

**RULEMAKING ISSUE**  
(Notation Vote)

July 31, 2007

SECY-07-0126

FOR: The Commissioners

FROM: Luis A. Reyes  
Executive Director for Operations /RA/

SUBJECT: PROPOSED RULE: GEOLOGIC REPOSITORY OPERATIONS  
AREA SECURITY AND MATERIAL CONTROL AND  
ACCOUNTING REQUIREMENTS (RIN 3150-AI06)

PURPOSE:

To request Commission approval to publish a proposed rule, in the *Federal Register*, that would amend 10 CFR Parts 60, 63, 73, and 74. The proposed amendments would revise the security and material control and accounting (MC&A) requirements for a geologic repository operations area (GROA).

SUMMARY:

The staff has prepared a proposed rule (Enclosure 1) that would amend the current security and MC&A regulations for a GROA. The security requirements applicable to a GROA were developed under a previous and different threat environment. Currently, there is no distinction between the security and MC&A requirements for independent spent fuel storage installations (ISFSIs) and those for larger, more complicated geologic repositories for permanent disposal of high-level radioactive waste (HLW).

The goal of this rulemaking is to ensure that the protection of HLW and other radioactive material at a GROA will have effective security measures in place given the post-September 11, 2001, threat environment. New requirements for specific training enhancements, improved

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access authorization, and enhancements to defensive strategies would be incorporated. The proposed rule would also establish general performance objectives and corresponding system capabilities for the GROA MC&A program, with a focus on strengthening, streamlining, and consolidating into Part 74 all MC&A regulations specific to a GROA.

#### BACKGROUND:

The security requirements applicable to a GROA were developed prior to September 11, 2001, under a previous and very different threat environment. At the time the security provisions were established, the NRC used the same regulatory approach for protecting a GROA as that for protecting spent nuclear fuel (SNF) storage facilities licensed under 10 CFR Part 72. GROA operations, at least those conducted in surface facilities, seemed vulnerable to the same kinds of potential threats that were characteristic of the storage of SNF. The same level of protection was deemed sufficient to protect against acts that might be inimical to the common defense and security. The NRC's regulatory approach was predicated on maintaining the physical integrity of the SNF rods. In the event the physical integrity of the SNF rods could not be maintained, the staff planned to address the additional security measures that would be necessary by incorporating conditions into the license. The same reasoning applies to the MC&A requirements.

Potential surface operations at a GROA have become more complex over the years. For example, Department of Energy (DOE) has indicated that it now plans to include SNF handling operations within a spent fuel pool to transfer SNF from a non-TAD (transfer, aging, disposal) canister to a TAD canister, which would then be utilized for emplacement and permanent disposal of the SNF in the Yucca Mountain repository.

Because both the threat environment and the plans for surface operations at the GROA have changed, the NRC now believes that a separate regulatory approach for protecting and safeguarding a GROA is necessary. DOE has not set forth a final concept of operations for the GROA. Therefore, it is not clear what types of facilities would be part of the surface operations or what type of handling of the HLW within the surface facilities may occur.

While it is expected that the primary waste to be handled at a GROA is irradiated reactor fuel, it is possible that DOE may propose the storage of other types of radioactive waste. Therefore, the new security and MC&A requirements should be broad enough and sufficiently flexible to cover a range of possible types of non-HLW radioactive materials without the need for additional rulemaking. DOE, in its Final Environmental Impact Statement (FEIS) for a geologic repository at Yucca Mountain, considered the possibility that radioactive waste types other than SNF and HLW, such as Greater-Than-Class-C low-level radioactive waste (LLW) and Special-Performance-Assessment-Required LLW might be disposed of in a geologic repository. (See Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, February 2002, Vol. II, A-1, A-57 - A-64.) Disposal of such non-HLW could require new legislation or a determination by NRC that these wastes require permanent isolation. NRC is not making such a determination in this rulemaking. However, the security and MC&A requirements being proposed for a GROA take account of the possibility that the geologic repository might be used for the disposal of radioactive materials which are not SNF or HLW.

The staff had planned to conduct a combined rulemaking for both GROA and ISFSI security requirements beginning in fiscal year (FY) 2008. In an April 20, 2006, Staff Requirements Memorandum (M060315A), the Commission directed the staff to separate the rulemaking to specify post-September 11, 2001, security requirements for a GROA from the rulemaking to specify security requirements for ISFSIs (ML061100397). The Commission further directed the staff to begin the GROA rulemaking in FY 2007 and to provide a proposed rule to the Commission by July 2007. A future rulemaking will update ISFSI security requirements.

The security orders, as well as other ongoing security rulemakings, have been used as the basis for upgrading the GROA security requirements. Specifically, the security requirements for power reactors in the proposed rule entitled "Power Reactor Security Requirements" (71 FR 62664; October 26, 2006) are being used as the starting point for the proposed security requirements for a GROA. The proposed rule is both risk-informed and performance-based.

#### DISCUSSION:

The goal of this rulemaking is to ensure that effective security measures are in place for the protection of HLW and other radioactive material at a GROA given the post-September 11, 2001, threat environment. New requirements for specific training enhancements, improved access authorization, and enhancements to defensive strategies would be incorporated. The proposed rule would also establish general performance objectives and corresponding system capabilities for the GROA MC&A program, with a particular focus on strengthening, streamlining, and consolidating into Part 74 all MC&A regulations specific to a GROA. In addition, the emergency plan requirements would be changed to use the term "radiological emergencies" instead of "radiological accident." The term "radiological emergencies" is more inclusive of the type of situations that the emergency plan may need to address and is consistent with the language in § 63.21(c)(21).

#### Material Control and Accounting

As stated above, the proposed rule would establish general performance objectives and corresponding system capabilities for the GROA MC&A program, with a particular focus on strengthening, streamlining, and consolidating in Part 74 all MC&A regulations specific to a GROA. The current MC&A requirements for a GROA are largely records and reports-oriented and are scattered throughout Part 72. Conforming changes would relocate all MC&A GROA requirements in Part 74. In addition, the current regulations do not require DOE to submit an MC&A plan for NRC approval; DOE is only required to submit a description of the program. Parts 60 and 63 would be revised to require submittal of an MC&A plan for NRC approval. Under the proposed rule, DOE would be required to submit the MC&A plan, for NRC review and approval, no later than 180 days after the Commission issues the construction authorization.

A new Subpart F in Part 74 would be established that would contain the MC&A requirements specific to a GROA. The new requirements would include establishment of general performance objectives and internal control measures, e.g., comprehensive item control and physical inventory measures. Proposed objectives for the GROA MC&A program would center on detecting and responding to a potential loss of special nuclear material (SNM), including theft and diversion, commensurate with the strategic worth of the SNM. DOE would be required

to submit an MC&A plan describing how those objectives would be achieved through the implementation of specified system capabilities commensurate with safeguards risks. Under the proposed rule, DOE would not be required to conduct independent measurements on receipts. DOE would be allowed to accept the originator-assigned values for the SNM content; no routine nondestructive assay measurements of receipts would be required. However, DOE would be required to closely coordinate with originators (i.e., the utilities) to adequately understand the technical basis for assigning SNM content and the procedures which were followed for packaging and assuring item identification and integrity, e.g., reactor fuel burnup calculations, unique serial numbers, and the tamper-safing of canisters and shipment overpacts.

Some independent confirmatory measurements of the SNM content would be required, as warranted, for off-normal circumstances, e.g., in resolving certain types of anomalies that may arise and trigger investigations and special reporting of safeguards events, particularly in cases where item identity and integrity may have been compromised.

The MC&A program would have requirements for the licensee to be able to rapidly detect and respond to indications of SNM loss, including possible theft or diversion by an internal threat using collusion, stealth, and deceit. This would include a required collusion protection program that would incorporate checks and balances sufficient to thwart attempts to steal or divert SNM, and to detect falsification of records and reports that could conceal the theft or diversion of SNM. The design of such a detection and response capability would include an analysis of postulated SNM loss scenarios or conceivable ways and means through which clandestine attempts of theft, diversion, or other misuse might occur.

Additional measures are proposed for the situation if DOE were to receive formula quantities of strategic SNM that are in a form other than irradiated fuel or HLW. These additional measures include: (1) item monitoring features as specified in § 74.55; (2) alarm resolution as specified in § 74.57; (3) quality assurance and accounting capabilities as specified in § 74.59; (4) establishment of controlled areas for strategic SNM; and (5) semiannual physical inventories of all strategic SNM. These measures are currently required for licensees that possess formula quantities of strategic SNM.

The proposed MC&A requirements are based on experience with other NRC licensees and have been drawn from various relevant MC&A requirements for Categories I, II, and III SNM and from MC&A requirements for ISFSIs.

### Physical Security

The current security requirements are not clear on whether DOE would be required to submit its security plans for NRC approval. Under the proposed rule, DOE would be required to submit the plans, for NRC review and approval, no later than 180 days after the Commission issues the construction authorization. The proposed rule would establish a new § 73.53 that, with some exceptions, mirrors the proposed security requirements for power reactors. In addition, the proposed rule would establish a new § 73.56a (access authorization), § 73.71a (reporting of safeguards events), and new sections in Appendix B (training and qualification plan for security personnel), Appendix C (safeguards contingency plans), and Appendix G (reportable safeguards events) that mirror the proposed requirements for power reactors.

The current regulations in § 73.51 require a GROA to have a physical protection system that is designed such that a loss of control of the facility would not result in a radiation exposure exceeding 0.05 Sievert (5 rem) dose limit at the controlled area boundary. The regulations do not include language requiring DOE to protect against the design basis threat (DBT) for radiological sabotage or theft or diversion or to provide assurance that the activities involving HLW do not constitute an unreasonable risk against the common defense and security.

Under the proposed rule, the threat to a GROA is largely defined by specific security scenarios which represent the greatest threats against which GROA security forces must be able to defend, with high assurance of success. The consequences of radiological security events are highly dependent on the characteristics and packaging of the HLW and other radioactive materials and their location within a GROA.

The NRC is establishing physical security requirements that would be dependent upon the consequences of a potential radiological event. These physical security requirements would be based on five proposed protection levels. The highest protection level would be for waste containing strategic SNM with the protection system designed to protect the material against the DBT in § 73.1(a) for both theft or diversion and radiological sabotage. The next protection level would be for radioactive material that could result in a significant radiological sabotage event releasing radioactive materials in sufficient quantity such that any individual located at the lesser of the controlled area boundary or 400 meters from the source could receive a total effective dose equivalent equal to or greater than 0.25 Sv (25 rem). For these materials, the protection system must be designed to protect against the DBT for radiological sabotage. The third protection level would be for radioactive material that could result in a moderate radiological sabotage event releasing radioactive materials in sufficient quantity such that any individual located at the lesser of the controlled area boundary or 400 meters from the source could receive a total effective dose equivalent equal to or greater than 0.05 Sv (5 rem) but less than 0.25 Sv (25 rem). For these materials, the protection system must be designed to protect the material against radiological sabotage. The fourth protection level would be for all other radioactive material containing SNM. The physical protection system would be designed to protect the material against security-related events for theft and diversion. The lowest protection level would be for other solidified radioactive material and material that would meet the criteria in Appendix P to Part 110 (Category 1 and 2 Radioactive Material). The protective strategy for these materials would be equivalent to increased controls (i.e., prevent or impede removal, locate and prompt recovery, and mitigation of any potential consequence).

As noted above, a GROA would have a graded security measures approach based on the material, waste form, and operations within a particular facility at the GROA; therefore, depending on the material content, waste form, and consequence, the security measures may or may not rely on the DBT defined in § 73.1(a). The staff plans to develop a GROA-specific regulatory guidance document. This document would address adversary characteristics for the DBTs and describe details of the GROA security-related threats. This document would be controlled as safeguards information or classified information, as appropriate.

The key aspects of the security requirements for a GROA are comparable to the security requirements for similar types of NRC-licensed material and facilities. The proposed regulations would require an integrated security plan that would implement defense-in-depth concepts and protective strategies based on protecting target sets from various threat

scenarios. The requirements are performance based and include an access authorization program and a physical protection system to detect, delay, and respond to postulated threat scenarios in such a way that prevents or mitigates undesirable consequences of malevolent actions. The postulated threat scenarios include the theft or diversion of HLW and other waste containing SNM, as well as radiological sabotage. The access authorization program requirements include measures necessary to assure that personnel having critical safety or security functions or having access to certain nuclear materials remain trustworthy and reliable. The physical protection system requirements for detection measures include intrusion sensing, alarm communication, alarm assessment, and entry or access controls. Detection would be provided through the use of detection equipment, patrols, access controls, and other program elements required by this proposed rule. It also would provide notification to the licensee that a potential threat is present and where the threat is located. Alarm assessment is the mechanism through which the licensee obtains the information necessary to identify the nature of the threat detected and assess the threat to determine how to respond. There are access control requirements for personnel, vehicles, and hazardous materials. The requirements for delay measures include barriers to delay adversary actions to allow a timely response by security personnel. The requirements for responding to malevolent events allow DOE to develop effective response strategies to challenge intruders so they cannot accomplish actions that are necessary to achieving undesirable consequences. In some instances, the strategy may include neutralizing adversaries to deny access to the nuclear material. The proposed rule uses a risk-informed approach for response requirements that permits protective strategies to be tailored to the type of material being protected, the waste form, and the potential consequences of postulated threat scenarios.

Weapons Authorization. There are two ways weapons may be authorized for use at a GROA. First, Section 161A of the Atomic Energy Act of 1954 (AEA), as amended, allows the NRC to authorize licensees to use, as part of their protective strategies, an expanded arsenal of weapons, including machine guns. Section 161A was added to the AEA under the Energy Policy Act of 2005, signed into law on August 8, 2005. Secondly, under Section 161k. of the AEA, DOE has separate authority for authorization of weapons on any of its sites. DOE, under its own authority under Section 161k. of the AEA may authorize the use of an expanded weapons arsenal, limited arrest authority, and the use of force in accordance with DOE's current regulations under 10 CFR Part 1047. NRC does not plan to use its authority under Section 161A of the AEA to authorize the use of an expanded arsenal of weapons, but plans to allow DOE to rely on its authority under Section 161k.

Force-on-Force Exercises. Under the proposed rule, DOE would be required to conduct force-on-force exercises to test the effectiveness of DOE's protective strategies for the high-consequence target sets. The requirement for annual force-on-force exercises only applies to waste containing formula quantities of strategic SNM and significant radiological sabotage consequence target sets.

Access Authorization. New access authorization requirements would be proposed in a new § 73.56a that would contain requirements specific for a GROA. The requirements would be nearly identical to those proposed for power reactors (71 FR 62664; October 26, 2006). Facilities that possess large radiation sources, such as irradiated reactor fuels, are attractive targets for those who seek to commit radiological malevolent acts. Insiders who have unescorted access to facilities that possess such radiation sources, including a GROA, could

pose a threat to the public health and safety or the common defense and security because they may have the ability to commit radiological malevolent acts. Therefore, imposing access authorization requirements is a prudent security measure to ensure that individuals who are granted unescorted access to GROA: (1) are trustworthy and reliable; (2) do not impose an unreasonable risk to the health and safety of the public or the common defense and security (as a result of increasing the likelihood of an insider threat); and (3) do not pose a potential threat to commit radiological malevolent acts. Background investigations represent a key element of the access authorization program ensuring that individuals who have unescorted access to a GROA are trustworthy and reliable.

#### Fitness-for-Duty

The NRC staff had planned to include in the GROA proposed rule revisions to the fitness-for-duty provisions in Part 26. However, due to the publication timing of the fitness-for-duty final rule, we have decided to prepare a second proposed rule that will contain changes to Part 26 applicable to a GROA. This second proposed rule will be provided to the Commission after publication of the fitness-for-duty final rule. In the Part 26 currently in place, fitness-for-duty provisions apply to any licensee that is authorized to possess or use formula quantities of strategic SNM. Because a GROA may be authorized to possess formula quantities of strategic SNM, the fitness-for-duty regulations may apply to that extent. In making revisions to Part 26 in the fitness-for-duty final rule awaiting publication, there was an attempt to provide clarity on the scope of the rule in accordance with Goal 6 of that rule, which was to improve clarity in the organization and language of the rule. The focus appears to have been on existing facilities that were authorized to possess strategic quantities of SNM, and the wording was changed to apply to any Part 70 licensee that is authorized to possess formula quantities of strategic SNM. Because a GROA would not be licensed under Part 70, the fitness-for-duty provisions would no longer apply to a GROA. This omission was not intentional, and the second proposed rule would rectify the omission and would reinstate the fitness-for-duty provisions for a GROA. The drug and alcohol provisions of the fitness-for-duty regulations would be reinstated for the same types of individuals to which the provisions currently pertain. In addition, the NRC staff will be recommending that the fatigue provisions of the fitness-for-duty regulations apply to the security personnel at a GROA.

#### NRC Strategic and Performance Goals

The proposed rule is consistent with NRC's strategic objective and performance goals. The proposed rule would strengthen both the security and MC&A requirements ensuring the secure use and management of radioactive materials at a GROA. This proposed rule primarily improves security and safeguards and would have limited impact on the protection of the public health and safety. The rulemaking would result in greater effectiveness and efficiency for the licensing process for the proposed repository. By conducting a rulemaking instead of issuing an order, the process is being conducted in an open manner that allows participation by the public. There will be a 75-day public comment period. In addition, the staff is planning to hold a public meeting in Nevada during the public comment period to receive oral public comments.

Agreement State Issues

NRC staff has analyzed the proposed rule in accordance with the procedures established within Part III of the Handbook to Management Directive 5.9, "Categorization Process for NRC Program Elements." Staff has determined that the proposed rule is classified as Compatibility Category "NRC." The NRC program elements in this category are those that relate directly to areas of regulation reserved to NRC by the AEA, as implemented in the provisions of Title 10 of the *Code of Federal Regulations*.

COMMITMENT:

Listed below are the actions or activities committed to by the staff in this paper.

1. Hold a public meeting in Nevada during the public comment period to receive oral public comments.
2. Develop a security-related regulatory guidance document for a GROA.
3. Prepare a proposed rule to contain changes to Part 26 applicable to a GROA.

RECOMMENDATIONS:

That the Commission:

1. Approve for publication, in the *Federal Register*, the proposed amendments to Parts 60, 63, 73, and 74 (Enclosure 1).
2. Note:
  - a. That the proposed amendments will be published in the *Federal Register*, allowing 75 days for public comment.
  - b. That the Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification and the reasons for it, as required by the Regulatory Flexibility Act, 5 U.S.C. 605(b).
  - c. That a draft Regulatory Analysis has been prepared for this rulemaking (Enclosure 2).
  - d. That appropriate Congressional committees will be informed of this action.
  - e. That a press release will be issued by the Office of Public Affairs when the proposed rulemaking is filed with the Office of the Federal Register.
  - f. Office of Management and Budget review is not required.

RESOURCES:

To complete the rulemaking, 0.4 full-time equivalent positions (FTE) will be required for Office of Federal and State Materials and Environmental Management Programs, 1.0 FTE for the Office of Nuclear Security and Incident Response, 0.1 FTE for the Office of the General Counsel, and 0.4 FTE for the Office of Nuclear Material Safety and Safeguards in FY 2008. These resources for completing the rulemaking are included in the current budget. A security-related regulatory guidance document is planned. The resources for this document will be covered by the HLW funds.

COORDINATION:

The Office of the General Counsel has no legal objection to the proposed rulemaking. The Office of the Chief Financial Officer has reviewed this Commission Paper for resource implications and has no objections.

***/RA Martin J. Virgilio Acting For/***

Luis A. Reyes  
Executive Director  
for Operations

Enclosures:

1. *Federal Register* Notice
2. Draft Regulatory Analysis

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Enclosures:

1. *Federal Register* Notice
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