[7590-01]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 60

[Docket No. PRM-60-3]

U.S. Department of Energy;

Receipt of Petition for Rulemaking

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; Notice of receipt.

SUMMARY: The Nuclear Regulatory Commission (NRC) is publishing for public comment a notice of receipt of a petition for rulemaking which was filed by the U.S. Department of Energy (DOE). The petitioner requests that the NRC amend its regulations pertaining to the disposal of high-level radioactive wastes in geologic repositories to include a specific dose criterion for design basis accidents. The petitioner believes this would facilitate the development and licensing of a geologic repository for high-level radioactive waste.

DATE: Submit comments by (90 days after publication). Comments received after this date will be considered if it is practical to do so but the Commission is able to ensure consideration only for comments received on or before this date.

ADDRESSES: Submit written comments to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch.

For a copy of the petition, write the Regulatory Publications Branch, Division of Freedom of Information and Publications Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The petition and copies of comments received may be inspected and copied for a fee at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC.

FOR FURTHER INFORMATION CONTACT: Michael T. Lesar, Chief, Rules Review Section, Regulatory Publications Branch, Division of Freedom of Information and Publications Services, Office of Administration, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone: 301-492-7758 or Toll Free: 800-368-5642.

SUPPLEMENTARY INFORMATION:

Background

On April 19, 1990, the U.S. Department of Energy (DOE) filed a petition for rulemaking with the Commission. Pursuant to 10 CFR 2.802, this petition was docketed by the Commission on April 26, 1990, and has been assigned Docket No. PRM-60-3.

The petition pertains to the requirements that would apply to DOE as the licensee for a geologic repository for high-level radioactive waste developed pursuant to the Nuclear Waste Policy Act, as amended, 42 U.S.C. 10101 et seq. As a licensee, DOE would be subject to the licensing requirements contained in 10 CFR Part 60. In its petition, DOE observes that § 60.21(c)(3)(ii) requires that tne Safety Analysis Report for a repository include a description and analysis that considers "the adequacy of structures, systems, and components provided for the prevention of accidents and mitigation of the consequences of accidents, including those caused by natural phenomena," yet Part 60 does not provide numerical dose criteria to use in identifying the need for engineered safety features and for determining their adequacy. The petitioner believes that specific accident dose criteria are necessary to reduce the uncertainties in the current regulation and to provide specific guidance for the protection of public health and safety.

The Suggested Amendments

The petitioner requests that the NRC amend 10 CFR Part 60 to include quantitative accident dose criteria of 5 rem effective dose equivalent, with a limit of 50 rem on the committed dose equivalent to any organ. To accomplish the desired amendment, the petitioner suggests that definitions be added for "preclosure control area," "committed dose equivalent," "committed effective dose equivalent," and "effective dose equivalent." The petitioner believes these definitions are needed to support the application of accident dose criteria.

The petitioner also believes there is a need to include a revision to the current definition of "important to safety." The specific amendments suggested by the petitioner are as follows:

1. In §60.2, the definition of "important to safety" is revised and definitions of "committed dose equivalent," "committed effective dose equivalent," "effective dose equivalent," and "preclosure control area" are added to read as follows:

§60.2 Definitions.

* * * * *

"Committed dose equivalent," means the dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

"Committed effective dose equivalent," means the sum of the products of the weighing factors applicable to each of the body organs or tissues which are irradiated and the committed dose equivalent.

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"Effective dose equivalent," means the sum of the products of the dose equivalent to the organ or tissue and the weighing factors applicable to each of the body organs or tissues which are irradiated.

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"Important to safety," with references to structures, systems, and components, means those engineered structures, systems, and components the failure of which could result in a release of radioactive material that produces an effective dose equivalent of 0.5 rem or greater to an individual located at or beyond the nearest boundary of the preclosure control area for an accident that could occur at any time until the completion of permanent closure. All engineered safety features shall be included within the meaning of the term "important to safety."

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"Preclosure control area," means the area immediately surrounding the repository facilities for which the licenses exercises authority over its use during the period up to completion of permanent closure. This area may be traversed by a highway, railroad, or waterway, so long as appropriate and effective arrangements are made to control traffic and to protect public health and safety.

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2. In §60.111, paragraph (a) is amended by removing "at all times," paragraph (b) is redesignated as paragraph (c), and a new paragraph (b) is added to read as follows:

§ 60.111 Performance of the geologic repository operations area through permanent closure.

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(b) Accident analysis. The geologic repository operations area shall be designed such that any individual member of the public located at or beyond the nearest boundary of the preclosure control area shall not receive a radiation dose from direct exposure and inhalation greater than 5 rem effective dose equivalent or 50 rem committed dose equivalent to any organ from any accidents considered in the design of the repository that could occur at any time until the completion of permanent closure.

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Supporting Information

The purpose of this proposed amendment is to establish quantitative accident dose criteria and to provide pertinent definitions to facilitate application of these criteria.

The petitioner considers the current rule deficient in that it does not contain the numerical dose criteria needed to determine design adequacy. The petitioner believes that the absence of quantitative accident dose criteria creates programmatic uncertainties associated with the design of the geologic repository operations area and the procurement of long lead-time items based on that design and that uncertainty could result in major redirection of design efforts and possibly affect the schedule for development of a geologic repository.

The petitioner points out that considerable knowledge and experience in the type of handling operations that will occur at a repository exists. In particular, activities at a geological repository would be similar to activities that occur at other nuclear facilities, including several facilities licensed by the NRC, and others operated by DOE. These activities will include the receipt, handling, transfer, and storage of highly radioactive materials, principally spent nuclear fuel assemblies and canisters of vitrified high-level radioactive waste. Similar or identical operations with highly radioactive materials are, or have been, performed routinely at facilities for independent storage of spent nuclear fuel.

The petitioner maintains that its proposed repository dose criteria are within the range of accident dose criteria established by the NRC for similar activities. It claims that proposed dose criteria would be consistent with the 5 rem criteria established by the NRC for accidents at facilities for independent storage of spent nuclear fuel and high-level radioactive waste (10 CFR Part 72) and even more conservative than the 6.25 rem criteria for nuclear power plant fuel handling accidents, including accidents involving drops of heavy loads on fuel assemblies or safety-related systems, components, or equipment. (For further information, DOE refers to NUREG-0800, Standard Review Plan, and NUREG-0612, Control of Heavy Loads at Nuclear Power Plants). Postulated accident scenarios include crane failures and other waste handling

accidents that may result in damage to the waste canister such that there is a breach of confinement barrier.

The petitioner considers the 5 rem effective dose equivalent accident dose criteria to be supported by accepted radiological protection criteria. DOE proposes that the 5 rem accident dose criteria be expressed in the form of effective dose equivalent, as defined by the International Commission on Radiological Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRPM), and be applied to the sum of the effective dose equivalent from external exposure and the committed effective dose equivalent from intake of radionucludes. To avoid nonstochastic effects, DOE is proposing that the accident dose criteria include a limit of 50 rem on the committed dose equivalent to any organ. For dosimetric purposes, DOE recommends that the dose criteria be applied to a member of the public who is generally representative of the exposed population (i.e., reference man), as is done with other NRC accident criteria. The exposure pathways to which the accident dose criteria would apply should be limited to direct irradiation and inhalation.

In the petitioner's view, the accident dose criteria should be applied at the boundary of a newly defined preclosure control area. The restricted area defined in 10 CFR 60.2 is used for both the area to be controlled in case of a radiological accident and the area controlled under normal operations. The petitioner believes that this area is unnecessarily large for application of normal access controls and radiological monitoring. To reduce the size of this area to a size that the petitioner deems more appropriate, it would be necessary to establish separate boundaries for the two controlled zones (i.e., accident and routine access control). For a repository, DOE proposes to define the location for application of the accident dose criteria and the "important to safety" threshold as the "preclosure control area" boundary.

The petitioner believes that establishment of accident dose criteria would not change the intent of the 0.5-rem "important to safety" threshold for classification. However, in its view, the current definition of "important to safety" would need to be modified to be consistent with other changes it has suggested. The current definition could be interpreted to mean that an accident resulting in a radiation dose of 0.5 rem or greater must be mitigated:

"those engineered structures, systems, and components essential to the prevention or mitigation of an accident..." (10 CFR 60.2, emphasis added). The threshold for determining the need for mitigation through the use of engineered safety features is the accident dose criterion, not the "important to safety" threshold. The petitioner suggests modification of the current definition "important to safety" to make it consistent with the proposed accident dose criterion by incorporating the effective dose equivalent concept and the new preclosure control area boundary.

Related NRC Regulatory Initiative

In the NRC Regulatory Agenda (NUREG-0936, Vol. 8, No. 4, published January 1990) and in the Unified Agenda of Federal Regulations (55 FR 17174; April 23, 1990), the NRC has announced a contemplated rulemaking action that would establish additional preclosure regulatory requirements for high-level waste geologic repositories (RIN 3150-AD51). The subject matter of the DOE petition relates closely with the actions under consideration by the NRC as part of this rulemaking effort.

The NRC approach to this related regulatory initiative includes plans to:

1. Perform a functional analysis of a geologic repository using a systematic approach. This functional analysis would include an evaluation of the preclosure operations phase of a repository.

2. Identify in this analysis the functions necessary to protect the health and safety of the workers and the public during normal conditions and abnormal conditions (e.g. design bases accidents/events).

3. Develop repository operational criteria for each function necessary to protect the health and safety of the workers and public.

4. Compare these repository operational criteria to the current criteria in 10 CFR Part 60 to help identify any potential regulatory uncertainties.

5. Use the results of the functional analysis and comparison studies as a basis for consideration of any potential rulemaking.

The NRC is in the process of obtaining studies that would address potential regulatory uncertainties in this area. The results of these studies would be made available as NUREG reports. These studies would provide technical support

for any regulatory action that may be needed. The NRC estimates that these reports would be available after November 1991.

Although DOE's petition does address areas of concern similar to those addressed in the NRC regulatory initiative described above, the petitioner's approach to establishing design criteria for structures, systems, and components important to safety differs markedly from that contemplated by the NRC. In applying the approach of the petitioner, it would be possible to have no structures, systems, and components important to safety if the nearest boundary of the preclosure control area were sufficiently distant. This could encourage extending the boundary of the preclosure control area in order to justify less effective safety design and quality assurance measures and result in inferior structures, systems, and components in the geologic repository operations area. While this approach might be adequate for protection of the general public, it would ignore the safety of the workers.

In contrast, in applying the approach proposed by the NRC staff, the scope of, and the design criteria for, structures, systems, and components important to safety would be derived from a consideration of the functional requirements of the repository system. In addition, criteria for a preclosure controlled area that takes into account postulated accident conditions that may be developed as a matter apart from the question of structures, systems, and components important to safety. The corresponding provisions in 10 CFR Part 72 may be considered as possible models for regulatory language in this context.

Comments are solicited with respect to the NRC's regulatory initiative as well as the DOE petition.

Dated in Rockville, Maryland this 9th day of July, 1990.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,
Secretary of the Commission.