Draft Regulatory Analysis for Proposed Rule: Amendments to Material Control and Accounting Regulations (10 CFR part 74)

U.S. Nuclear Regulatory Commission

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Table of Contents

Executive Summary

The U.S. Nuclear Regulatory Commission (NRC or the Commission) is proposing to amend the Title 10 of the *Code of Federal Regulations* (10 CFR) part 74 material control and accounting (MC&A) regulations applicable to special nuclear material (SNM) and some source material. This rulemaking would consolidate the MC&A requirements currently in 10 CFR part 72 for independent spent fuel storage installations (ISFSIs) in 10 CFR part 74. Also, 10 CFR 150.17 (applicable to licensees located in Agreement States) would be changed to conform to 10 CFR 74.13. Other miscellaneous changes would also be made to 10 CFR part 74 requirements for Category III, II, and I facilities respectively in Subparts C, D, and E. Plain language revisions would also be made to 10 CFR part 74. Existing NUREG guidance documents would be revised to reflect these changes and a previously un-issued NUREG guidance document for Category II facilities would also be updated and included. References to due dates and reporting frequencies would be made more uniform by expressing such times in terms of calendar days. Section 74.4 would be amended by adding, removing, and modifying certain defined terms that are used throughout 10 CFR part 74.

The regulatory analysis examines the benefits and costs of the proposed changes to the requirements for general performance objectives, recordkeeping and submitting reports, written MC&A procedures, completing physical inventories, item controls, tamper-safing operations, and designating material balance areas and item control areas and custodial responsibilities for these areas. The analysis makes the following key findings:

- Total Cost to Industry. The proposed rule would result in a total one-time cost to licensees of approximately $169,000 to $193,000 followed by total annual costs of approximately $72,000 to $87,000. The analysis estimates the total present value of these costs to be approximately $678,000 to $802,000 (using a 7-percent discount rate) and approximately $787,000 to $933,000 (using a 3-percent discount rate) over the 10-year analysis period.

- Costs to the NRC. The rule would result in a one-time cost to the NRC of approximately $259,000, followed by no annual costs.

Decision Rationale. The NRC believes that the rule is cost-justified because the proposed regulatory initiatives would update, clarify, and strengthen the existing requirements, and thereby, promote the common defense and security.

Acronyms

ADAMS	NRC's Agencywide Documents Access and Management System
10 CFR	Title 10 of the *Code of Federal Regulations*
FNMC	Fundamental Nuclear Material Control
FTE	Full-Time Equivalent
GPO	General Performance Objective
NRC	U.S. Nuclear Regulatory Commission
SNM	Special Nuclear Material
ISFSI	Independent Spent Fuel Storage Installation
MC&A	Material Control and Accounting
MOX	Mixed Oxide
NMMSS	Nuclear Materials Management and Safeguards System
NUREG	Nuclear Regulatory Publication
OMB	Office of Management and Budget
ROP	Reactor Oversight Program

1. Introduction

The NRC is proposing to amend the 10 CFR part 74 MC&A regulations applicable to SNM. This rulemaking would consolidate the MC&A requirements currently in 10 CFR part 72 for ISFSIs in 10 CFR part 74. Also, 10 CFR 150.17 (applicable to licensees located in Agreement States) would be changed to conform to 10 CFR 74.13. No substantive changes would be involved. References to due dates and reporting frequencies would be made more uniform by expressing such times in terms of calendar days. Section 74.4 would be amended by adding, removing, and modifying certain defined terms that are used throughout 10 CFR part 74.

This analysis presents background material, rulemaking objectives, alternatives, and input assumptions, and it describes the consequences of the rule language and alternative approaches necessary to accomplish the regulatory objectives.

The remainder of this introduction is divided into two sections. Section 1.1 states the problem and the objective of the rulemaking. Section 1.2 provides background information.

1.1 Statement of the Problem and Objective of the Rulemaking

The Commission has directed the staff to revise and consolidate requirements for MC&A in 10 CFR part 74. The MC&A requirements for an ISFSI that are currently located in 10 CFR part 72 would be relocated in 10 CFR part 74. In addition, 10 CFR part 74 would be revised to make it clear what requirements apply to different types of facilities. The general provisions would be revised to include general performance objectives (GPOs) for the MC&A program that would apply to licensees authorized to possess SNM in a quantity greater than 350 grams. Some current exemptions in the regulations would be deleted or modified. The requirements in 10 CFR part 74 would be revised to include definitions for some new terms and to clarify the definitions of some terms. Other miscellaneous changes would also be made to 10 CFR part 74 requirements for Category III, II, and I facilities respectively in Subparts C, D, and E. Plain language revisions would also be made to 10 CFR part 74. Existing NUREG guidance documents would be revised to reflect these changes and a NUREG guidance document for Category II facilities would be developed.

1.2 Background

Many of the current MC&A requirements were developed over 20 years ago and have been considered over the past several years during self-assessment and operating experience activities completed by the NRC. A more risk-informed and performance-based approach is being considered for the requirements in 10 CFR part 74. The previous amendments to 10 CFR part 74 consolidated the MC&A requirements from 10 CFR part 70. All that remains to be moved are the requirements in 10 CFR part 72 that apply to a licensee operating an ISFSI. There are reporting requirements for the Nuclear Materials Management and Safeguards System (NMMSS) that are located in 10 CFR part 40 for source material. These requirements would not be moved as they are not applicable for SNM. There are also NMMSS reporting requirements in 10 CFR part 150 that apply to Agreement State licensees. These requirements would not be relocated to 10 CFR part 74. This rulemaking would complete the relocation process by including ISFSIs in the scope of 10 CFR part 74 and in the requirements for

submitting material status reports and nuclear material transaction reports to the NRC via the NMMSS. Conforming changes would remove the requirements from 10 CFR part 72 and refer to the MC&A requirements in 10 CFR part 74. The proposed reporting requirements for a licensee under 10 CFR part 72 would be essentially unchanged except that the requirements would be located in 10 CFR part 74.

Currently there are no GPO requirements for NRC-licensed facilities which are authorized to possess more than 350 grams of SNM, but which are not Category I, II, or III facilities. This rulemaking would revise Subpart A of 10 CFR part 74 to enlarge the set of NRC licensees who are subject to GPO requirements.

This rulemaking would add defined terms to 10 CFR part 74, modify some existing terms, and remove one defined term. Newly defined terms include: *accounting, custodian, item control system* and *item control area, material balance area,* and *material control and accounting*. Modified terms include, *formula quantity, special nuclear material of moderate strategic significance,* and *special nuclear material of low strategic significance*. For these classes of materials, 10 CFR part 74 would be revised to improve clarity of the requirements that apply to different types of facilities. These classes of materials would be designated respectively as a Category I quantity, a Category II quantity, and a Category III quantity. Also, a new appendix would be added to 10 CFR part 74: Appendix A, Categories of Special Nuclear Material, that includes a table showing the quantities for each category, the reference corresponding to the subpart in 10 CFR part 74 for each category, and formulae to calculate any combination of SNM in a quantity for a category. The term *Effective kilograms of special nuclear material* would be removed from 10 CFR part 74 and the requirements would simply refer to gram quantities. *Effective kilograms of special nuclear material* would remain as a defined term in 10 CFR parts 40, 70, 75, 76, and 110, to ensure the continued effective implementation of the U.S./International Atomic Energy Agency Safeguards Agreement.

Many of the references to due dates and reporting frequencies would be changed to calendar days, to make 10 CFR part 74 more uniform in this regard. Using calendar days avoids the existing uncertainty over whether weekends and holidays are counted in determining whether or not a licensee has taken timely action.

A new item control requirement would be added to Subpart B of 10 CFR part 74. Subparts C and D would be revised to remove some exemptions or modify requirements for item control of smaller quantities of SNM. Subparts C, D, and E would be revised to require certain procedures to be established for tamper-safing containers or locations and to require designation of material balance areas or item control areas. Plain language revisions would clarify an MC&A program and various systems that comprise the MC&A program. The term, MC&A plan would replace the term, Fundamental Nuclear Material Control (FNMC) plan. Conforming changes would be completed for associated guidance documents that are used by licensees and the NRC and interested members of the public.

2. Identification and Preliminary Analysis of Alternative Approaches

The following sections describe the two regulatory options that the NRC is considering in order to meet the rulemaking objective identified in the previous section. Section 3 presents a detailed analysis.

2.1 Option 1: No Action

Under Option 1, the no-action alternative, the NRC would not amend the current regulations at 10 CFR part 74. Current NRC regulations do not include GPO requirements for licensees authorized to possess more than 350 grams of SNM, but which are not Category I, II, or III facilities. Licensees under Subpart B are required to establish and follow written MC&A procedures but reactor licensees and ISFSI licensees are not required to implement item controls. Licensees under Subparts C and D (Category III and II facilities, respectively) are now exempt from certain item controls involving kilogram amounts of SNM. There is no tamper-safing requirement in Subpart C and licensees under Subpart E (Category I facilities) are not required to control access to unused tamper seals or account for seals. Licensees under Subparts C, D, and E are not required to designate material balance areas, item control areas, or custodians for these areas. Any future irradiated fuel reprocessing plant would currently be exempt from the Subpart E requirements.

The licensees would continue to comply with existing regulations. They may choose to voluntarily implement these practices that have been encouraged within the industry for many years. There are currently no facilities that are licensed to operate under Subpart D of 10 CFR part 74. The licensees operating under Subparts C and E have already implemented best practices which are similar to the proposed changes. Option 1 would avoid costs that the proposed rule would impose; however, the existing requirements would not be updated, clarified, or consolidated to improve security issues for facilities authorized to possess and use SNM that the NRC considers necessary to assure the common defense and security. Option 1, which is the no-action alternative, is the baseline for this regulatory analysis.

2.2 Option 2: Amend 10 CFR part 74

The changes listed below are consistent with Option 2 to revise and consolidate MC&A requirements in 10 CFR part 74.

- Relocate to 10 CFR part 74 the NMMSS-related reporting requirements for ISFSIs that currently exist in 10 CFR part 72. These requirements in 10 CFR part 72 duplicate requirements in existing Subpart B of 10 CFR part 74. In this regard, revisions are proposed to 10 CFR 72.72 and 72.74; 10 CFR 72.76 and 72.78 would be removed.

- Revise 10 CFR part 74 to make it clear what requirements apply to different types of facilities because although the Subpart B general provisions apply to almost all facilities that are authorized to possess and use SNM, some licensees and NRC staff have expressed confusion as to what requirements apply to a particular facility. To address this matter, the staff proposes to modify the 10 CFR part 74 definitions for *formula quantity, special nuclear material of moderate strategic significance*, and *SNM of low strategic significance* by conforming them to the existing definitions in 10 CFR parts 70 and 73, which clarify these classes of SNM respectively as Category I, II, and III quantities of strategic SNM. Licensees

authorized to possess Category I material are subject to the requirements in 10 CFR part 74, Subpart E, while licensees authorized to possess Category II or III material are subject to the requirements in Subpart D or C, respectively. To further clarify these divisions, the staff proposes to add Appendix A to 10 CFR part 74 – a table listing the Category I, II, and III quantities of strategic SNM, and the formulae used to calculate these quantities.

- Include GPOs that would apply to licensees authorized to possess more than 350 grams of SNM but which are not licensees authorized to possess Category I, II, and III quantities of material. Examples of GPOs include the need to confirm the presence of SNM and to resolve indications of missing material. The GPOs that would apply to all NRC licensees authorized to possess SNM in a quantity greater than 350 grams are stated in proposed 10 CFR 74.3.

- Add item control requirements in proposed 10 CFR 74.19(d) that would apply to reactor licensees under 10 CFR part 50 or 52 and ISFSI licensees under 10 CFR part 72. Item control exemptions would be removed from 10 CFR 74.31(c)(6), 10 CFR 74.33(c)(6), and 10 CFR 74.43(b)(6).

- Move the exemptions for sealed sources in 10 CFR 74.31(a)(1) and 10 CFR 74.41(a)(1). These exemptions exclude sealed sources from being used in calculating whether or not a facility possesses SNM of low strategic significance or SNM of moderate strategic significance, respectively. To clarify this point, these exemptions would be moved to Appendix A.

- Remove the existing exemption in 10 CFR 74.51(a) for an irradiated fuel reprocessing plant.

- Include definitions for some new terms and to clarify the definitions of some terms. In this regard, the staff proposes to add defined terms for *accounting, custodian, item control area, item control system, material balance area,* and *material control and accounting.*

- Strengthen requirements related to tamper-indicating device programs. Having a tamper-safing program is already required in Subparts D and E at 10 CFR 74.43(c)(3) and 74.59(f)(2), respectively, and similar tamper-safing requirements would be added to Subpart C in proposed 10 CFR 74.31(c)(9) for fuel fabrication facilities using SNM of low strategic significance and 10 CFR 74.33(c)(9) for uranium enrichment facilities.

Other miscellaneous changes would be made, including plain language revisions. These changes and revisions would replace the existing references to the FNMC Plan with references to an MC&A Plan. The staff's view is that FNMC is an outdated term and does not explicitly refer to "accounting." Thus, it does not fully describe the accounting aspects of the MC&A program.

The NUREG guidance documents listed below would be updated. A previously un-issued guidance document for a Category II facility would be updated and included with the guidance documents listed below.

1. NUREG-1280, Rev. 1 (1995), "Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment"

2. NUREG-1065, Rev. 2 (1995), "Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities"

3. NUREG/CR-5734 (1991), "Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities"

4. NUREG/BR-0096 (1992), "Instructions and Guidance for Completing Physical Inventory Summary Report"

The NRC has estimated the benefits and costs of this option, as described in Sections 3 and 4 of this regulatory analysis, and has pursued Option 2 for the reasons discussed in Section 5.

3. Estimation and Evaluation of Values and Impacts

This section describes the analysis that the NRC conducted to identify and evaluate the benefits (values) and costs (impacts) of the two regulatory options. Section 3.1 identifies the attributes that the staff expects the proposed rulemaking to affect. Section 3.2 describes how the values and impacts have been analyzed. Finally, Section 3.3 presents the detailed results of the projected impacts.

3.1 Identification of Affected Attributes

This section identifies the factors within the public and private sectors that the final rule is expected to affect, using the list of potential attributes in Chapter 5 of NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook," issued January 1997, and in Chapter 4 of NUREG/BR-0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," Revision 4, issued September 2004. The evaluation considered each attribute listed in Chapter 5 of NUREG/BR-0184. The basis for selecting those attributes is presented below.

Affected attributes include the following:

- Industry Implementation. The proposed changes would require certain licensees to implement general performance objectives, establish and follow written MC&A procedures, implement an item control system, and designate material balance areas and/or item control areas and custodial responsibilities for these areas. Certain items currently exempted from an item control program would be subject to item controls. An irradiated fuel reprocessing plant would no longer be exempted from the requirements for a Category I facility in 10 CFR part 74, Subpart E.

- NRC Implementation. Under the proposed action, the NRC would develop the proposed rule package to be published by the Office of the Federal Register and prepare the final

rule package that responds to comments from stakeholders and sets forth the final rule text for publication by the Office of the Federal Register. The NRC would revise guidance and inspection procedures to accommodate the requirements that would be added or modified by the rulemaking process.

- Industry Operations. The new 10 CFR 74.19(d) in subpart B would require licensees under 10 CFR part 50 or 52 and ISFSI licensees under 10 CFR part 72 to establish item control systems. Licensees would maintain material balance areas and/or item control areas and ensure custodial responsibilities are assigned to these areas. Certain items currently exempted from item control requirements would be tracked to maintain current knowledge of each item.

- NRC Operations. The proposed changes would include inspection and enforcement of requirements for certain licensees to adequately assure common defense and security of workers and members of the public from lost, missing, stolen, or diverted SNM. Inspectors would assess licensee implementation of the requirements noted above and operational activities noted above to maintain the MC&A program at licensee facilities. The NRC does not estimate any additional operating cost due to the proposed regulations because the routine inspection program is reviewed and updated at 3-year intervals and the proposed changes would be incorporated without increasing cost to the NRC to update procedures. The NRC inspection activities at a facility would include the proposed changes without increasing inspection effort.

- Security and Safeguards Considerations. The regulatory basis for 10 CFR part 74 is security and the information and data and the activities to manage the information and data ensure that an adequate level of safety and security over SNM is maintained.

Attributes that the rulemaking options would *not* affect include the following: occupational health (routine), occupational health (accidents), public health (routine), public health (accidents), regulatory efficiency, environmental considerations, general public, improvements in knowledge, offsite property, onsite property, antitrust considerations, and other Government regulations.

3.2 Analytical Methodology

This section describes the methodology used to analyze the consequences associated with the proposed rule. The values (benefits) include any desirable changes in the affected attributes. The impacts (costs) include any undesirable changes in the affected attributes.
As described in Section 3.1, the attributes expected to be affected include the following:

- Industry implementation
- Industry operation
- NRC implementation
- NRC operations
- Security and safeguards considerations

This analysis relies on a qualitative evaluation of one of the affected attributes (security and safeguards considerations) due to the difficulty in quantifying the impact of the current

rulemaking. This attribute would be affected by the regulatory options through the associated reduction in the risks of damage from malevolent use of SNM. Quantification would require estimation of factors such as: (1) the frequency of attempted theft or diversion, (2) the frequency with which theft or diversion attempts are (i.e., pre-rule) and will be (i.e., post-rule) successful, and (3) the impacts associated with successful theft or diversion attempts.

The NRC collected input assumptions using data and information from NRC workgroups and staff experience and NRC databases to estimate the costs associated with implementation and costs associated with annual operations of industry and the NRC.

In accordance with guidance from the Office of Management and Budget (OMB) and NUREG/BR-0058, Revision 4, this regulatory analysis presents the results of the analysis using both 3-percent and 7-percent real discount rates. The real discounted rates or present-worth calculation simply determines how much society would need to invest today to ensure that the designated dollar amount is available in a given year in the future. By using present-worth, costs and benefits, regardless of when averted in time, are valued equally. Based on OMB guidance (OMB Circular No. A-4, September, 17, 2003), present-worth calculations are presented using both 3-percent and 7-percent real discount rates. The 3-percent rate approximates the real rate of return on long-term government debt which serves as a proxy for the real rate of return on savings. This rate is appropriate when the primary effect of the regulation is on private consumption. Alternatively, the 7-percent rate approximates the marginal pretax real rate of return on an average investment in the private sector, and is the appropriate discount rate whenever the main effect of a regulation is to displace or alter the use of capital in the private sector. The NRC seeks public comments on the accuracy of these regulatory analysis assumptions and on the validity of the proposed rule's value and impact estimation methods.

3.2.1 Data and Assumptions

The analysis assumes that one-time implementation costs will be incurred in calendar year 2014. The analysis assumes that ongoing costs to revise and consolidate requirements for MC&A in 10 CFR part 74 related to the proposed rule will begin in 2013 and will be modeled on an annual cost basis. The analysis calculated cost and savings over a 10-year time horizon with each year's costs or savings discounted back at a 7-percent and 3-percent discount rate in accordance with NUREG/BR-0058, Revision 4. Costs and savings are expressed in 2012 dollars.

Data/Affected Entities

The analysis assumes that licensees of the following existing facilities will be affected by this rule:

- Reactor facilities licensed under 10 CFR part 50 or 52
- Industrial, academic, and research facilities licensed under 10 CFR part 70
- Category III- Enrichment Facilities licensed under 10 CFR part 70
- Category III- Fuel Fabrication Facilities licensed under 10 CFR part 70
- Category I- Fuel Fabrication Facilities licensed under 10 CFR part 70

- ISFSIs licensed under 10 CFR part 72

Within the next 10 years, the NRC expects to review an application for a medical isotope production facility. Such a facility, if licensed, would likely be a Category II facility that would be affected by this rule. In addition, within the next 10 years the NRC expects to issue licenses for new reactor facilities under 10 CFR part 52, however, none are expected to be new sites where no reactor facility is currently licensed to operate. A new reactor facility would not be impacted by this rule because the licensee at the site would have already implemented the rule and the operations at the site would already include an item control system.

Other Data and Assumptions

The analysis makes the following other assumptions:

- The NRC's labor rates are determined using the methodology in Abstract 5.2, "NRC Labor Rates," of NUREG/CR-4627, "Generic Cost Estimates, Abstracts from Generic Studies for Use in Preparing Regulatory Impact Analyses." This methodology considers only variable costs that are directly related to the implementation, operation, and maintenance of the proposed amendments. Currently, the NRC hourly labor rate is $119. The estimation of costs for rulemaking is based on professional NRC staff full-time equivalent (FTE).

- Licensee labor rates were obtained from National Wage Data available on the Bureau of Labor Statistics Web site (www.bls.gov). Depending on the industry and the occupation (e.g., manufacturing, health and safety, etc.), an appropriate mean hourly labor rate is selected. Because exact hourly rates would be difficult to obtain and may not be sufficiently recent, nationwide mean hourly rates are used. The bases for the labor rates are described below. The hourly cost was determined by multiplying the hourly labor rate by 1.5 to account for benefits (insurance premiums, pension, and legally required benefits). For licensee labor rates, $73.20/hour ($48.80/hour X 1.5) is used, which is from the Bureau of Labor Statistics Employer Costs for Employee Compensation data set, "Nuclear Engineers."

- The analysis assumes that the final rule will be published in September 2014 and would be effective in late-2014.

- The analysis calculated cost over a 10-year timeframe with each year's costs or savings discounted back at a 7-percent and 3-percent discount rate, in accordance with NUREG/BR-0058, Revision 4.
- To the extent practicable, quantitative information (e.g., costs and savings) and qualitative information (e.g., the nature and magnitude of impacts) on attributes affected by the rule were obtained from, or developed in consultation with, the NRC staff.

3.3 Detailed Results

This section presents a detailed estimate of the impacts for the proposed rulemaking (Option 2). Some values and impacts are addressed qualitatively for reasons discussed in Section 3.2. Exhibits 3-1, 3-2, 3-3, and 3-4 summarize these results.

Option 1: No Action

By definition, this option does not result in any values or impacts. The baseline for the Main Analysis is the No-Action Alternative. The baseline assumes full compliance with existing NRC requirements. This baseline is consistent with NUREG/BR-0058, which states that, "in evaluating a new requirement...the staff should assume that all existing NRC requirements have been implemented."

Option 2: Amend Regulations to Revise and Consolidate Requirements for MC&A of SNM in 10 CFR part 74

Sites licensed under 10 CFR part 50 currently perform MC&A activities, which include item controls, that may be routinely inspected under the Reactor Oversight Program (ROP) that is conducted by the NRC, Office of Nuclear Reactor Regulations (NRR). It is unclear to what extent the 10 CFR part 50 licensees have implemented item control systems similar to those proposed in the new 10 CFR 74.19(d) and are capable of quickly resolving indications of missing SNM. For example, a licensee may be capable of quickly and accurately listing all items and associated information. A licensee may be capable of securing their record system to guard against destruction or falsification of data. A licensee may be capable of demonstrating how it would investigate the evidence of missing or compromised items or item records and would quickly determine the status of an item. Because of uncertainty regarding the extent to which 10 CFR part 50 licensees have developed an item control system, similar to that required by the proposed rule, the NRC is using a full credit and no credit scenario to bound the regulatory analysis of impacts.

Consistent with NUREG/BR-0058, two sets of value-impact estimates are presented for Option 2. Option 2A is based on full credit, and Option 2B is based on no credit, being given for current industry actions related to one of the newly proposed requirements (implementing an item control system).

Option 2A: Full Credit Given for Current Industry Actions

<u>Industry Implementation</u>

Impact: Establish, Maintain Written MC&A Procedures

The proposed changes to 10 CFR 74.19(b) would require each licensee authorized to possess SNM, at any one time and site location, in a quantity greater than 350 grams of contained uranium-235, uranium-233, or plutonium, or any combination thereof, to establish, maintain, and follow written MC&A procedures that are sufficient to enable the licensee to account for the SNM in its possession under the license. It is estimated by the NRC that the changes would not impact any additional licensees. The NRC staff compared the current number of licensees subject to the current requirement with the number of licensees that would be subject to the proposed requirement which would reduce the threshold possession limit from one effective kilogram of SNM to a quantity greater than 350 grams of contained uranium-235, uranium-233, or plutonium, or any combination thereof and determined that no additional licensees would be affected by proposed 10 CFR 74.19(b).

Impact: Item Control System

The new 10 CFR 74.19(d) would require licensees under 10 CFR part 50 or 52 and ISFSI licensees under 10 CFR part 72 to establish, document, implement, and maintain an item control system as defined in § 74.4. There are 65 reactor sites with one or more reactor units that are licensed under 10 CFR part 50. The 65 reactor sites have already implemented their programs under existing requirements in 10 CFR part 74 to (1) establish MC&A procedures, (2) conduct physical inventories of the SNM at the site, (3) maintain records, and (4) make reports. Licensee performance is evaluated during routine inspections conducted under the ROP. Under this Option 2A full credit is given to these 65 reactor sites for having an item control system that would satisfy proposed 10 CFR 74.19(d). Thus, there would be no additional cost impact on these sites as a result of the proposed 10 CFR 74.19(d).

There are 63 stand-alone ISFSI licensees under 10 CFR part 72 that would be impacted by the proposed requirement. The staff estimated about 5 labor hours would be needed for each of the 63 ISFSI licensees to establish an item control system. The labor rate is $73.20 per hour. The one-time cost per licensee would be $366 and the total one-time cost to the industry would be $23,058.

Impact: Item Control Exemptions for Category III and II Facilities

The proposed changes to 10 CFR 74.31(c)(6) would require each Category III fuel fabrication facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for 14 days or less and individual items containing less than 500 grams of uranium-235 up to a total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact the three licensees that are currently operating Category III fuel fabrication facilities. The implementation time would be 250 hours at $73.20 per hour. The one-time cost per licensee would be $18,300 and the total one-time cost to the industry would be $54,900.

The proposed changes to 10 CFR 74.33(c)(6)(ii) would require each Category III enrichment facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for less than 14 days and individual items containing less than 500 grams uranium-235 up to a cumulative total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact two licensees that are operating enrichment facilities and two potential licensees that are constructing enrichment facilities that will be licensed to operate in the future. The implementation time would be 250 hours at $73.20 per hour. The one-time cost per licensee would be $18,300 and the total one-time cost to the industry would be $73,200.

The proposed changes to 10 CFR 74.43(b)(6) would require any future Category II facility to include currently exempted items in their item control system. The currently exempted items include items that exist for less than 14 calendar days and individual items containing less than 200 grams of plutonium or uranium-233 or 300 grams or more of uranium-235 up to a total of one formula kilogram of strategic SNM or 17 kilograms of uranium-235 contained in uranium enriched to 10.00 percent or more but less than 20.00 percent in the uranium-235 isotope. It is

estimated by the NRC that the changes would impact one potential licensee (e.g., a medical isotope production facility could be operating within 10 years) and the implementation time would be 250 hours at $73.20 per hour. The total one-time cost to the licensee and the industry would be at $18,300.

NRC Implementation

Impact: Develop Rule Package and Revise Guidance Documents

The NRC staff would develop the rule package and revise guidance and inspection procedures to accommodate the requirements that would be added or modified by the rulemaking process. This is an estimated $259,000 one-time cost to the NRC. This effort will require one-half FTE (1040 hours) for participating in the rulemaking activities and one-half FTE (1040 hours) to revise and update the guidance documents.

Industry Operation

Impact: Item Control System

The new 10 CFR 74.19(d) would require licensees under 10 CFR part 50 or 52 and ISFSI licensees under 10 CFR part 72 to establish, document, implement, and maintain an item control system as defined in § 74.4. Assuming sites with 10 CFR part 50 licenses have already implemented their programs to control and account for SNM at the sites, these licensees would not be impacted by the proposed requirement. The 63 ISFSI licensees, would be impacted by the proposed requirement, the annual time to perform these actions would be 3 hours per ISFSI. The annual cost at $73.20 per hour would be $220 per licensee and the total annual cost to the industry would be $13,835.

Impact: Item Control Exemptions for Category III and II Facilities

The proposed changes to 10 CFR 74.31(c)(6) would require each Category III fuel fabrication facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for 14 days or less and individual items containing less than 500 grams of uranium-235 up to a total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact these three licensees that are currently operating the Category III facilities. The annual time would be 100 hours. The annual cost at $73.20 per hour would be $7,320 per licensee and the total annual cost to the industry would be $21,960.

The proposed changes to 10 CFR 74.33(c)(6)(ii) would require each Category III enrichment facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for less than 14 days and individual items containing less than 500 grams uranium-235 up to a cumulative total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact two licensees that are operating enrichment facilities and two potential licensees that are constructing enrichment facilities that will be licensed to operate in the future. The annual time

would be 100 hours at $73.20 per hour. The annual cost per licensee would be $7,320 and the total annual cost to the industry would be $29,280.

The proposed changes to 10 CFR 74.43(b)(6) would require any future Category II facility to include currently exempted items in their item control system. The currently exempted items include items that exist for less than 14 calendar days and individual items containing less than 200 grams of plutonium or uranium-233 or 300 grams or more of uranium-235 up to a total of one formula kilogram of strategic SNM or 17 kilograms of uranium-235 contained in uranium enriched to 10 percent or more but less than 20 percent in the uranium-235 isotope. It is estimated by the NRC that the changes would impact one potential licensee and the annual time would be 100 hours at $73.20 per hour. The annual cost to the licensee and the industry would be $7,320.

Impact: Removal of Exemption in 10 CFR 74.51(a) for an Irradiated Fuel Reprocessing Plant

This proposed change would impact no licensees, because there are currently no operating irradiated fuel reprocessing plants.

NRC Operation

Impact: The amount of NRC inspection effort would not change. Inspectors would evaluate licensee implementation of the changes within the scope of the routine inspection program elements. The inspection procedures would be updated within the normal review and revision cycle.

Security and Safeguards Considerations

The NRC believes that the proposed regulatory initiatives would promote common defense and security by enhancing protection of SNM. The qualitative values or benefits of the proposed rule relate to the reduced risk of malevolent use of SNM that the NRC believes would be achieved as a result of implementing proposed requirements for item controls. The NRC is unable to quantify this reduction in risk due to factors such as: (1) the frequency of attempted theft or diversion; (2) the frequency with which theft or diversion attempts are and will be successful; and (3) the impact associated with successful theft or diversion. The benefits of the proposed requirements for item controls are discussed below in qualitative terms. The NRC realizes that the incremental increase in benefits is reduced to the extent that licensees are currently performing MC&A activities satisfactorily under the ROP. However, the NRC believes the net overall value realized would warrant the cost of the proposed rule to enhance regulatory effectiveness.

The NRC's regulations specify requirements for collecting and reporting information about SNM that is held by a licensee. The MC&A regulations ensure that the information about SNM is accurate, authentic, and sufficiently detailed to enable a licensee to maintain current knowledge of its SNM and manage its program for securing and protecting SNM. MC&A, together with physical protection of facilities and information security requirements, make up the primary elements of the NRC's SNM safeguards program.

For this regulatory analysis the NRC assumes security benefits for 2 of the proposed changes: the item control system and the removal of existing item exemptions.

With regard to the new item control system requirement in 10 CFR 74.19(d), security and safeguards would be enhanced by licensee efforts to maintain current knowledge of items. The new requirement would increase and maintain (1) the accuracy of inventory information that supports the resolution of discrepancies, (2) the protection against unauthorized removal or unrecorded removal of items or removal of SNM from an item, and (3) the capability of rapidly locating selected items.

Under Option 2A, full credit is given to 10 CFR part 50 licensees at the 65 reactor sites for having an adequate item control system in place to enhance their capabilities for security and safeguards as indicated in the previous paragraph, and therefore no benefit is assumed for the licensees. Benefit is assumed however for the 63 stand-alone ISFSI licensees under 10 CFR part 72 that would be required to periodically collect and verify the MC&A information recorded for the installation.

With regard to removing existing item control exemptions, the MC&A component of the larger safeguards program helps ensure that SNM within a fuel cycle facility is not stolen or otherwise diverted from the facility and promotes the NRC's strategic goal of maintaining adequate protection over the use and management of radioactive materials. Removing some of the currently allowed exemptions for item control for Category III licensees would require these licensees to collect and maintain additional MC&A information on these types of items and verify the information periodically.

Exhibit 3-1
Quantitative Results
Total Present Value for the Cost of Option 2A
With Full Credit Given for Current Industry Actions

	One-Time Implementation Costs	Annual Operating Costs	Total Combined Implementation and Annual Cost for 10-Year Period at 3% Discount Rate	Total Combined Implementation and Annual Cost for 10-Year Period at 7% Discount Rate
Industry Costs	$169,458	$72,395	$787,000	$677,929
NRC Costs	$259,420	$0	$259,420	$259,420
Total	$428,878	$72,395	$1,046,420	$937,349

Exhibit 3-2
Detailed Quantitative Results: Licensee Costs of Option 2A
With Full Credit Given for Current Industry Actions

CFR Citation	Description	Number of Licensees Affected	Labor Rate $/hr	Annual Hours per Licensee	Annual Cost per Licensee	Total Annual Cost	One-Time Implementation Cost per Licensee	Total One-Time Implementation Cost
74.19(b)	Written MC&A Procedures	0	$73.20	0	$0	$0	$0	$0
74.19(d)	Item Control System	63	$73.20	3	$220	$13,835	$366	$23,058
74.31(c)(6)	Item Control Exemptions	3	$73.20	100	$7,320	$21,960	$18,300	$54,900
74.33(c)(6)(ii)	Item Control Exemptions	4	$73.20	100	$7,320	$29,280	$18,300	$73,200
74.43(b)(6)	Item Control Exemptions	1	$73.20	100	$7,320	$7,320	$18,300	$18,300
Total						$72,395		$169,458

Option 2B: No Credit Given for Current Industry Actions

This value-impact estimate addresses the attributes that would change when no credit is given to industry for MC&A activities that are currently being performed to establish, implement, and maintain an item control system. There are 65 reactor sites with one or more reactor units that are licensed under 10 CFR part 50. Option 2A gives full credit for these licensees having an adequate item control system in place. Because of the uncertainty of knowing the extent to

which 10 CFR part 50 licensees have developed an adequate item control system, Option 2B assumes no credit for these licensees having an item control system in place.

As with Option 2A, Option 2B also assumes no credit for the 63 stand-alone ISFSI licensees under 10 CFR part 72 that would be impacted by the proposed requirement.

With no credit given for the current actions taken by the licensees to track and control SNM at the site, it is assumed that the only attributes that would change under Option 2B are the industry implementation, the industry operations, and the security and safeguards considerations.

Industry Implementation

Impact: Item Control System

Under Option 2B, the new 10 CFR 74.19(d) would require licensees under 10 CFR part 50 or 52 and ISFSI licensees under 10 CFR part 72 to establish, document, implement, and maintain an item control system as defined in § 74.4. The staff estimated about 5 labor hours would be needed for each of the 128 (65 reactor sites and 63 ISFSIs) licensees to establish an item control system. The labor rate is $73.20 per hour. The one-time cost per licensee would be $366 and the total one-time cost to the industry would be $46,848 and no credit would be given for the actions currently being taken by the licensees to track and control SNM at the site.

Industry Operation

Impact: Item Control System

Under Option 2B, the new 10 CFR 74.19(d) would require licensees under 10 CFR part 50 or 52 and ISFSI licensees under 10 CFR part 72 to establish, document, implement, and maintain an item control system as defined in § 74.4. The 128 licensees would be impacted by the proposed requirement, the annual time to perform these actions would be 3 hours per licensee. The annual cost at $73.20 per hour would be $220 per licensee and the total annual cost to the industry would be $28,109 and no credit would be given for the actions currently being taken by the licensees to track and control SNM at the site.

Security and Safeguards Considerations

The NRC believes that the proposed regulatory initiatives would promote common defense and security by enhancing protection of SNM. The qualitative values or benefits of the proposed rule relate to the reduced risk of malevolent use of SNM that the NRC believes would be achieved as a result of implementing proposed requirements for item controls. The NRC is unable to quantify this reduction in risk due to factors such as: (1) the frequency of attempted theft or diversion; (2) the frequency with which theft or diversion attempts are and will be successful; and (3) the impact associated with successful theft or diversion. The benefits of the proposed requirements for item controls are discussed below in qualitative terms. The NRC realizes that the incremental increase in benefits is reduced to the extent that licensees are currently performing MC&A activities satisfactorily under the ROP. However, the NRC believes

the net overall value realized would warrant the cost of the proposed rule to enhance regulatory effectiveness.

The NRC's regulations specify requirements for collecting and reporting information about SNM that is held by a licensee. The MC&A regulations ensure that the information about SNM is accurate, authentic, and sufficiently detailed to enable a licensee to maintain current knowledge of its SNM and manage its program for securing and protecting SNM. MC&A, together with physical protection of facilities and information security requirements, make up the primary elements of the NRC's SNM safeguards program.

For this regulatory analysis the NRC assumes security benefits for 2 of the proposed changes: the item control system and the removal of existing item exemptions. With respect to security benefits, the only difference between Option 2A and Option 2B is the benefit assumed to be gained under the proposed item control system requirement.

The primary qualitative benefit of the new item control system requirement in 10 CFR 74.19(d) is that security and safeguards would be enhanced at 128 sites that are licensed by the NRC (the 65 reactor sites and the 63 stand-alone ISFSIs). The licensees would be required to increase and maintain (1) the accuracy of inventory information that supports the resolution of discrepancies, (2) the protection against unauthorized removal or unrecorded removal of items or removal of SNM from an item, and (3) the capability of rapidly locating selected items.

Under Option 2B, no credit is given to 10 CFR part 50 licensees at the 65 reactor sites for having an adequate item control system in place to enhance their capabilities for security and safeguards as indicated in the previous paragraph, and therefore full benefit is assumed for the licensees. Option 2A assumes full benefit only for the 63 stand-alone ISFSI licensees under 10 CFR part 72 that would be required to implement and maintain an item control system to collect and verify the MC&A information recorded for the installation. Thus, the additional benefits under Option 2B are associated with the 65 reactor sites that would be required to implement and maintain item control systems for SNM at the sites.

Exhibit 3-3
Quantitative Results
Total Present Value for the Cost of Option 2B
With No Credit Given for Current Industry Actions

	One-time Implementation Costs	Annual Operating Costs	Total combined Implementation and Annual Cost for 10-year period at 3% discount rate	Total combined Implementation and Annual Cost for 10-year period at 7% discount rate
Industry Costs	$193,248	$86,669	$932,550	$801,973
NRC Costs	$259,420	$0	$259,420	$259,420
Total	$452,668	$86,669	$1,191,970	$1,061,393

Exhibit 3-4
Detailed Quantitative Results: Licensee Costs of Option 2B
With No Credit Given for Current Industry Actions

CFR Citation	Description	Number of Licensees Affected	Labor Rate S/hr	Annual Hours per Licensee	Annual Cost per Licensee	Total Annual Costs	One-Time Implementation Cost per Licensee	Total One-Time Implementation Cost
74.19(b)	Written MC&A Procedures	0	$73.20	0	$0	$0	$0	$0
74.19 (d)	Item Control System	128	$73.20	3	$220	$28,109	$366	$46,848
74.31(c)(6)	Item Control Exemptions	3	$73.20	100	$7,320	$21,960	$18,300	$54,900
74.33 (c)(6)(ii)	Item Control Exemptions	4	$73.20	100	$7,320	$29,280	$18,300	$73,200
74.43(b)(6)	Item Control Exemptions	1	$73.20	100	$7,320	$7,320	$18,300	$18,300
Total						$86,669		$193,248

4. Presentation of Results

4.1 Values and Impacts

This section summarizes the values (benefits) and impacts (costs) estimated for these regulatory options. (Section 3.3 presents a more detailed analysis) To the extent that the affected attributes could be analyzed quantitatively, the net effect of each option has been calculated and is presented in Exhibits 4.1 and 4.2. However, some values and impacts could be evaluated only on a qualitative basis.

The NRC has not quantified the values (benefits) associated with the proposed rule. The qualitative values of the proposed rule relate to security and safeguards considerations regarding an expected decrease in the risk of a security-related event, such as theft or diversion of SNM and the subsequent use of SNM for unauthorized purposes. Increasing the security of SNM decreases this risk and increases the common defense and security of the nation. The NRC realizes that the incremental increase in benefits is reduced to the extent that licensees are currently performing MC&A activities which are routinely inspected by the NRC under the ROP and which may already include an item control system to track and control SNM. However, the NRC believes the net overall value realized would warrant the cost of the proposed rule to enhance regulatory effectiveness by providing a baseline requirement for the expectation that a licensee would establish, implement, and maintain an item control system for purposes of information collection and reporting about items containing SNM.

Exhibit 4-1 summarizes the results of the value-impact analysis with full credit given for current industry actions (Option 2A) relative to the no-action alternative (Option 1). Option 2A would result in a net quantitative impact estimation of approximately $1.05 million at a 3-percent discount rate and $937,000 at a 7-percent discount rate. The qualitative benefits would include the enhancements to security and safeguards that are described in Section 3.3. It is assumed that there would be reduced qualitative benefit because licensees under 10 CFR part 50 at the 65 reactor sites are assumed to be currently performing MC&A activities which include tracking SNM at the site, which would constitute an adequate item control system.

Exhibit 4-2 summarizes the results of the value-impact analysis with no credit given for current industry actions (Option 2B), relative to the no-action alternative (Option 1).Option 2B would result in a net quantitative impact estimation of approximately $1.2 million at a 3-percent discount rate and $1.1 million at a 7-percent discount rate. The qualitative benefits would include the enhancements to security and safeguards that are described in Section 3.3. Under Option 2B, the full qualitative benefit would be realized for licensees under 10 CFR part 50 at the 65 reactor sites implementing the item control system that would be required by 10 CFR 74.19(d).

Exhibit 4-1
Summary of Impacts at Discount Rates of 3 Percent and 10 Percent for a 10-Year Period With Full Credit Given for Current Industry Actions (Option 2A)

Attribute	One-Time Implementation Costs	Annual Operating Costs	Total Combined Implementation and Annual Cost for 10-Year Period at 3% Discount Rate	Total Combined Implementation and Annual Cost for 10-Year Period at 7% Discount Rate
Industry Implementation	$169,458		$169,458	$169,458
Industry Operation		$72,395	$617,542	$508,471
Industry Total Costs			$787,000	$677,929
NRC Implementation	$259,420		$259,420	$259,420
NRC Total Costs			$259,420	$259,420
Total	$428,878	$72,395	$1,046,420	$937,349

Exhibit 4-2
Summary of Impacts at Discount Rates of 3 Percent and 10 Percent for a 10-Year Period With No Credit Given for Current Industry Actions (Option 2B)

Attribute	One-time Implementation Costs	Annual Operating Costs	Total Combined Implementation and Annual Cost for 10-year period at 3% Discount Rate	Total combined Implementation and Annual Cost for 10-year period at 7% Discount Rate
Industry Implementation	$193,248		$193,248	$193,248
Industry Operation		$86,669	$739,302	$ 608,725
Industry Total Costs			$932,550	$801,973
NRC Implementation	$259,420		$259,420	$259,420
NRC Total Costs			$259,420	$259,420
Total	$452,668	$86,669	$1,191,970	$1,061,393

5. Decision Rationale

The changes in this rulemaking are intended to consolidate MC&A requirements in 10 CFR part 74 and to clarify, revise, modify, and strengthen the existing requirements. The decision rationale is based on how the values and impacts have been analyzed. Relative to the no-action alternative, Option 2 would result in a one-time implementation cost to the industry of approximately $169,000 to $193,000 and a net annual cost to the industry of approximately $72,000 to $87,000. Offsetting the net cost, the NRC believes that Option 2 would result in substantial qualitative benefits, as discussed previously in Section 3.3. Although costs are incurred as a result of the rule, the qualitative benefits associated with the rule outweigh its cost. The NRC believes that the rule is cost-justified because the proposed regulatory initiatives would promote the common defense and security of SNM.

6. Implementation

The staff proposes to make the final rule effective 90 days after its publication in the *Federal Register*. For this analysis, the final rule effective date is late 2014.

7. References

- NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook, Final Report," U.S. Nuclear Regulatory Commission, Washington, DC, January 1997.
- NUREG/BR-0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," Revision 4, U.S. Nuclear Regulatory Commission, Washington, DC, September 2004.
- SECY-08-0059, Rulemaking Plan: part 74 - Material Control and Accounting of Special Nuclear Material, April 25, 2008.
- NUREG/CR-4627, "Generic Cost Estimates, Abstracts from Generic Studies for Use in Preparing Regulatory Impact Analyses."
- OMB Circular No. A-4, September, 17, 2003.
- Department of Labor (U.S.), Bureau of Labor Statistics. Occupational Employment Statistics, Occupational Employment and Wages.