



# REGULATORY GUIDE

## OFFICE OF NUCLEAR REGULATORY RESEARCH

### REGULATORY GUIDE 5.29

(Draft was issued as DG 5028, dated May 2012)

## SPECIAL NUCLEAR MATERIAL CONTROL AND ACCOUNTING SYSTEMS FOR NUCLEAR POWER PLANTS

### A. INTRODUCTION

#### Purpose

This guide describes a method that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable to implement special nuclear material control and accounting system requirements for nuclear power plants. This guide applies to all nuclear power plants.

#### Applicable Rules and Regulations

Title 10, of the *Code of Federal Regulations*, Part 74, “Material Control and Accounting of Special Nuclear Material” (10 CFR Part 74) (Ref. 1), Subpart B, “General Reporting and Recordkeeping Requirements,” establishes the material control and accounting performance requirements for special nuclear material at nuclear power plants. The regulations at 10 CFR 74.11, “Reports of loss or theft or attempted theft or unauthorized production of special nuclear material,” require, in part, that nuclear power reactor licensees notify the NRC of any such events within one hour of discovery. The regulations at 10 CFR 74.13, “Material status reports,” require nuclear power reactor licensees to submit material status reports for certain quantities of special nuclear material. The regulations at 10 CFR 74.15, “Nuclear material transaction reports,” require nuclear power reactor licensees to complete transaction reports when transferring, receiving, or making adjustments to specified quantities of special nuclear material. The regulations at 10 CFR 74.19, “Recordkeeping,” require, in part, that nuclear power reactor licensees keep records that show the receipt, inventory (including location and unique identity), acquisition, transfer, and disposal of all special nuclear material in their possession. Additionally, 10 CFR 74.19 requires, in part, that licensees establish, maintain, and follow written material control and accounting procedures, and that they conduct physical inventories of special nuclear material at intervals not to exceed once every 12 months.

#### Purpose of Regulatory Guides

The NRC issues regulatory guides to describe methods that the staff considers acceptable for use in implementing specific parts of the agency’s regulations, to explain techniques that the staff uses in evaluating specific problems or postulated accidents, and to provide guidance to applicants. Regulatory

---

Written suggestions regarding this guide or development of new guides may be submitted through the NRC’s public Web site under the Regulatory Guides document collection of the NRC Library at <http://www.nrc.gov/reading-rm/doc-collections/reg-guides/contactus.html>.

Electronic copies of this regulatory guide, previous versions of this guide, and other recently issued guides are available through the NRC’s public Web site under the Regulatory Guides document collection of the NRC Library at <http://www.nrc.gov/reading-rm/doc-collections/>. The regulatory guide is also available through the NRC’s Agencywide Documents Access and Management System (ADAMS) at <http://www.nrc.gov/reading-rm/adams.html>, under ADAMS Accession No. ML13051A421. The regulatory analysis may be found in ADAMS under Accession No. ML13051A418 and the staff responses to the public comments on DG-5028 may be found under ADAMS Accession No. ML13051A417.

---

guides are not substitutes for regulations and compliance with them is not required. Methods and solutions that differ from those set forth in regulatory guides will be deemed acceptable if they provide a basis for the findings required for the issuance or continuance of a permit or license by the Commission.

This regulatory guide provides ANSI N15.8-2009 as an acceptable approach to the NRC staff for complying with the NRC's regulations regarding material control and accounting requirements in Subpart B of 10 CFR Part 74 at nuclear power plants.

### **Paperwork Reduction Act**

This regulatory guide contains information collection requirements covered by 10 CFR Part 74 that the Office of Management and Budget (OMB) approved under OMB control number 3150-0123. The NRC may neither conduct nor sponsor, and a person is not required to respond to, an information collection request or requirement unless the requesting document displays a currently valid OMB control number.

## **B. DISCUSSION**

### **Reason for Revision**

Revision 1 to Regulatory Guide 5.29, "Nuclear Material Control Systems for Nuclear Power Plants," issued June 1975, (Ref. 2) found American National Standards Institute (ANSI) N15.8-1974, "Methods of Nuclear Material Control—Material Control Systems—Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants" as an acceptable method for implementing NRC's requirements for material control and accounting of special nuclear material at nuclear power plants. However, this standard primarily addressed control and accounting of fuel assemblies and did not address fuel rods that are separated from the parent assembly. Additionally, ANSI N15.8-1974 did not provide specific guidance on control and accounting of pieces resulting from fuel damage. The NRC, therefore, withdrew Regulatory Guide 5.29 in January 1998 (63 FR 2426). In the absence of endorsed guidance, licensees relied on site-specific procedures and processes to implement material control and accounting requirements, and licensee programs and procedures were reviewed by the NRC on a case-by-case basis. Subsequently, ANSI revised its standards for special nuclear material control and accounting and published ANSI N15.8-2009, "Methods of Nuclear Material Control—Material Control Systems—Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants" (Ref. 3). ANSI N15.8-2009 provides guidance on the control and accounting of 1) fuel rods that are separated from their parent assemblies; and 2) pieces of irradiated material that are separated as a result of fuel damage. Revision 2 is also consistent with the recommendations in U.S. Government Accountability Office 05-339, "NRC Needs To Do More To Ensure That Power Plants Are Effectively Controlling Spent Nuclear Fuel" (Ref 4).

### **Background**

Control and accounting for special nuclear material at a nuclear power plant are considerably less complex than at other facilities, such as fuel cycle facilities, because the material is usually maintained in the form of readily identifiable fuel assemblies that can be managed on a per-item basis. However, problems in control and accounting can arise when fuel rods become separated from the parent assembly. Maintaining proper control is necessary to ensure that licensed material is properly accounted for in a manner that provides continuity of control throughout the total fuel cycle.

The material control and accounting process is designed to use control and monitoring measures to prevent or detect loss when it occurs or soon thereafter. Additionally, statistical and accounting measures are used to maintain knowledge of the quantities of special nuclear material present in each area of a facility. Physical inventories and material balances are used to verify the presence of licensed material or to detect the loss of such material after it occurs, in particular, through theft by an insider.

### **Harmonization with International Standards**

The International Atomic Energy Agency (IAEA) has established a series of safety guides and standards constituting a high level of safety for protecting people and the environment. IAEA safety guides present international good practices and increasingly reflects best practices to help users striving to achieve high levels of safety. Pertinent to this regulatory guide, “IAEA Nuclear Security Series No. 13, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities,” issued January 2011, (Ref. 5) et. al. , address considerations necessary for a nuclear material security program. While the NRC has an interest in facilitating the harmonization of standards used domestically and internationally and because security requirements typically follow requirements identified in the CFR, the NRC does not specifically accept the IAEA document for use, and is only acknowledging that it may be valuable as a reference for general programmatic information. The NRC could consider the use of the international standard in a licensing action following adequate justification and technical review.

### **Documents Discussed in the Staff Regulatory Guidance**

This regulatory guide endorses the use of a voluntary consensus standard developed by an external organization. This standard may contain references to other codes or standards (“secondary references”). If a secondary reference has itself been incorporated by reference into NRC regulations as a requirement, then licensees and applicants must comply with that standard as set forth in the regulation. If the secondary reference has been accepted for use in a regulatory guide as an acceptable approach for meeting an NRC requirement, then the standard constitutes a method acceptable to the NRC staff for meeting that regulatory requirement as described in the specific regulatory guide. If the secondary reference has neither been incorporated by reference into NRC regulations nor endorsed in a regulatory guide, then the secondary reference is neither a legally-binding requirement nor a “generic” NRC approval as an acceptable approach for meeting an NRC requirement. However, licensees and applicants may consider and use the information in the secondary reference, if appropriately justified and consistent with current regulatory practice, consistent with applicable NRC requirements such as 10 CFR 50.59.

## **C. STAFF REGULATORY GUIDANCE**

The staff considers conformance with the provisions of ANSI N15.8-2009 an acceptable approach to meet the material control and accounting requirements in Subpart B of 10 CFR Part 74 at nuclear power plants.

## D. IMPLEMENTATION

This section discusses how applicants, licensees,<sup>1</sup> and the NRC staff may use this regulatory guide. The materials control and accounting activities addressed in this regulatory guide are not within the scope of matters subject to the requirements of the Backfit Rule (10 CFR 50.109) or any issue finality provisions in 10 CFR Part 52.

### Use by Applicants and Licensees

Applicants and licensees may voluntarily<sup>2</sup> use the guidance in this document to demonstrate compliance with the underlying NRC regulations. Methods or solutions that differ from those described or referenced in this regulatory guide may be deemed acceptable if they provide sufficient basis and information for the NRC staff to verify that the proposed alternative demonstrates compliance with the appropriate NRC regulations. Licensees may use the information in this regulatory guide for actions which do not require NRC review and approval. Licensees may use the information in this regulatory guide or applicable parts to resolve regulatory or inspection issues.

### Use by NRC Staff

The staff may discuss with licensees various actions consistent with staff positions in this regulatory guide, as one acceptable means of meeting the underlying NRC regulatory requirement. Such discussions would not ordinarily be considered backfitting even if prior versions of this regulatory guide are part of the licensing basis of the facility. However, unless this regulatory guide is part of the licensing basis for a facility, the staff may not represent to the licensee that the licensee's failure to comply with the positions in this regulatory guide constitutes a violation.

If an existing licensee voluntarily seeks a license amendment or change and (1) the NRC staff's consideration of the request involves a regulatory issue directly relevant to this new or revised regulatory guide, and (2) the specific subject matter of this regulatory guide is an essential consideration in the staff's determination of the acceptability of the licensee's request, then the staff may request that the licensee either follow the guidance in this regulatory guide or provide an equivalent alternative process that demonstrates compliance with the underlying NRC regulatory requirements.

This regulatory guide addresses compliance with the NRC's current material control and accounting regulations in 10 CFR Part 74. The NRC considers these requirements to be information collection and reporting, and therefore are not within the scope of matters covered by the Backfit Rule or the issue finality provisions of 10 CFR Part 52.

If a licensee believes that the NRC is either using this regulatory guide or requesting or requiring the licensee to implement the methods or processes in this regulatory guide in a manner inconsistent with the discussion in this Implementation section, then the licensee may file a backfit appeal with the NRC in accordance with the guidance in NUREG-1409, "Backfitting Guidelines," and NRC Management Directive 8.4, "Management of Facility-specific Backfitting and Information Collection."

---

<sup>1</sup> In this section, "licensees" refers to licensees of nuclear power plants under 10 CFR Parts 50 and 52; and the term "applicants," refers to applicants for licenses and permits for (or relating to) nuclear power plants under 10 CFR Parts 50 and 52, and applicants for standard design approvals and standard design certifications under 10 CFR Part 52.

<sup>2</sup> In this section, "voluntary" and "voluntarily" mean that the licensee is seeking the action of its own accord, without the force of a legally binding requirement or an NRC representation of further licensing or enforcement action.

## REFERENCES

1. 10 CFR Part 74, “Material Control and Accounting of Special Nuclear Material,” U.S. Nuclear Regulatory Commission, Washington, DC.<sup>3</sup>
2. Regulatory Guide 5.29, “Nuclear Material Control Systems for Nuclear Power Plants,” Revision 1, issued June 1975. U.S. Nuclear Regulatory Commission, Washington, DC.
3. ANSI N15.8-2009, “Methods of Nuclear Material Control—Material Control Systems—Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants,” American National Standards Institute, New York, NY, February 18, 2009.<sup>4</sup>
4. U.S. Government Accountability Office 05-339, “NRC Needs To Do More To Ensure That Power Plants Are Effectively Controlling Spent Nuclear Fuel.”<sup>5</sup>
5. NUREG 1409, “Backfitting Guidelines,” U.S. Nuclear Regulatory Commission, Washington, DC.
6. Management Directive 8.4, “Management of Facility-specific Backfitting and Information Collection,” U.S. Nuclear Regulatory Commission, Washington, DC.

---

<sup>3</sup> Publicly available NRC published documents are available electronically through the NRC Library on the NRC’s public Web site at <http://www.nrc.gov/reading-rm/doc-collections/>. The documents can also be viewed online or printed for a fee in the NRC’s Public Document Room (PDR) at 11555 Rockville Pike, Rockville, MD; the mailing address is USNRC PDR, Washington, DC 20555; telephone 301-415-4737 or (800) 397-4209; fax (301) 415-3548; and e-mail [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

<sup>4</sup> Copies of American National Standards Institute (ANSI) standards may be purchased from ANSI, 25 West 43<sup>rd</sup> St, 4<sup>th</sup> floor, New York, NY 10036; telephone (212) 642-4900 and fax (212) 398-0023. Purchase information is available at the ANSI web-based store at <http://webstore.ansi.org/>.

<sup>5</sup> Copies of this report are available electronically through the U.S. Government Printing Office web site at <http://www.gpo.gov/fdsys>.