

CONSOLIDATION OF MATERIAL CONTROL AND ACCOUNTING (MC&A) REGULATIONS

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ABSTRACT

An overview is presented on progress made by the Nuclear Regulatory Commission (NRC) in consolidating all MC&A regulations for fuel cycle facilities. This effort resulted in the recent publication of MC&A requirements for Category II facilities. Previously, the MC&A requirements for Category II facilities and other general MC&A requirements were interspersed among the safety and general licensing requirements in Part 70 of Title 10 of the Code of Federal Regulations (10 CFR Part 70). A Category II licensee is one that is licensed to possess and use special nuclear material (SNM) of moderate strategic significance (e.g., 10 kilograms of uranium enriched to 10 percent or more but less than 20 percent in the uranium-235 isotope, with limited quantities at higher enrichments). The final amendments consolidate, in 10 CFR Part 74, the MC&A requirements for all three facility categories. Furthermore, the MC&A requirements for Category II facilities have been revised to be more risk-informed and performance-based, consistent with the existing MC&A regulations for Category I and III facilities. The relocation and modification of the Category II MC&A requirements will enhance the regulatory process by providing the licensees with a better understanding of the procedures and requirements for MC&A, and also simplify locating the requirements for all licensees, thereby improving the efficiency and effectiveness of the regulations. The new rule is intended to reduce the regulatory burden on both licensees and the NRC staff, while maintaining adequate safeguards. This consolidation of regulations is another step towards NRC's regulatory reform goal of providing a graded approach to MC&A regulations.

INTRODUCTION

In 1982, the NRC initiated activities to move the MC&A requirements from 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," to 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material." This initiative also included efforts to make the requirements more performance-oriented. In 1985, the MC&A regulations for Category III facilities were made more performance-based and were moved to Part 74. The regulations for Category I facilities were similarly moved to Part 74 in 1987. This recent rulemaking completes the final stage, resulting in the consolidation of all domestic MC&A regulations in a single location in Part 74 by relocating the general MC&A requirements, and converting the requirements for Category II facilities to be risk-informed and performance-oriented. In addition, other amendments to MC&A regulations included the revision of the frequency and timing for submitting material balance reports, and the broadening of the exclusion from the requirements to perform an environmental assessment with regard to safeguards plans and license amendments. These amendments are intended to reduce unnecessary regulatory burden on licensees and NRC without adversely affecting public health and safety. This paper provides an overview of the revision of MC&A requirements for Category II facilities.

REGULATORY CONSIDERATIONS

The relocation of the MC&A general requirements and the modification to the Category II requirements enhance the regulatory process by providing stakeholders a better understanding

of the procedures and requirements for MC&A, and simplify locating the requirements that apply to a given facility. In the past, the MC&A requirements for Category II facilities and the general requirements have been scattered among the safety and general licensing requirements in Part 70. The rulemaking for this effort moves these remaining MC&A requirements to Part 74 to avoid confusion with the safety requirements in Part 70, and to provide for the consolidation of domestic MC&A requirements into one place. Furthermore, portions of the previous regulations regarding Category II material in Part 70 are considered overly prescriptive. The new requirements are more risk-informed and performance-oriented, consistent with other existing MC&A requirements for other facility categories.

CATEGORY II MC&A REQUIREMENTS

The NRC published the new rule for Category II requirements, "Subpart D – Special Nuclear Material of Moderate Strategic Significance," in the Federal Register on December 23, 2002 (67 FR 78146), and the final rule is effective March 24, 2003. General reporting requirements, as well as specific requirements for certain licensees possessing SNM of low strategic significance, SNM of moderate strategic significance, and formula quantities of strategic SNM, are included. The following table summarizes specific information on material limits for Category I, II, and III licensees.

Categorization of Materials

Material	Form	Category I	Category II	Category III
Plutonium	Any	2 kg or more	Less than 2 kg but more than 500 g	500 g or less but more than 15 g
Uranium-235	Uranium enriched to 20 percent U-235 or more	5 kg or more	Less than 5 kg but more than 1kg	1 kg or less but more than 15 g
	Uranium enriched to 10 percent U-235 but less than 20 percent U-235	_____	10 kg or more	Less than 10 kg but more than 1 kg
	Uranium enriched above natural, but less than 10 percent U-235	_____	_____	10 kg or more
Uranium-233	Any	2 kg or more	Less than 2 kg but more than 500 g	500 g or less but more than 15 g

A Category I licensee is one that is licensed to possess and use formula quantities of strategic SNM (SSNM), i.e., 5 kilograms of uranium enriched to 20 percent or more in the uranium-235 isotope. SSNM means uranium-235 (contained in uranium enriched to 20 percent or more in the uranium-235 isotope), uranium-233, or plutonium. A Category II license is one that is licensed to possess and use SNM of moderate strategic significance, i.e., 10 kilograms of uranium enriched to 10 percent or more but less than 20 percent in the uranium-235 isotope, with limited quantities at higher enrichments. A Category III licensee is one that is licensed to possess and use quantities of SNM of low strategic significance, i.e., uranium enriched to less than 10 percent in the uranium-235 isotope, with limited quantities at higher enrichments.

With regard to Category II facilities, the basic MC&A requirements are being retained in Part 74, but are presented in a more organized manner. Emphasis has been given to risk assessment and performance approaches rather than prescriptive requirements to allow licensees to select the most cost-effective way to satisfy NRC requirements. The NRC's overall safeguards program establishes graded performance standards that are designed to prevent material diversion and, if that fails, to trigger timely detection, including response and recovery operations. The emphasis is on defining performance objectives. Implementation of these objectives is commensurate with the strategic value of various types and quantities of materials.

The performance objectives for Category II facilities include the following elements:

- 1) confirmation of the presence and location of SNM;
- 2) prompt investigation and resolution of any anomalies indicating a possible loss of SNM;
- 3) rapid determination of whether an actual loss of a significant quantity of SNM has occurred; and
- 4) timely generation of information to aid in the investigation and recovery of missing SNM in the event of an actual loss.

Three new sections were introduced in Subpart D of Part 74 for Category II facilities:

- Section 74.41 - Nuclear material control and accounting for special nuclear material of moderate strategic significance.

This new section is added to provide the general performance objectives, implementation schedule, and system capabilities and requirements for SNM of moderate strategic significance.

- Section 74.43 - Internal controls, inventory, and records.

This new section is added to provide the requirements for internal controls, inventory control and physical inventories, and recordkeeping for SNM of moderate strategic significance.

- Section 74.45 – Measurements and measurement control.

This new section is added to provide the requirements for the accountability measurement system and measurement control program for SNM of moderate strategic significance.

In summary, the principal differences between the MC&A requirements in the final rule and those in the previous regulations are as follows:

- 1) The revised regulations reduce the required frequencies of Category II physical inventories from the current frequency of every 2 months for SSNM and every 6 months for everything else, to every 9 months. From a safeguards risk and graded approach perspective, this is consistent with the annual frequency for Category III facilities and semiannual frequency for Category I facilities;
- 2) The concept of Inventory Difference (ID) and Standard Error of the Inventory Difference (SEID) is used to replace the Material Unaccounted For (MUF) concept in the statistical program. This is consistent with the statistical terms and methods used in Part 74 for Category I and III facilities and with NRC guidance and reference documents;
- 3) The significance testing of ID with a three SEID limit is less restrictive than the test level of two SEID specified in previous regulations. This is consistent with Category I facilities that use a three-SEID limit with a constraint on SEID of 0.10 percent of active inventory. The measurement quality constraint for Category II remains at 0.125 percent of active inventory for SEID. This change results in a reduction of unwarranted, disruptive, and costly investigations, reports, or responses to ID threshold actions;
- 4) An item control program for Category II facilities that is consistent with Category III facilities is added. Category II item control requirements are less costly than the more stringent Category I item monitoring program. The item control requirements mainly consist of providing current knowledge of location, identity, and quality of plant-wide items existing for at least 14 days. The performance-based program allows a licensee to propose its item control method and frequency;
- 5) The combined standard error concept and a de minimus quantity of plutonium and uranium in the evaluation of shipper-receiver differences are used. This is consistent with the requirements for Category I and III facilities in Part 74; and
- 6) The required frequency for the independent review and assessment of the facility's MC&A overall program is changed from annual to a minimum of 18 months. From a safeguards risk and graded approach perspective, this compares to the annual requirement for Category I and the every 2-year requirement for Category III.

CONCLUSION

The NRC has made changes to the final rule and provided risk-informed and performance-oriented regulatory bases for the MC&A requirements for Category II facilities. This consolidation of MC&A regulations is a significant stage toward NRC's regulatory reform goal of providing a graded approach to MC&A regulations while maintaining adequate safeguards measures. It also reduces the regulatory burden by making it easier for a licensee or applicant to identify the MC&A requirements that apply to its facility.