

**Southern Nuclear
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U.S. Nuclear Regulatory Commission
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Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4 Combined License Application
Request for Additional Information Letter No. 064

Ladies and Gentlemen:

By letter dated March 28, 2008, Southern Nuclear Operating Company (SNC) submitted an application for combined licenses (COLs) for proposed Vogtle Electric Generating Plant (VEGP) Units 3 and 4 to the U.S. Nuclear Regulatory Commission (NRC) for two Westinghouse AP1000 reactor plants, in accordance with 10 CFR Part 52. During the NRC's detailed review of this application, the NRC identified a need for additional information, involving information related to material control and accounting of special nuclear material. By letter dated October 22, 2010, the NRC provided SNC with Request for Additional Information (RAI) letter No. 064 concerning this information need. Enclosure 1 to this letter provides the SNC response to this request. Enclosure 1 also includes a request for exemption from the requirements of § 70.22(b) [and, in turn, §§ 74.31, 74.41, and 74.51] as well as 70.32(c), such that the exceptions allowed in these regulations for nuclear reactors licensed under 10 CFR Part 50 will also be applied to those licensed under 10 CFR Part 52. Enclosure 2 provides a description of the planned Special Nuclear Material (SNM) Material Control and Accounting Program.

This letter identifies changes that will be made to a future revision of the VEGP Units 3 and 4 combined license application (COLA).

If you have any questions regarding this letter, please contact Mr. Wes Sparkman at (205) 992-5061.

DO92
NRO

Mr. C. R. Pierce states he is the AP1000 Licensing Manager of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Charles R. Pierce

C. R. Pierce

Sworn to and subscribed before me this 23rd day of November, 2010

Notary Public: Dana Marie Williams

My commission expires: 12/29/2010



CRP/DMW

Enclosures:

1. VEGP Units 3 and 4 COL Application - Response to NRC RAI Letter No. 064 Involving Material Control and Accounting of Special Nuclear Material
2. VEGP Units 3 and 4 Special Nuclear Material (SNM) Material Control and Accounting Program Description

cc: Southern Nuclear Operating Company

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Enclosure 1

VEGP Units 3 and 4 COL Application –

Response to NRC RAI Letter No. 064

Involving

Material Control and Accounting of Special Nuclear Material

NuStart Qb Tracking No. 4242

NRC eRAI No. 5144

VEGP RAI 01.05-03

Part 1, Section 1.1.4, Request Licenses and Authorized Use (Page 1-16): Review requirements of 10 CFR 70.22(b) for the program addressing the control and accounting of SNM and provide descriptions of how the applicable requirements for material accounting and controls under 10 CFR 74 will be met for the possession and storage of SNM during construction and prior to the operation of the nuclear power plant. In addition, provide a proposed license condition to clearly establish full implementation of the material control and accounting program meeting the applicable requirements of 10 CFR 74 prior to receipt of SNM, consistent and concurrent with the proposed license condition for implementing the applicable security (i.e., physical protection) requirements of 10 CFR 73.

Please revise Part 2, Section 1.9, Compliance with Regulatory Criteria, Table 1.9-204, Generic Communications Assessment, Bulletin 05-01, Material Control and Accounting at Reactors and Wet Spent Fuel Storage Facilities (Page 1.9-68) to align with the response. Specifically, cite the FSAR section that contains information that responds to the Bulletin.

Regulatory Basis: Title 10 CFR 70.22(b) states that "[e]ach application for a license to possess special nuclear material, to possess equipment capable of enriching uranium, to operate an uranium enrichment facility, to possess and use at any one time and location special nuclear material in a quantity exceeding one effective kilogram, except for applications for use as sealed sources and for those uses involved in the operation of a nuclear reactor licensed pursuant to part 50 of this chapter and those involved in a waste disposal operation, must contain a full description of the applicant's program for control and accounting of such special nuclear material or enrichment equipment that will be in the applicant's possession under license to show how compliance with the requirements of §§ 74.31, 74.33, 74.41, or 74.51 of this chapter, as applicable, will be accomplished." However, the current regulatory requirement of 10 CFR 70 does not provide an exception for a Part 52 combined license for construction and operation of a nuclear power plant, which does not distinguish between the possession and use of material licenses issued prior to operating a nuclear reactor and the possession and use of byproduct, source, or SNM (e.g., handling and storage of fuel assemblies) before completion of construction or anytime prior to operating a nuclear power reactor. If appropriate, an applicant may apply the requirements for operating reactors in accordance with 10 CFR 74.19 and describe additional requirements (e.g., 10 CFR 74. , , , etc.) that would satisfy the applicable requirements of 10 CFR 74 required for a material license pursuant to 10 CFR 70.22(b).

Response:

Southern Nuclear Operating Company (SNC) will develop and implement a Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program that meets the general reporting and recordkeeping requirements of Subpart B to 10 CFR Part 74. The COL application will describe this MC&A program. However, SNC requests an exemption from the requirements of 10 CFR § 70.22(b) and, in turn, §§ 74.31, 74.41, and 74.51. Section 70.22(b) requires an application for a license for special nuclear material to contain a full description of the applicant's program for material control and accounting (MC&A) of special nuclear material

under §§ 74.31, 74.33, 74.41, and 74.51¹. However, §§ 70.22(b), 74.31, 74.41, and 74.51 contain exceptions for nuclear reactors licensed under 10 CFR Part 50. Similarly, § 70.32(c) contains exceptions for nuclear reactors licensed under 10 CFR Part 50 from the requirements to maintain and follow certain SNM programs and procedures. A request for exemption similar to the exceptions for nuclear reactors licensed under 10 CFR Part 50 is described in the Associated COL Application Revisions section below. In accordance with the requested exemption, the requirements of 10 CFR Part 74, Subpart B, §§ 74.11 through 74.19, excluding § 74.17 will be applied to the SNM MC&A program.

All non-irradiated special nuclear material (SNM) for the AP1000 units is identified as Category III, SNM of low strategic significance, as defined in 10 CFR 74.4. No SNM at an AP1000 nuclear facility will exceed a uranium-235 isotope enrichment of 10 percent. The quantity of SNM will be documented, controlled, and communicated to the NRC as required in 10 CFR 74.13, 10 CFR 74.15, and 10 CFR 74.19(a) and (c).

A description of the SNM MC&A Program is provided in Enclosure 2 for inclusion as an enclosure in COLA Part 11. The SNM MC&A Program, which will be developed for control and accounting of SNM in accordance with the applicable requirements of 10 CFR Part 74, Subparts A and B, will be based on guidance provided in ANSI N15.8-2009, Material Control Systems – Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants. The SNM MC&A Program will be implemented prior to receipt of SNM at the plant site and will remain in effect until it is shipped from the plant site. The procedures constituting the SNM MC&A Program will delineate the requirements, responsibilities, and methods of SNM control necessary to address the following programmatic elements:

1. Establish, maintain, and follow written material control and accounting procedures to account for SNM.
2. Maintain adequate records of the initial receipt or current inventory of SNM, including records of isotopic content, material received, material shipped, and material lost (material balance reports and physical inventory listing reports).
3. Develop adequate inventory procedures and maintain adequate perpetual inventory records.
4. Inventory SNM within the 12-month prescribed frequency.
5. Report SNM inventories on the applicable forms.
6. Establish an individual responsible for the control and accountability of SNM.
7. Report the loss of or inability to find SNM items in a timely manner.
8. Control access to SNM.
9. Control the shipping and transfer of SNM.

A new FSAR subsection 13.5.2.2.9 will summarize the use of plant procedures to address material control and accounting of SNM. FSAR Table 1.9-204 will be revised to refer to FSAR subsection 13.5.2.2.9 for the discussion of plant procedures, such as those that address the processes that constitute the SNM MC&A Program, which was the subject of NRC Bulletin 05-01.

The above new FSAR section is in addition to the listing of sections addressing SNM identified in SNC's letter of July 9, 2010 (ND-10-1305), in response to NRC SER Open Item 01.05-01.

¹ While not containing an explicit exception for Part 50 reactors, § 74.33 applies only to uranium enrichment facilities and thus is not directly implicated in this exemption request.

While the Open Item only requested information on Parts 30 and 40, the listing of sections in the FSAR addressing the byproduct and source material is also applicable for Part 70 special nuclear material (note that the listings that identify the byproduct and source material also identify that they address the special nuclear material).

Table 13.4-201 will be revised to provide information related to implementation of the SNM MC&A Program.

In order to address the applicable 10 CFR Part 74 material control and accounting requirements prior to power operation, a license condition will be proposed to require implementation of a material control and accounting program prior to receipt of SNM on site. Implementation of the SNM MC&A Program prior to SNM receipt will also address the SNM possession and storage requirements during construction and prior to operation of the nuclear power plant.

As a result of the above discussed evaluation, the associated COL Application Revisions identified below will be included in a future COLA revision.

This response is expected to be STANDARD for each S-COLA.

Associated VEGP COL Application Revisions:

1. COLA Part 2, FSAR Chapter 1, Section 1.9, Table 1.9-204, Bulletin Number 05-01, Material Control and Accounting at Reactors and Wet Spent Fuel Storage Facilities, will be revised from:

Number	Title	Comment
05-01	Material Control and Accounting at Reactors and Wet Spent Fuel Storage Facilities	13.6

To read:

Number	Title	Comment
05-01	Material Control and Accounting at Reactors and Wet Spent Fuel Storage Facilities	13.5.2.2.9

2. COLA Part 2, FSAR Chapter 13, Section 13.4, Table 13.4-201, will be revised by adding a new Item # (where # is the next appropriate number designation) with a left margin annotation (LMA) of STD COL 13.4-1, as follows:

Program Title: SNM Material Control and Accounting Program

Program Source (Required by): 10 CFR 74, Subpart B (§§ 74.11 – 74.19, excl. § 74.17)

FSAR Section: 13.5.2.2.9

Implementation Milestone: Prior to receipt of special nuclear material

Implementation Requirement: License Condition

3. COLA Part 2, FSAR Chapter 13, Section 13.5, will be revised to add a new subsection 13.5.2.2.9 with an LMA of STD COL 13.5-1, as follows:

13.5.2.2.9 Special Nuclear Material (SNM) Material Control and Accounting Procedures

A material control and accounting system consisting of special nuclear material accounting procedures is utilized to delineate the requirements, responsibilities, and methods of special nuclear material control from the time special nuclear material is received until it is shipped from the plant. These procedures provide detailed steps for SNM shipping and receiving, inventory, accounting, and preparing records and reports. The Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program description is submitted to the Nuclear Regulatory Commission as a separate licensing basis document.

4. COLA Part 7, Departures, Exemptions, and Variances, Part B, will be revised to add the following exemption request (where # is the next appropriate exemption request number):

#. Special Nuclear Material (SNM) Material Control and Accounting Program Description

5. COLA Part 7, Departures, Exemptions, and Variances, Part B, will be revised to add the following discussion and justification for Exemption # (where # is the next appropriate exemption request number):

#) Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program Description [Part 70, Subpart D and Part 74, Subparts C, D, and E]

Applicable Regulation(s): 10 CFR §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51

Specific wording from which exemption is requested:

10 CFR 70.22(b), Contents of applications:

- (b) Each application for a license to possess special nuclear material, to possess equipment capable of enriching uranium, to operate an uranium enrichment facility, to possess and use at any one time and location special nuclear material in a quantity exceeding one effective kilogram, except for applications for use as sealed sources and for those uses involved in the operation of a **nuclear reactor licensed pursuant to part 50 of this chapter** and those involved in a waste disposal operation, must contain a full description of the applicant's program for control and accounting of such special nuclear material or enrichment equipment that will be in the applicant's possession under license to show how compliance with the requirements of §§ 74.31, 74.33, 74.41, or 74.51 of this chapter, as applicable, will be accomplished.

10 CFR 70.32, Conditions of licenses:

- (c) (1) Each license authorizing the possession and use at any one time and location of uranium source material at an uranium enrichment facility or special nuclear material in a quantity exceeding one effective kilogram, except for use as sealed sources and those uses involved in the operation of a **nuclear reactor licensed pursuant to part 50 of this chapter** and those involved in a waste disposal operation, shall contain and be subject to a condition requiring the licensee to maintain and follow:
- (i) The program for control and accounting of uranium source material at an uranium enrichment facility and special nuclear material at all applicable facilities as implemented pursuant to § 70.22(b), or §§ 74.31(b), 74.33(b), 74.41(b), or 74.51(c) of this chapter, as appropriate;
- (ii) The measurement control program for uranium source material at an uranium enrichment facility and for special nuclear material at all applicable facilities as

implemented pursuant to §§ 74.31(b), 74.33(b), 74.45(c), or 74.59(e) of this chapter, as appropriate; and

- (iii) Other material control procedures as the Commission determines to be essential for the safeguarding of uranium source material at an uranium enrichment facility or of special nuclear material and providing that the licensee shall make no change that would decrease the effectiveness of the material control and accounting program implemented pursuant to § 70.22(b), or §§ 74.31(b), 74.33(b), 74.41(b), or 74.51(c) of this chapter, and the measurement control program implemented pursuant to §§ 74.31(b), 74.33(b), 74.41(b), or 74.59(e) of this chapter without the prior approval of the Commission. A licensee desiring to make changes that would decrease the effectiveness of its material control and accounting program or its measurement control program shall submit an application for amendment to its license pursuant to § 70.34.

10 CFR 74.31, Nuclear material control and accounting for special nuclear material of low strategic significance:

- (a) General performance objectives. Each licensee who is authorized to possess and use more than one effective kilogram of special nuclear material of low strategic significance, excluding sealed sources, at any site or contiguous sites subject to control by the licensee, other than a production or **utilization facility licensed pursuant to part 50** or 70 of this chapter, or operations involved in waste disposal, shall implement and maintain a Commission approved material control and accounting system that will achieve the following objectives:

10 CFR 74.41, Nuclear material control and accounting for special nuclear material of moderate strategic significance:

- (a) General performance objectives. Each licensee who is authorized to possess special nuclear material (SNM) of moderate strategic significance or SNM in a quantity exceeding one effective kilogram of strategic special nuclear material in irradiated fuel reprocessing operations other than as sealed sources and to use this material at any site other than a **nuclear reactor licensed pursuant to part 50 of this chapter**; or as reactor irradiated fuels involved in research, development, and evaluation programs in facilities other than irradiated fuel reprocessing plants; or an operation involved with waste disposal, shall establish, implement, and maintain a Commission-approved material control and accounting (MC&A) system that will achieve the following performance objectives:

10 CFR 74.51, Nuclear material control and accounting for strategic special nuclear material:

- (a) General performance objectives. Each licensee who is authorized to possess five or more formula kilograms of strategic special nuclear material (SSNM) and to use such material at any site, other than a **nuclear reactor licensed pursuant to part 50 of this chapter**, an irradiated fuel reprocessing plant, an operation involved with waste disposal, or an independent spent fuel storage facility licensed pursuant to part 72 of this chapter shall establish, implement, and maintain a Commission-approved material control and accounting (MC&A) system that will achieve the following objectives:

Discussion:

Southern Nuclear Operating Company (SNC) requests an exemption from the requirements of 10 CFR § 70.22(b) and, in turn, §§ 70.32(c), 74.31, 74.41, and 74.51. Section 70.22(b) requires an application for a license for special nuclear material to contain a full description of the applicant's program for material control and accounting (MC&A) of special nuclear material under §§ 74.31, 74.33, 74.41, and 74.51¹. Section 70.32(c) requires a license authorizing the use of special nuclear material to contain and be subject to a condition requiring the licensee to maintain and follow a special nuclear material control and accounting program, measurement control program, and other material control procedures, including the corresponding records management requirements. However, §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51 contain exceptions for nuclear reactors licensed under 10 CFR Part 50. The regulations applicable to the MC&A of special nuclear material for nuclear reactors licensed under 10 CFR Part 50 are provided in 10 CFR Part 74, Subpart B, §§ 74.11 through 74.19, excluding § 74.17. The purpose of this exemption request is to seek a similar exception for this combined license (COL) under 10 CFR Part 52, such that the same regulations will be applied to the special nuclear material MC&A program as nuclear reactors licensed under 10 CFR Part 50.

Nuclear reactors licensed under Part 50 are explicitly excepted from the requirements of §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51. There is no technical or regulatory reason to treat nuclear reactors licensed under Part 52 differently than reactors licensed under Part 50 with respect to the MC&A provisions in 10 CFR Part 74. As indicated in the Statement of Considerations for 10 CFR § 52.0(b) (72 Fed. Reg. 49352, 49372, 49436 (Aug. 28, 2007)), applicants and licensees under Part 52 are subject to all of the applicable requirements in 10 CFR Chapter I, whether or not those provisions explicitly mention a COL under Part 52. This regulation clearly indicates that plants licensed under Part 52 are to be treated no differently than plants licensed under Part 50 with respect to the substantive provisions in 10 CFR Chapter I (which includes Parts 70 and 74). In particular, the exception for nuclear reactors licensed under Part 50, as contained in §§ 70.22(b), 70.32(c), 74.31, 74.41, or 74.51, should also be applied to reactors licensed under Part 52.

An exemption from the requirements of §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51 would not mean that a MC&A program would be unnecessary or that the COL application would be silent regarding MC&A. To the contrary, the MC&A requirements in Subpart B to Part 74 would still be applicable to the COL just as they are to licenses issued under Part 50. Additionally, the COL application will describe the MC&A program for satisfying Subpart B to Part 74.

This exemption request is evaluated under 10 CFR § 52.7, which incorporates the requirements of § 50.12. That section allows the Commission to grant an exemption if 1) the exemption is authorized by law, 2) will not present an undue risk to the public health and safety, 3) is consistent with the common defense and security, and 4) special circumstances are present as specified in 10 CFR § 50.12(a)(2). The criteria in § 50.12 encompass the criteria for an exemption in 10 CFR §§ 70.17(a) and 74.7, the specific exemption requirements for Parts 70 and 74, respectively. Therefore, by demonstrating that the exemption criteria in § 50.12 are satisfied, this request also demonstrates that the exemption criteria in §§ 52.7, 70.17(a) and 74.7 are satisfied.

¹ While not containing an explicit exception for Part 50 reactors, § 74.33 applies only to uranium enrichment facilities and thus is not directly implicated in this exemption request.

Evaluation Against Exemption Criteria

- 1) This exemption is not inconsistent with the Atomic Energy Act or any other statute and is therefore authorized by law.
- 2) An exemption from the requirements of 10 CFR §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51 would not present an undue risk to public health and safety. The exemption would treat the COL applicant similarly to Part 50 license applicants, who are excepted from the regulations in question. Furthermore, the COL application will contain a description of the applicant's MC&A program under Subpart B to Part 74. Therefore, the exemption from 10 CFR §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51 would not present an undue risk to public health and safety.
- 3) An exemption from the requirements of 10 CFR §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51 would not be inconsistent with the common defense and security. The exemption would treat the COL applicant similarly to Part 50 license applicants, who are excepted from the regulations in question. Furthermore, the COL application will contain a description of the applicant's MC&A program under Subpart B to Part 74. Therefore, the exemption from §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51 is consistent with the common defense and security.
- 4) The exemption request involves special circumstances under 10 CFR § 50.12(a)(2)(ii). That subsection defines special circumstances as when "[a]pplication of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule." Since the Commission determined that the requirements in 10 CFR §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51 are unnecessary for Part 50 applicants, those requirements are also unnecessary for Part 52 applicants.

As demonstrated above, the exemption complies with the requirements of 10 CFR §§ 50.12, 52.7, 70.17, and 74.7. For these reasons, approval of the requested exemption is requested from the regulations of 10 CFR §§ 70.22(b), 70.32(c), 74.31, 74.41, and 74.51, as described herein.

6. COLA Part 10, Proposed License Conditions, LC#3.C, Operational Program Implementation, Receipt of Materials, will be revised to include a new line item for implementation of an SNM material control and accounting program, as follows (where # is the next appropriate letter designation):

C.#. SNM Material Control and Accounting Program
7. COLA Part 11, Enclosures, will be revised by the addition of a new Enclosure 11.#, Special Nuclear Material Control and Accounting Program Description (where # is the next appropriate Appendix 11 letter designation). Enclosure 11.# is provided as Enclosure 2 to this letter.

Enclosure 2

VEGP Units 3 and 4

**Special Nuclear Material (SNM) Material Control and Accounting
Program Description**

This enclosure is a 9 page stand alone document.

Special Nuclear Material (SNM) Material Control and Accounting Program Description

1. Scope

The Special Nuclear Material (SNM) Material Control and Accounting Program establishes guidelines concerning control of and accounting for SNM at [the Southern Nuclear Operating Company (SNC) Vogtle Electric Generating Plant (VEGP) Units 3 and 4].

The criteria prescribed in the SNM Material Control and Accounting Program are applicable to SNM and various material mixtures containing SNM. Generally, the SNM involved is plutonium, ^{233}U , or uranium enriched in the isotope ^{235}U . The ^{235}U content will vary depending on various reactor parameters. SNM is typically in the form of pellets encapsulated in fuel rods. Criteria are established for the SNM control and accounting system, including criteria for the receipt, internal control, physical inventory, and shipment of SNM.

In addition to the information provided in this program description, the following VEGP Units 3 and 4 licensing basis documents provide the regulatory basis that describes how the applicable requirements for material control and accounting under 10 CFR 74 will be met:

- Information related to amounts of SNM as reactor fuel required for reactor operation is provided in FSAR Section 4.1.
- Information related to storage of SNM as reactor fuel is provided in FSAR Section 9.1.
- Information related to the organizational structure of the applicant, including those responsible for SNM material control and accounting, is provided in FSAR Section 13.1.
- Information related to training of personnel, including those responsible for SNM material control and accounting, is provided in FSAR Section 13.2.
- Information related to implementation of this SNM MC&A Program is provided in FSAR Table 13.4-201.
- Information related to plant procedures, including those used to control special nuclear material, is provided in FSAR Section 13.5.

2. Definitions

In this program description, the following definitions shall apply:

- 2.1. book inventory (inventory of record).** A master database or listing of all SNM currently possessed, reflecting the input of all material control records.
- 2.2. dry storage canister.** The smallest structurally discrete item containing fuel assemblies or fuel components, which is stored on an ISFSI pad within the area controlled by the owner.
- 2.3. fuel assembly.** The grouping of fuel components combined as an integral unit for use in a nuclear reactor.
- 2.4. fuel component.** The smallest structurally discrete part of a fuel assembly that contains SNM. This is normally a fuel rod for intact components, but includes rod

fragments, or pellets (or significant fraction thereof) if the rod structural integrity is not maintained.

- 2.5. fuel component container.** A container that provides protection to fuel components comparable to that afforded by an intact fuel assembly and that is held to the same accounting standards as a fuel assembly, in that the container has the following attributes:
- The container is specifically designed to contain rods/rod fragments;
 - The container is stored in the fuel storage racks; and
 - The use of specialized handling tools and equipment is required to access the SNM stored in the container.
- 2.6. Independent Spent Fuel Storage Installation (ISFSI).** A complex designed and constructed for dry interim storage of spent nuclear fuel.
- 2.7. item.** Fuel assembly, fuel component container, non-fuel SNM container, sealed container, reassembled reactor vessel, dry storage canister, or a discrete piece of SNM (fuel or non-fuel) that is not stored in a container.
- 2.8. item control area (ICA).** A defined area within the owner controlled area for which the SNM (fuel assemblies, fuel components, or non-fuel SNM) is maintained in such a way that, at any time, an item count and related SNM quantities can be obtained from the records for the SNM located within the area. ICAs have defined physical boundaries; these generally comprise fresh and irradiated fuel storage areas, including ISFSIs, reactor vessels, spent fuel pools, and non-fuel SNM storage areas.
- 2.9. item count (piece count).** Visual verification that an item is in the location documented in the material control records. Verification of an item's identification number is not necessary for a piece count.
- 2.10. material control records.** Records of SNM receipt, internal transfer, reconstitution, acquisition, inventory, and shipment (including disposal).
- 2.11. non-fuel SNM.** Items containing SNM that are not intended for use as fuel, e.g., fission detectors.
- 2.12. non-fuel SNM container.** A container used to store non-fuel SNM items, which has the following attributes:
- The container is specifically designed or evaluated for storage of SNM;
 - The container is stored in an area with controlled access; and
 - The use of specialized handling tools and equipment is required to access the SNM stored in the container.
- 2.13. physical inventory.** Determination on a measured basis of the quantity of SNM on hand at a given time; a complete check of all material on hand. The methods of physical inventory and associated measurements will vary depending on the material to be inventoried and the process involved. The typical physical inventory at a power reactor plant consists of an item count (piece count) of SNM in each ICA.

2.14. sealed container. Container storing SNM that has been sealed with a tamper-safing device or other mechanical means, e.g., welding.

2.15. special nuclear material (SNM). Plutonium, uranium-233, uranium enriched in the isotope ^{233}U or in the isotope ^{235}U , and any other material which the Nuclear Regulatory Commission (NRC), pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended, determines to be SNM.

2.16. tamper-safing. The use of a device on a container in a manner and at a time that ensures a clear indication of any violation of the integrity of the contents of the container.

3. Organizational Requirements

3.1. Delegation of Responsibilities and Authority

Material control functional and organizational relationships are set forth in writing in organizational directives, instructions, procedures, manuals, and other documents. Documentation includes position qualification requirements and definitions of authority, responsibilities, and duties. The assignment of SNM material control and accounting functions is such that the activities of one person or unit serve as a control over and a check of the activities of other persons or units. Activities involving handling, accounting, or control of SNM are verified by a second person. Specific assignments of responsibilities are prescribed for all facets of the SNM control system. Delegation of material control responsibilities and authority are in writing. Material control functions are assigned in accordance with 3.1.1 through 3.1.3.

Titles assigned to the positions are intended to be descriptive only. Organizations, specific titles, and related functions may vary.

3.1.1. [Site VP]

[The site VP has overall physical control and physical inventory responsibilities for SNM at the plant site.]

3.1.2. [Plant Manager]

[The plant manager has overall responsibility for implementation of the SNM control and accounting function.]

3.1.3. [SNM Custodian]

[The SNM custodian is responsible for the performance of the functions that relate to the control of SNM.]

3.2. Experience or Training

Personnel responsible for SNM control and accounting have experience or training applicable to their functions.

3.3. Accounting Group

[The SNM accounting group maintains records for the SNM in the plant's possession as required in 10 CFR 74.19(b).]

3.4. Vendor/Contractor Oversight

A program is established to provide adequate oversight of vendors/contractors conducting activities involving handling, accounting, and control of SNM.

4. Material Control and Accounting Program

4.1. Procedures

Written procedures are prepared and maintained covering the SNM control and accounting system, as required in 10 CFR 74.19(b). These procedures shall address, as a minimum, the following topics:

- (1) Organization and personnel responsibilities and authorities;
- (2) Designation and description of ICAs;
- (3) Material control records and reporting;
- (4) Notification for events concerning SNM;
- (5) Receiving and shipping SNM;
- (6) Internal transfer of SNM;
- (7) Physical inventory of SNM;
- (8) SNM element and isotopic calculation method; and
- (9) Characterization and identification of items as SNM or non-SNM to preclude loss of control of SNM items.

4.2. Configuration Control

Provisions are made for written approval of revisions to the contents of the SNM material control and accounting procedures by the appropriate plant personnel, such as the [plant manager].

4.3. Corrective Action Program

Discrepancies or program deficiencies are documented, investigated, reported, as required in 10 CFR 74.11 and 10 CFR 20.2201, and resolved using the [plant corrective action program].

5. Input Control

5.1. Review of Fuel Supplier's Values

[Nuclear Fuel Services] reviews the adequacy of the fuel supplier's material control and accounting system used in establishing the quantities and assays of SNM. In the event of a significant discrepancy between the fuel supplier's values for SNM quantities and assays and those determined by [SNC], the cause of such discrepancies are investigated with the fuel supplier and the differences are resolved and reconciled expeditiously.

5.2. Receipt of SNM

For SNM received at the plant site, [SNC]:

- (1) Contacts the shipping vendor in the event the SNM does not arrive as scheduled; initiates an investigation and resolves, as required in 10 CFR 73.67 and 10 CFR 74.11;

- (2) Verifies the integrity of the shipping container and tamper-safing devices and resolves any problems identified, as required in 10 CFR 73.67 and 10 CFR 74.11;
- (3) Verifies that the quantity (item count) and unique identification numbers are in agreement with those indicated on the shipper's documents;
- (4) Takes appropriate steps to resolve and reconcile any differences in quantities or identification numbers, as required in 10 CFR 73.67 and 10 CFR 74.11; and
- (5) Notifies the regulatory body, as required in 10 CFR 73.67 and 10 CFR 74.11.

5.3. Documentation

The SNM custodian reports the receipt of each item containing SNM, by serial number or other unique identifier, to the accounting group. The receipt of SNM is documented in the material control records and the book inventory updated for the applicable ICA, as required in 10 CFR 74.19(a). A Nuclear Material Transaction Report is completed, as required in 10 CFR 74.15.

6. Internal Control

6.1. Unit of Control

Units of SNM that require control are the items defined in paragraph 2.7. Each of these units are identified in the material control records by its serial number or other unique identifier (e.g., a physical description of the item) and location, as required in 10 CFR 74.19(a).

6.2. Item Control Areas

ICAs are established for physical and administrative control of SNM. The number of ICAs is sufficient to establish control.

6.3. Internal Transfers

Transfers of SNM into, out of, or within an ICA are accomplished only upon written authorization of the SNM custodian or other individual(s) at the plant site responsible for the SNM program. Written authorization is obtained prior to the movement. All transfers of SNM are documented using a material control record by the responsible person involved in each operation, and the book inventory is updated for the applicable ICA.

6.4. Non-SNM items

Non-SNM items stored with items containing SNM are clearly identified as such to preclude SNM items from being mistaken for non-SNM items.

6.5. Sealed containers

A container with a tamper-safing device can be treated as a single item for inventory purposes; however, before the container is closed and the tamper-safing device is installed, the contents are physically inventoried. If the contents of a sealed container are accessed, the contents will be physically re-inventoried or administrative procedures will be in place to establish the integrity of the contents before it can be treated as a single item for inventory purposes.

6.6. Damaged Cladding

Severe damage to cladding, where rod structural integrity has not been maintained, has the potential to result in inadvertent physical separation and dispersal of fuel components from the fuel rod. Upon visual identification of inadvertent physical separation, an estimate of the SNM quantity and an engineering judgment concerning the origin of the SNM will be made and documented. The amount of irretrievable or inadvertent loss will be reported, if the quantity is reportable, as required in 10 CFR 74.13. Methods used to estimate SNM quantities include, for example, engineering calculation, engineering judgment, physical measurement of length, destructive or non-destructive measurement, and count of the number of pellets retrieved or missing.

7. Physical Inventory

7.1. Conduct

Physical inventory is taken at intervals not to exceed 12 months, as required in 10 CFR 74.19(c). Physical inventory is conducted according to written inventory procedures, as required in 10 CFR 74.19(b).

7.2. Coverage

Physical inventory includes all SNM possessed under license and is conducted in all ICAs, including:

- (1) New fuel storage areas;
- (2) Irradiated fuel storage areas;
- (3) Reactors;
- (4) ISFSIs; and
- (5) Areas containing non-fuel SNM.

7.3. Inventory Method

An item count is conducted of all SNM, as required in 10 CFR 74.19(c).

7.3.1. Assemblies and Fuel Component Containers

For fuel assemblies and fuel component containers, an item count is sufficient. If the contents of an assembly or a fuel component container are accessed, the contents are physically reinventoried before the assembly or container can be treated as a single item for inventory purposes.

7.3.2. Fuel Components

For fuel components that are not part of an intact assembly, physically captured in an assembly, stored in a sealed container, or stored in a fuel component container, each component is inventoried.

7.3.3. Sealed Containers

For sealed containers, verification of the integrity of the tamper-safing device is sufficient.

7.3.4. Reactor

Whenever fuel assemblies are loaded into a reactor, the unique identifier and location of each item is visually verified. When the reactor vessel is reassembled, the reactor is considered one item for inventory purposes.

7.3.5. Non-fuel SNM

For non-fuel SNM, the method of physical inventory depends on the method of storage and use:

- For installed components, verification is performed at the time of installation, and administrative procedures and controls are established so that records concerning the location and unique identity are accurate.
- For non-installed components stored in primary containment, administrative procedures and controls are established so that records concerning the location and unique identity are accurate when the reactor is at power, and verification is performed during refueling outages.
- For non-fuel SNM containers, item count of the containers is sufficient. If the contents of the container are accessed, the contents are physically re-inventoried or administrative procedures are in place to ensure the integrity of the contents before the container can be treated as a single item for inventory purposes.

7.4. Reconciliation and Resolution

The physical inventory is reconciled to the book inventory. Discrepancies between the physical inventory and the book inventory are investigated and addressed expeditiously. The book inventory shall be adjusted to agree with the result of the physical inventory.

7.5. Documentation

The results of the physical inventory of SNM are documented in the material control records of the applicable ICA and utilized as input to the isotopic calculations. A Material Balance Report and Physical Inventory Listing Report are completed, as required in 10 CFR 74.13.

8. SNM Calculations

8.1. Element and Isotopic Computations

Methods of computation are established and utilized for determining the total element and isotopic composition of SNM in irradiated nuclear fuel assemblies and fuel components. The computed values are the basis for shipment documents, as required in 10 CFR 74.15, and material status reports, as required in 10 CFR 74.13.

8.2. Analysis of Results

Refinement of the element and isotopic computations used in determining the SNM content of irradiated fuel are considered as new technologies evolve. For reprocessed fuel, this may include a collection and comparison of reprocessing plant measurement data with computed data for fuel assemblies.

9. Output Control

9.1. Shipment

Procedures are established, as required by 10 CFR 74.19(b), to provide for:

- (1) Verification and recording of the serial number or unique identifier of each item containing SNM;
- (2) Recording of the quantities of SNM contained in each item;
- (3) Reporting the quantity of SNM shipped, if the quantity is reportable, as required in 10 CFR 74.15;
- (4) Verification of compliance with regulations, including licensing, transportation, and security requirements for shipment; and
- (5) Reporting the completion of each shipment to the accounting group

Care is taken to assure that SNM contained in fuel is not shipped inadvertently with shipments of non-fuel SNM waste.

9.2. Documentation

The shipment of fuel assemblies, fuel components, or non-fuel SNM is documented in the material control records and the book inventory updated for the applicable ICA. Nuclear Material Transaction Reports are completed, as required in 10 CFR 74.15.

9.3. Review and Audit of Reprocessing (Recycling) Measurements

For SNM being reprocessed, [SNC] or its representative:

- (1) Reviews the adequacy of the reprocessor's material control system used in establishing the quantities and assays of SNM, including written procedures;
- (2) Audits the implementation of the reprocessor's material control system used in establishing the quantities and assays of SNM, including observation of measurement and material control activities;
- (3) Audits the reprocessor's accounting activities, measurements, analyses, computations, and records affecting the determination of SNM quantities and assays; and
- (4) In the event of a significant discrepancy between the reprocessor's values for SNM quantities and assays and those determined by audit, investigates and reconciles any differences expeditiously.

10. Records and Reports

Records are created and retained, as required in 10 CFR 74.19(a). The accounting records are the basis for the material control and accounting program. Quantitative data generated by [SNC's] calculations of changes in quantities and isotopic composition due to irradiation and decay are recorded and reported in accordance with [SNC's] standard recording and reporting procedures. The records and reports system include:

- (1) An accounting system for maintaining the book inventory;
- (2) Material control records maintained for each ICA;
- (3) Reconciliation of the results of physical inventories to the book inventory;
- (4) Recording the transfer of SNM into or out of each ICA;

- (5) Recording movement of SNM between locations within an ICA, for ICAs where locations have been established;
- (6) Recording the creation of items containing SNM, such as creation of a rod fragment;
- (7) Recording the estimated quantity and origin of SNM which has been inadvertently separated from fuel upon the discovery of the separation;
- (8) Reporting to the accounting group the transfer of SNM into, within, or out of an ICA, if applicable;
- (9) Perpetual inventory records of each ICA, including the serial number or other unique identifier and location of each item in the ICA that contains SNM;
- (10) Historical data of SNM in each nuclear fuel assembly, fuel component, or non-fuel SNM item while in [SNC's] possession; and
- (11) Retention as required in 10 CFR 72 and 74.

11. System Review and Assessment

Reviews of the SNM program are conducted periodically. The results of the reviews are documented and reported in accordance with the requirements of the quality assurance or self-assessment program.

12. Physical Security

Protection of SNM is in accordance with the requirements of 10 CFR 73.67 and [SNC's] Physical Security Plan.