RULEMAKING ISSUE
(NEGATIVE CONSENT)

September 26, 2001 SECY-01-0178

FOR: The Commissioners

FROM: William D. Travers
Executive Director for Operations

SUBJECT: MODIFIED RULEMAKING PLAN: 10 CFR Part 72 -- "GEOLOGICAL AND SEISMOLOGICAL CHARACTERISTICS FOR SITING AND DESIGN OF DRY CASK INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS"

PURPOSE:

To request, by negative consent, Commission approval of the attached Modified Rulemaking Plan for amending certain sections in 10 CFR Part 72 dealing with seismic siting and design criteria for dry cask independent spent fuel storage installations (ISFSIs). The staff proposes modifications to the approved Rulemaking Plan, SECY-98-126, "Rulemaking Plan: Geological and Seismological Characteristics for the Siting and Design of Dry Cask Independent Spent Fuel Storage Installations, 10 CFR Part 72."

SUMMARY:

The Commission is amending certain sections in 10 CFR Part 72 dealing with seismic siting and design criteria for dry cask independent spent fuel storage installations (ISFSIs). The staff proposes modifications to the approved Rulemaking Plan, SECY-98-126, "Rulemaking Plan: Geological and Seismological Characteristics for the Siting and Design of Dry Cask Independent Spent Fuel Storage Installations, 10 CFR Part 72."

The Rulemaking Plan in SECY-98-126 provided three options. Option 3, recommended by the staff and approved by the Commission in its SRM to SECY-98-126, adopted the Probabilistic Seismic Hazard Analysis (PSHA) and also provided an option to use the risk-informed graded approach to seismic design for ISFSI SSCs. An additional change was recommended in SECY-98-126 to require that the design of cask storage pads and areas account for dynamic loads in addition to static loads for general licensees.

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After further consideration of the use of the graded approach in Option 3, the staff is recommending a fourth option that has been added to the attached Modified Rulemaking Plan. This new Option 4 retains the PSHA approach, described in Option 3, but provides for a single design earthquake ground motion rather than the graded approach in Option 3.

The Plan clarifies the applicability of the proposed changes to Part 72 general and specific licensees. Except as described above, the Modified Rulemaking Plan is consistent with all other aspects of the approved rulemaking plan in SECY-98-126.

BACKGROUND:

In a Staff Requirements Memorandum issued on June 24, 1998, in response to SECY-98-126, the Commission did not object to the staff's plan to develop a proposed rule for changing Part 72. The Rulemaking Plan, in SECY-98-126, would amend Part 72 to:

(1) Require new Part 72 applicants to use a probabilistic seismic hazard analysis (PSHA) approach (10 CFR 100.23) instead of the current deterministic approach (10 CFR Part 100, Appendix A) in determining the design earthquake ground motion.

(2) Allow for classification of systems, structures, and components (SSCs) that are important to safety into one of two different categories for earthquake designs, to account for the safety importance of the SSC and risk levels (risk-informed graded approach). SSCs whose failure would result in high accident consequences would be required to use a design earthquake equivalent to those used for SSCs of nuclear power plants (NPPs). SSCs whose failure would result in low accident consequences could be designed for a lower earthquake.

(3) Require that the design of cask storage pads and areas account for dynamic loads in addition to static loads.

In SECY-99-036, "Proposed Rulemaking Activity Plan," the staff informed the Commission of its intent to put this rulemaking activity on hold for higher-priority rulemakings, but to continue development of the technical basis. During the subsequent development of the technical basis, the staff determined that some of the changes proposed in the approved Rulemaking Plan required modification. The Modified Rulemaking Plan includes a new option to address these modifications.

DISCUSSION:

The Rulemaking Plan in SECY-98-126 provided three options. Option 1 took no action (maintained the current Part 72 requirements). Option 2 required the use of the PSHA approach as described in 10 CFR 100.23, in lieu of 10 CFR Part 100 Appendix A, for determining seismic design ground motion. Option 3 adopted the PSHA and also provided an option to use the risk-informed graded approach to seismic design for ISFSI SSCs. Option 3 was recommended by the staff. An additional change was recommended in SECY-98-126 to require that the design of cask storage pads and areas account for dynamic loads in addition to static loads for general licensees. After further consideration of the use of the graded approach in Option 3, the staff is recommending a fourth option, that has been added to the attached Modified Rulemaking Plan. This new Option 4 provides an alternative to the graded approach

for the seismic design of dry cask ISFSI SSCs. Except for incorporating an Option 4 and several minor editorial changes and clarifications, the rulemaking plan in SECY-98-126 has not otherwise been modified.

The Modified Rulemaking Plan clarifies the applicability of the proposed changes to Part 72 general and specific licensees. Applicants for a Part 72 specific license after the effective date of the rule for an ISFSI site, located in the western U.S. and not co-located with an NPP, must comply with the proposed changes. A Part 72 specific license applicant for an ISFSI site located in the western U.S. and co-located with an NPP has the option of using the proposed PSHA methodology for determining the design earthquake ground motion, or using the existing design criteria for the NPP. Where the existing design criteria for the NPP are used at sites with multiple NPPs, the criteria for the most recent NPP would be used. For all specific-license applicants, whose sites are located in the central and eastern U.S., the proposed changes are also optional. The proposed changes regarding the use of the PSHA method are not applicable to general licensees at existing NPPs operating an ISFSI under a Part 72 general license anywhere in the U.S. The proposed additional change, requiring that the design of cask storage pads and areas account for dynamic loads in addition to static loads, is applicable to general licensees for new ISFSIs after the effective date of the rule. Current practice already provides that specific licensees demonstrate that static and dynamic loads are considered.

The proposed changes also apply to the design basis of both dry cask storage ISFSIs and U.S. DOE monitored retrievable storage installations (MRS) because these facilities are similar in design. The Modified Rulemaking Plan uses the term “ISFSI” to include both ISFSI and MRS facilities. The staff does not intend to revise the Part 72 geological and seismological criteria as they continue to apply to wet storage facilities because of the greater consequences associated with the potential accident scenarios for these facilities.

In summary, the proposed changes related to the PSHA methodology are mandatory after the effective date of the rule for specific-license applicants for ISFSIs, located in the western U.S., and not co-located with a NPP. For all other dry cask storage specific-license applicants, the proposed changes are voluntary. The proposed additional change related to dynamic loads, is applicable to general licensees for new ISFSIs designed after the effective date of the rule.

Option 4 proposes changing Part 72 as follows:

<u>OPTION 4:</u>

(1) Require certain Part 72 applicants (as described above) to comply with a new 10 CFR 72.103 (use of PSHA based on 10 CFR 100.23, as described in Options 2 and 3), in lieu of 10 CFR 72.102(f), which requires the use of Part 100, Appendix A.

(2) Maintain the present Part 72 requirement of using a single-level design earthquake, but with a lower design earthquake ground motion that is commensurate with the level of risk associated with an ISFSI.

Item 1 of Option 4 differs slightly from that previously approved by the Commission in the Rulemaking Plan (SECY-98-126). It adds a new section in Part 72 that is based on 10 CFR

100.23, instead of referencing 10 CFR 100.23. This will make Part 72 independent of Part 100. The staff believes this is aligned with NRC's plain language initiative. Item 2 is a change to the approved Rulemaking Plan and is discussed further in the following sections. Detailed guidance for the use of Option 4 will be provided in a guidance document for ISFSI applicants that will be published as a draft document concurrently with the proposed rule.

The staff evaluated the recommendations related to the graded approach and concluded that the use of two earthquake levels for an ISFSI facility should be revised. A modified approach, using a single-level design earthquake with a ground motion that is commensurate with the level of risk associated with an ISFSI, has been added to the Modified Rulemaking Plan as Option 4. The current Part 72 regulations are based on the use of a single-level design earthquake. However, Option 4 uses a lower design earthquake ground motion than those used in the current Part 72 and in Option 3 for SSCs whose failure would result in greater accident consequences. The Modified Rulemaking Plan is consistent with all other aspects of the approved Rulemaking Plan. The basis for this change is summarized below and discussed in more detail in the Modified Rulemaking Plan.

The staff recognized that because SSCs important to safety in an ISFSI facility are few relative to those in an NPP, the use of a graded approach for classifying ISFSI SSCs into one of two different categories for earthquake designs would not benefit applicants and could unnecessarily increase the complexity in applications, without a commensurate improvement to safety.

In comparison to NPPs, an operating ISFSI facility is a relatively simple facility in which the primary activities are waste receipt, handling, and storage. An ISFSI facility does not have the variety and complexity of active systems necessary to support an operating NPP. After the spent fuel is in place, an ISFSI facility is a static operation. During normal operations, the conditions required for the release and dispersal of significant quantities of radioactive materials are not present. Temperatures and pressures are relatively low during normal operations or even under design basis accident conditions; therefore, the likelihood of release and dispersal of radioactive materials is low primarily due to low heat generation rates of spent fuel with greater than the required one year of decay before storage in an ISFSI, combined with low inventory of volatile radioactive materials readily available for release to the environs. The long-lived and potentially biologically hazardous materials present in spent fuel are tightly bound up in the fuel materials and are not readily dispersible. The short-lived volatile nuclides, such as I-131, are no longer present in aged spent fuel (e.g., cooled at least one year). Furthermore, even if the short-lived nuclides were present during an event of a fuel assembly rupture, the canister surrounding the fuel assemblies would confine these nuclides. The radiological risk associated with an ISFSI facility is significantly less than the risk associated with an NPP, and therefore, the use of a lower design earthquake ground motion is appropriate.

The Commission explained in the Statement of Considerations accompanying the initial Part 72 rulemaking that "[f]or ISFSI's which do not involve massive structures, such as dry storage casks and canisters, the required design earthquake will be determined on a case-by-case basis until more experience is gained with the licensing of these types of units." [45 FR 74697 (1980)]. With more than 10 years of experience licensing dry cask storage systems, together with analyses demonstrating their robust behavior in accident scenarios involving earthquakes,

the staff concludes that designing ISFSI SSCs using a single-level design earthquake with a ground motion that is commensurate with the level of risk associated with an ISFSI, is sufficient to provide reasonable assurance in demonstrating protection of public health and safety.

The use of a lower design earthquake ground motion is consistent with the Commission's approval of the U.S. Department of Energy's (DOE's) request for an exemption from 10 CFR 72.102(f)(1) for a proposed ISFSI at the Idaho National Engineering and Environmental Laboratory (INEEL). In its evaluation of the request to lower the design earthquake ground motion, the NRC staff considered the relative risk posed by the ISFSI. Considering the minor radiological consequences expected from a cask failure resulting from a seismic event and the lack of a credible mechanism to cause such a failure, the staff believed that the design earthquake proposed by DOE for dry storage facilities at INEEL was conservative. The design earthquake level proposed in the Modified Rulemaking Plan is the same as the design earthquake level used as the basis for approving DOE's request for an exemption. Furthermore, the staff notes that the proposed Option 4, as it relates to the design basis earthquake level, is consistent with DOE Standard 1020, "Natural Phenomena Hazards Design Evaluation Criteria for Department of Energy Facilities" for similar type facilities.

As demonstrated in the Modified Rulemaking Plan, the probability of exceeding the lower design earthquake event at an ISFSI facility with an operational period of 20 years is the same as the probability of exceeding the higher design earthquake event at the pre-closure facility at Yucca Mountain with an operational period of 100 years. Therefore, the probability of failure of an SSC important to safety is the same for these two types of facilities over their respective operational periods. In this respect, the proposed changes to Part 72 are consistent with the requirements of 10 CFR Parts 60 and 63.

The approach in the Modified Rulemaking Plan and the graded approach in Parts 60 and 63, as recommended in SECY-98-126, are similar in that they are both risk-informed. However, for ISFSI applications, the staff determined that maintaining the current Part 72 approach of a single design basis event is more appropriate than the use of the graded approach because of the relative simplicity of the ISFSI design and operation.

APPLICATION OF THE SCREENING CRITERIA FOR RISK-INFORMING NMSS REGULATORY ACTIVITIES:

The Office of Nuclear Material Safety and Safeguards (NMSS) has developed a set of screening criteria to identify NMSS regulatory activities amenable to increased use of risk information. The staff applied the criteria to the proposed changes in the Modified Rulemaking Plan to determine if the risk-informed approach of lowering the design earthquake to a level that is commensurate with the lower risk associated with an ISFSI should be implemented. The proposed changes satisfy the screening criteria because they: (1) improve efficiency and effectiveness of the NRC regulatory process by eliminating the need for applicants to request exemptions from 10 CFR 72.102(a), 72.102(b), and 72.102(f)(1) (similar to DOE's request for the ISFSI at INEEL), and the need for NRC to review the exemption requests; (2) reduce unnecessary regulatory burden for the applicant or licensee by reducing the design earthquake level to account for the lower risk associated with ISFSI facilities; (3) can be supported by analytical models that evaluate the seismic behavior of a cask; (4) would not result in significant start-up or implementation costs to NRC and applicants, other than technical training and further development of analytical models; and (5) do not involve other factors, with the

exception of potential adverse stakeholder reaction as can be the case when using risk-informed approaches. Satisfying these criteria supports the implementation of the proposed risk-informed approach.

NRC STRATEGIC GOALS:

The staff considered the merits of the rulemaking within the context of the performance goals listed in the Agency's strategic plan. The rulemaking effort would increase NRC's effectiveness and efficiency and reduce unnecessary regulatory burden by reducing the number of exemption requests that would need to be submitted and reviewed. This rule would maintain safety by selecting the design earthquake level to be commensurate with the risk associated with an ISFSI. The changes to the design earthquake level are considered risk-informed, consistent with NRC policy to develop risk-informed regulations. This rule would increase realism by enabling ISFSI applicants to use the state-of-the-art approach to more accurately characterize the seismicity of a site. Public confidence may be adversely affected because the proposed risk-informed approach lowers the design earthquake level commensurate with the lower risk of an ISFSI facility.

COORDINATION:

The Office of the General Counsel has no legal objection to the modified rulemaking plan. The Office of the Chief Financial Officer has no objection to the resource estimates contained in this paper. However, the plan suggests changes in information collection requirements that must be submitted to the Office of Management and Budget before publication of the proposed rule.

SCHEDULE:

The staff believes that an expedited schedule for this rulemaking is appropriate. As a result of current activities being conducted by the NRC, the staff believes that expediting this rule would enhance the licensing process by potentially reducing exemption requests. It is anticipated that the need for new ISFSI facilities in the Western U.S. will continue to grow as the need for spent fuel storage increases. As a result, the staff expects to receive ISFSI licensing requests in the near future. In addition, the Commission has previously approved an exemption request for the storage of TMI-2 fuel at the Idaho National Engineering and Environmental Laboratory, based on an approach similar to that of the preferred option in the modified rulemaking plan. The staff has received a similar request for exemption by another ISFSI applicant (Private Fuel Storage, L.L.C.) which is currently the subject of an adjudicatory proceeding, referred to in CLI-01-12, 53 NRC ___ (June 14, 2001).

RESOURCES:

If the Commission directs the staff to go forward with Option 1, no additional resources would be required. Option 2 would cost 1.6 full-time equivalents (FTEs) and approximately $65,000 for technical support spread out over 2 years. For Option 3 and recommended Option 4, which includes the development of regulatory guidance, 3.8 FTE and approximately $200,000 for technical support would be required spread over fiscal years 2001 and 2002. Technical support will be used to assist in the development of the proposed and final rule and related guidance documents.

SECY-98-126 estimated 2.1 FTE and $100,000 would be needed to complete the rulemaking. During the development of the Modified Rulemaking Plan, the staff determined that an increase in rulemaking complexity beyond what was anticipated in SECY-98-126, an expected increase in stakeholder involvement, and the expedited schedule, resulted in additional resources being necessary. These resources will be reallocated through the Planning Budgeting Performance Management process for the office, pending Commission approval of the Modified Rulemaking Plan.

RECOMMENDATION:

Staff request action within 10 days. Action will not be taken until the SRM is received. We consider this action to be within the delegated authority of the EDO.

/RA/

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Attachment:
Modified Rulemaking Plan-Geological and
Seismological Characteristics for the Siting
and Design of Dry Cask ISFSIs, Part 72

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