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DOCKET NUMBER
PROPOSED RULE PR 2, 19, 20 et al.
(64 FR 8640)

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Rulemakings and Adjudications Staff

Dear Sir/Madam:

This letter is to transmit comments on the proposed repository licensing rule submitted on behalf of the State of Nevada. The Agency for Nuclear Projects was established by the Nevada Legislature in 1985 to carry out the State's duties in overseeing all aspects of the federal high-level nuclear waste program pursuant to the Nuclear Waste Policy Act. Reviewing and commenting on proposed actions by the Nuclear Regulatory Commission regarding repository licensing is within the Legislature's assignment to the Agency.

The comments are separated into General Comments, our answers to the five Specific Questions asked by the Commission, and Additional Comments on the contents of the proposed rule.

The State of Nevada expects the NRC to give serious consideration to these comments on this unprecedented proposed repository licensing rule. If you have any questions, please feel free to contact me.

Sincerely,

Robert R. Loux
Executive Director

Attachment

Acknowledged by card JUN 30 1999

Template=SECY-067

SECY-02

cc: Governor Guinn
Nevada Congressional Delegation
Attorney General's Office

STATE OF NEVADA COMMENTS

RE: Proposed Rule: Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada (10 CFR Parts 2,19,20,21,30,40,51,60,61,63), 64 FR. No. 34, Feb. 22, 1999, pp. 8640-8679.

GENERAL COMMENTS

Timeliness: The Energy Policy Act of 1992 requires that the Commission "not later than 1 year after the [EPA] Administrator promulgates [repository] standards...modify its technical requirements and criteria...as necessary, to be consistent with the Administrator's standards..." To date, the Administrator of the Environmental Protection Agency has not promulgated the new repository standards required by the Act. Therefore, it is premature for the Commission to propose any modifications of its licensing criteria absent such standards. Once the EPA standards are promulgated, it then will be clear what, if any, modifications to the NRC licensing rule will be needed to maintain consistency.

We understand that the potential license applicant, the U.S. Department of Energy, has announced its current schedule for repository site recommendation and subsequent license application, and has stated its need for relevant regulations and standards to be in place early in 2000. However, without the final EPA repository standard, there is no rulemaking action incumbent upon the Commission, even in the face of impatient demands by the Department of Energy. No potential applicant for any NRC license, especially the Department of Energy with its long record of delay in meeting its own deadlines, should be allowed to tax the limited resources of the NRC and the affected public with its demands for premature and potentially unnecessary actions that are outside the mandate of law.

We recommend that this Proposed Rule be withdrawn by the Commission and modifications of the Commission's repository licensing rule be proposed, if necessary, in a timely manner subsequent to promulgation of a Yucca Mountain standard by the Administrator of the Environmental Protection Agency, as required by law.

Authority and Jurisdiction: The Energy Policy Act of 1992 supersedes the Nuclear Waste Policy Act of 1982, as amended, with respect to regulatory criteria and standards. It mandates new EPA standards specific to a Yucca Mountain repository, but it does not mandate a new Commission rule specific to Yucca Mountain to replace its general rule for licensing geologic repositories. It only requires modification of NRC technical requirements and criteria, as necessary, to be consistent with new EPA environmental and human protection standards once they have been promulgated. Further, the Energy Policy Act of 1992 does not authorize the Commission to expand its licensing jurisdiction to include proposing standards for human safety and environmental protection that are within the statutory mandate and jurisdiction of the Environmental Protection Agency.

We recommend that once new EPA standards for a Yucca Mountain repository are promulgated, the Commission's existing repository licensing rule, 10 CFR Part 60, be modified, if necessary, to be consistent with the new EPA standard.

Defense in Depth. We make the above recommendation notwithstanding the Commission's recent drive for risk informed, performance-based regulation. This regulatory approach may be appropriate for operating facilities where off-normal events or detected poor performance may be mitigated by ceasing operation, but it is not appropriate for assuring the long-term safety of a repository facility with many orders of magnitude of uncertainty in performance projections, as is and will continue to be the case with the proposed Yucca Mountain repository system. The existing sub-system performance requirements in 10 CFR Part 60 serve to mitigate at least some of the total system performance uncertainty by providing intermediate prescriptive check points important to the projected safety of the post-closure system. The sub-system performance requirements of 10 CFR Part 60 should be retained in the Commission's repository licensing rule because they help to assure defense in depth through evaluation of the individual effectiveness of the natural and engineered components of the multiple barrier system.

The meaning of defense in depth through multiple barriers in a geologic repository system is described in the Department of Energy's 1980 Final Environmental Impact Statement Management of Commercially Generated Radioactive Waste. The EIS states, "Geologic barriers are expected to provide isolation of the waste for at least 10,000 years after the waste is emplaced in a repository and probably will provide isolation for millennia thereafter. Engineered barriers are those designed to assure total containment of the waste within the disposal package during the initial period during which most of the intermediate-lived fission products decay. This time period might be as long as 1,000 years..." Any repository licensing rule must explicitly uphold at least this minimal notion of defense in depth through reliance on the characteristics and behavior of multiple barriers against loss of waste isolation.

SPECIFIC QUESTIONS

The Commission has requested comment on five specific questions relative to its proposed repository licensing rule. Our comments here are not intended in any way to detract from the primacy of our general comments and recommendations above about the timeliness, authority, and regulatory approach of this proposed rulemaking.

Question 1. The Commission solicits comments on the appropriateness of its proposed approach to defining the critical group and reference biosphere for Yucca Mountain. In particular, the Commission solicits comments on any other candidate population groups, biosphere assumptions and potential exposure pathways that should be considered in the establishment of a "critical group" for Yucca Mountain.

If the intent of the rule is to assure adequate protection for future generations of people who may be exposed to radionuclide releases from a Yucca Mountain repository, it is not achieved by Section 63.115: Required characteristics of the reference biosphere and critical group.

First, the dose receptor of interest should not be the average member of the critical group with behavior and characteristics expressing the mean value of the group's variability. This results in some people (barring those few individuals with extreme habits) being less well protected than others by design. And, while the variance in level of protection may be definable consistent with current conditions, the uncertainty of the projection of that variance increases with time, especially over a period of 10,000 years. The uncertainty in the variance also is likely to increase as expected doses increase when groundwater flow lines originate in different parts of the repository. While we cannot predict the exact human future in the area, the one thing we know with certainty is that it is incorrect to assume current human conditions will prevail long into the future and then rely on an average calculated from current conditions. The extreme consequence of this approach is that some future individuals in the group that today are thought to be protected adequately, will in the future actually receive radiation doses beyond the regulatory limit only because the range of variation within the group has broadened.

This problem can be eliminated, and confidence can be improved that all except those few individuals with extreme habits will be protected by taking a different approach. If the dose receptor of interest was the reasonable maximally exposed individual among a group or family of subsistence farmers, protection of that individual would result in protection of all others in the area of expected greatest exposure. Pathway calculations for people of different age, gender, and physical characteristics should be used to define and provide regulatory protection for the reasonable maximally exposed individual. This approach would reduce uncertainty as to whether all individuals of future generations are adequately protected. It would lessen the effect of uncertainty arising from the assumption that human conditions remain unchanged through time.

Locating the critical group at a distance of 20 km (12 miles) down gradient from the waste emplacement area has the effect of placing the boundary of the accessible environment (a concept not included in the proposed rule) where compliance with the safety standard is calculated 20 km from the radionuclide contaminant source. It also means that the site, which is subject to the proposed rule's ownership and control requirements, extends down gradient along the groundwater flow path(s) of uncertain width and location for a distance of 20 km. Under these circumstances, the actual location of the site boundaries and the area of the site is very large compared to the waste emplacement area and the repository operations area. This is the case because DOE relies on dilution in the groundwater for repository performance, and the proposed rule at 63.102(d) says, " The geologic repository operations area, plus the portion of the geologic setting that provides isolation of the radioactive waste, make up the geologic repository." The 20 km compliance boundary is also inconsistent with the controlled area definition (though none is defined in proposed Part 63) in the existing 10 CFR Part 60, which is not to exceed 10 km from the waste emplacement area.

It is without precedent that a waste disposal facility should be permitted to rely on such a long groundwater travel distance before regulatory compliance is required. If waste containment and isolation are still the intended goals of geologic disposal, regulatory compliance must be demonstrable near the location of the emplaced waste. It is not acceptable to simply enlarge the repository through definitions in order to encompass an area sufficient to meet safety requirements at its boundary, especially when it is predicted by the license applicant that through time expected doses will rise to a level that vastly exceeds the safety standard of the proposed rule. Violation of the safety standard is only averted by the proposed rule which, in conflict with the recommendation of the National Research Council Committee on the Technical Bases for Yucca Mountain Standards, arbitrarily ends the regulatory compliance period after 10,000 years, rather than after the recommended time of projected peak dose. The regulatory compliance period should extend at least through the time of projected peak dose from the repository.

The rationale offered for the 20 km distance is not convincing. It is based on "an informed assumption regarding the accessibility of groundwater for irrigation" with the assumption being that it is not economical to drill irrigation wells where the water table is greater than about 100-150 meters beneath the land surface because well cost is related to depth. At the location of Lathrop Wells, approximately 20 km from the location of potential waste emplacement, the water table is about 100 meters below the land surface, with the water currently being used to support small agricultural, commercial, and residential uses, none of which are constrained by well cost. The depth to the water table 10 km north of Lathrop Wells, going toward the potential waste emplacement area, is 200 meters below the land surface, and near the waste emplacement area, it is about 300 meters below land surface. The bottom of the open intervals of two water supply wells at Lathrop Wells, which are monitored for water level by the DOE, are at 239 and 152 meters. This suggests that the depth of drilling is not a constraining factor. And, with modern efficient submersible well pump technology, the lift interval would not preclude agricultural and other uses of water, even near the vicinity of the waste emplacement area if there was a need for the water, and the value of the agricultural product was sufficient to make water production economically effective. This is the case in some other locations in the country and could well be the case for a subsistence farmer in the Yucca Mountain area.

Also, there is evidence that, within the last 10,000 years, the water table was more than 100 meters higher than its present level with springs intersecting the land surface less than 20 km south of the proposed waste emplacement area.

The proposed rule has arbitrarily selected the location of the critical group 20 km distant from the proposed waste emplacement area, and by constraining the biosphere and geohydrologic setting to current conditions with allowance for the past 10,000 years' climate, has contrived an artificial scenario to attempt to justify its selection.

The only precedent for setting a compliance distance from a repository boundary is in EPA's 40 CFR 191 that applies to the transuranic waste repository at WIPP in New Mexico. The boundary of the accessible environment pursuant to that rule is not greater than 5 km from the waste emplacement area. If the compliance boundary is not set at the edge of the waste

emplacement area, precedent suggests that it should be the same as that set in 40 CFR 191 for the boundary of the accessible environment at no greater than 5 km.

Question 2.

> The Commission solicits comments on the appropriateness of its proposed human intrusion scenario, and the assumed timing of its occurrence, as a reasonable measure for evaluating the consequences of intrusion at a repository at Yucca Mountain.

The human intrusion scenario is that "it shall be assumed that the human intrusion occurs 100 years after permanent closure and takes the form of a drilling event that results in a single nearly vertical borehole that penetrates a waste package, extends to the saturated zone, and is not adequately sealed." [10 CFR Part 63.113(d)]. Hazards to the intruders and public from the material brought to the surface are not to be considered. Instead, this is intended to be a single stylized scenario that demonstrates the repository's resilience to a breach of the engineered and geologic barriers and its ability to still perform adequately if its barriers are breached. It is not intended to be taken as a prediction of the likely manner or frequency of intrusion.

While this scenario may appear to be extreme, it does not fully address the concern about potential human intrusion. In the case of a Yucca Mountain repository, the key feature of the scenario is the matter of the inadequately sealed borehole becoming a pathway for additional water to enter the repository, resulting in an eventual increased radionuclide release rate and quantity from the repository. Thus, in assessing the performance consequence of human intrusion, the frequency of intrusion, in both time and space, is of great importance, and a single borehole at a single time does not adequately reflect this condition.

If the human intrusion is a result of exploration for buried natural resources, it can be expected for some time in the future that attractive areas will be periodically re-explored because of exploration and extraction technology advances or because of demand for materials for new technologies for which there is not a demand today. Therefore, it is not unreasonable to establish a human intrusion scenario that takes place on a recurring basis, e.g., the proposed borehole scenario that takes place 100 years after closure, but is then repeated every 100 years until 1,000 years after closure. This would mean 10 boreholes breaching waste containers at different locations over a 1,000 year period that are left inadequately sealed, thus affecting the repository performance over a portion of or all of the regulatory period.

Question 3.

> The Commission solicits comment on the merits of requiring DOE to implement a quality assurance program for the geologic repository based on the criteria of Appendix B of 10 CFR Part 50.

Based on our many years of experience with the high-level nuclear waste program and the regulatory environment, we do not know of any valid reason to discontinue the requirement for a quality assurance program for the geologic repository based on the criteria of Appendix B

of 10 CFR Part 50. The criteria provide a consistent and standardized means of accountability for the elements of the scientific and engineering program that are important to safety. The criteria also cause there to be a defensible systematic record of decisions that are important to safety, how they were made, and what considerations molded the decision process. This is especially important in a decades long project.

Question 4.

> The Commission solicits comments on the suitability of alternative criteria for proposed 63.44. These alternative criteria are included in the statement of considerations discussion of proposed 63.44 and are substantially equivalent to that proposed last year for nuclear reactors and spent fuel storage facilities.

The alternative criteria in the statement of consideration for 63.44 appear to clarify beneficially the issues involved in changes, tests, and experiments by providing definitions for key elements and expanding the list of specific criteria. We are concerned that the word "nonconservative" in the description of the meaning of "Reduction in margin of safety associated with any license specification" could be open to a range of interpretations. The intended meaning could be further clarified, as could the intent of the word "minimal" as used throughout 63.44(b)(2).

Question 5.

> The Commission solicits comments on whether the approach and criteria for changes, tests, and experiments at 63.44 should apply solely to the Safety Analysis Report or to the contents of the entire license application, irrespective of whether the proposed 63.44 or the alternative criteria presented in the statement of consideration are selected.

The criteria for changes, tests, and experiments should apply to the entire license application in order to assure that the entire application is maintained as a current reference document for those overseeing the project, including the Commission and all parties to the licensing proceeding.

ADDITIONAL COMMENTS

As stated above, our comments here are not intended in any way to detract from the primacy of our general comments and recommendations above about the timeliness, authority, and regulatory approach of this proposed rulemaking.

63.16 (footnote) Review of site characterization activities: As a matter of completeness, the meaning of issue resolution during the pre-license application period should be stated explicitly in the rule, just as it has been in numerous Commission documents and letters.

63.21 Content of application: Section (b)(1) should include the requirement to define the site boundary, which would include all the land subject to 63.121: Requirements for ownership and control of interests in land.

Section (c)(19) should include in the plans for retrieval a requirement to describe the concept of operation for retrieval.

Section(c)(22)(vii) should also require an analysis of the effects of any plans for use of the airspace above the geologic repository operations area.

63.32 Conditions of construction authorization: Section (a)(4), which states, "Results of research and development programs being conducted to resolve safety questions" should continue with the following: including results of demonstration of retrieval of containers of a design intended for waste emplacement under expected conditions of repository operation.

Sections (c)(1), (2), and (3) should state explicitly "prior notice to the Commission [and all parties]".

63.43 License specification: Section (b)(3) should include restrictions not only on the amount of waste permitted per unit volume of storage space, but also restrictions on the thermal energy output of waste per unit area of the emplacement area. This is an expression of a critical design feature.

63.51 License amendment for permanent closure: The decision to issue a license amendment for permanent closure would constitute a major federal action in that it includes a decision that retrieval of the waste is not necessary and that the expected impacts of the waste affecting the environment far into the future and far beyond the site are acceptable. Such a decision should be accompanied by a Final Environmental Impact Statement pursuant to the National Environmental Policy Act. This decision would be made many decades after the decision to license the repository, and the EIS that accompanied that decision would have little or no current validity. The situation clearly calls for a new, up-to-date Environmental Impact Statement dealing with all relevant issues and alternatives at the time.

63.113 Performance objective for the geologic repository after permanent closure: Section (b) should be amended to reflect the only U.S. regulatory precedent for doses from geologic repositories to members the public. This standard is found in 40 CFR Part 191 which limits doses to 15 mrem TEDE per year from all pathways and 4 mrem per year from the groundwater pathway. This, or an even more conservative standard, is prudent in the Yucca Mountain repository situation for three important reasons. First, there is no rational basis to apply a lesser standard of protection of the public from the hazards of a nuclear waste repository at Yucca Mountain than at any other location in the nation. Second, there is a real possibility that the public exposed to releases from a Yucca Mountain repository will also be exposed to releases from at least two other known man-made sources of radiation in the area, the Nevada Test Site and the closed low-level radioactive waste disposal site at Beatty. It is uncertain what, if any, the dose levels to the public from these sources would be, but the situation calls for conservatism on

the part of regulation of any new source terms contributing to radiation doses to the public in the same area. And third, since it is known that the most significant doses to the public from a Yucca Mountain repository will originate from pumped groundwater, members of the public relying on the quality of that groundwater should be afforded all legally sustainable protection from the hazards of a permitted facility.

The argument that the proposed performance objective is consistent with regulation of low-level radioactive waste disposal sites is not relevant. If a shallow land burial site is found to be, or is expected to be in violation of the standards on which it was licensed, various levels of remediation are possible to mitigate the release of radionuclides, including removal of the waste from the site to end the source of the violation. With a geologic repository, no such remedies are available, and in the Yucca Mountain situation, the level of violation will increase through time. The added conservatism of a more limiting standard would be a step in the regulatory process toward reducing the likelihood of an unsafe facility being licensed.

CONCLUSION

In closing, we again urge that this proposed rule be withdrawn, and appropriate modifications to the Commission's current repository licensing rule, 10 CFR Part 60, be proposed in a timely manner after the Environmental Protection Agency promulgates its mandated standards for a Yucca Mountain repository. If the intent in proposing this rule at this time is to give the prospective license applicant, DOE, guidance on what a new licensing rule might look like, that guidance mission has been served, and the guidance is not inconsistent with what DOE had been planning for in any event. If the intent was to establish, in advance of EPA, the substance of a repository safety standard that will accommodate DOE's current understanding of Yucca Mountain repository performance, this does not serve the regulatory goal of objectively evaluating whether the Yucca Mountain potential repository site can be demonstrated to provide reasonable assurance of safety.