclear Power Reactors and Wet Storage Sites," dated January 8, 2008 (Agencywide Documents and Access Management System (ML072841281)

List of Attachments

Attachment 1: Revision History for IP 75100.11

END

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Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional Non-Public Information)
N/A	ML26243A443 10/20/26 CN 26-048	Initial IP developed to support advanced reactor security construction inspections under IMC 2203.		ML25272A124