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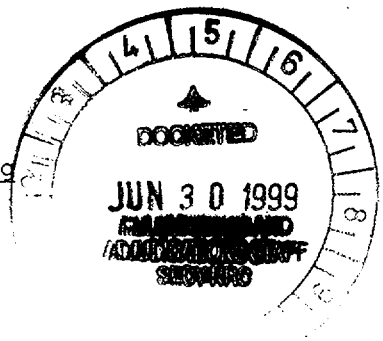

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Wednesday, June 30, 1999

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

ATTENTION: Rulemakings and Adjudications Staff

RE: Proposed Rule: Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada

These comments on the proposed repository licensing rule are being submitted on behalf of the Nuclear Information and Resource Service, based in Washington, D.C. and our members in all 50 states.

The Nuclear Regulatory Commission's (NRC) proposed rule is unacceptable from environmental, public health, and legal perspectives.

The NRC is outside its authority in jumping the gun on EPA by setting radiological standards for the proposed Yucca Mountain repository. NRC has no legal authority to usurp EPA's legally mandated jurisdiction, under the Energy Policy Act of 1992, to set radiation release, public health, and environmental protection standards for the proposed Yucca Mountain repository. This rush by NRC to set standards before EPA is, no doubt, an accommodation to the Department of Energy (DOE) (and ultimately the nuclear interests that this program serves). NRC openly admits this on page 8644, under "III. Development of a New 10 CFR Part 63". In its impatience to move towards its recommendation to the President and its license application for the Yucca Mountain repository, DOE is pressuring NRC to set standards soon, in advance of the EPA. NRC should not give in to DOE's pressure. DOE has quite the reputation for missing its own deadlines, and should not be allowed to rush this process with no legal authority to do so. EPA's legally mandated jurisdiction to set the standards should be honored. Due to EPA's legal jurisdiction alone, the NRC's proposed rule should be withdrawn. When EPA promulgates standards, NRC can then modify its repository licensing rule to meet the EPA standards, as required by law.

Not only does NRC's proposed rule rush standard setting without a legal mandate, it would also seriously weaken radiation protection. This would also lower the standards to such an extent that Yucca Mountain might still qualify to serve as the repository for the nation's high-level radioactive waste, despite its ever more evident, severe safety shortcomings. In fact, the science to date (showing the intense seismic activity, the possibility of a magma pocket, and the fast rate of water seepage into and through the proposed repository area) should disqualify Yucca Mountain from consideration.

There is no justification for setting a radiation standard that is less protective of public health and the environment than current standards. Today peer-reviewed research is confirming increased concern about adverse effects from low-dose radiation exposure, environmental contamination and alpha radiation. This is compelling evidence that radiation standards should be more stringent, not less.

The weakening of standards under the new rule is readily apparent. Current EPA standards (40 CFR Part 191) for the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, limit doses from geologic repositories to members of the public to 15 millirem per year total effective dose equivalent (TEDE) from all pathways, and only 4 mrem/year from the groundwater pathway. The NRC's proposed rule would allow 25 mrem/year TEDE from all pathways. But

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it is already known that at some point in the future, the Yucca Mountain repository would massively violate the 4 mrem/year standard for water contamination. The worst doses to the public from the Yucca Mountain repository would be ingested via groundwater used for drinking or irrigating crops. Why should Nevadans living near the proposed Yucca Mountain repository be less protected from radioactive contamination of their water supply than New Mexicans living near WIPP? This discrepancy is quite shocking and unacceptable, especially considering that local Nevadans will also be exposed to radioactivity from two other sources: the Nevada Test Site, and the Beatty "low level" radioactive waste dump. Since groundwater contamination would deliver Yucca's worst doses of radioactivity to nearby residents, water quality must be protected to the fullest extent of the law, which this proposed NRC rule miserably fails to do. Yucca Mountain should have the most stringent of standards, for leakage will only increase and persist over time. Such stringent standards would guard against an unsafe location being licensed for the repository in the first place. This NRC proposed rule does not assure adequate protection for future generations of people who would be exposed to radionuclide releases from the proposed Yucca Mountain repository.

Along similar lines, this NRC proposed rule does not even require that the 25 mrem/year standard be achieved until 20 km "downstream" from the repository. That is ***twice*** the distance of the 10 km boundary currently required for compliance under 10 CFR Part 60, and ***four times*** the distance of 5 km set by the EPA's 40 CFR 91 for WIPP. Despite the rhyme, dilution is ***not*** the solution to pollution. To protect public health and the surrounding environment, the compliance boundary for hazardous waste dumps should be set at the edge of the waste emplacement area. If not that, then the 5 km precedent at WIPP should be considered an absolute maximum "nuclear sacrifice" area. It is unprecedented and completely unacceptable that a nuclear waste dump be allowed to dilute its radioactive contaminants over such a long distance before regulatory compliance is required. In addition, NRC's 20 km assumptions about water drilling depths are unfounded. It is certainly possible that farmers will drill wells down to the level of groundwater contaminated by high-level waste, especially considering that groundwater levels could very well rise over geologic time. Evidence shows that, within the past 10,000 years, the water table stood more than 100 meters higher than its present level, with springs emerging from the ground less than 20 km from the proposed repository. "Engineering away" Yucca Mountain's shortcomings on paper, or pencil-whipping the proposed repository into compliance, is not acceptable. An unfit location should not be licensed to become the nation's high-level nuclear waste repository, no matter how much pressure from whatever source is trying to force the wrong decision. Science, not politics, must decide whether Yucca Mountain qualifies or not. The science already in raises grave doubts about Yucca Mountain's qualifications.

It seems clear that Yucca Mountain will leak massively over time. In fact, the proposed safety standard is only achieved by the proposed rule by arbitrarily ending the compliance period after 10,000 years. The projected peak doses will occur after that. Thus, this proposed rule is in conflict with the recommendation of the National Research Council Committee on the Technical Bases for Yucca Mountain Standards. The regulatory compliance period should extend at least through the time of the projected peak dose from the repository. Given that the level of violation of the safety standard will only increase over time, and the unprecedented level of uncertainty associated with trying to predict repository performance thousands of years into the future, even more stringent safety standards than would normally be applied should be established from the very beginning. Again, establishing a conservative, more limiting standard now reduces the unacceptable danger of an unsafe facility being licensed in the first place.

In terms of the "critical group" and biosphere assumptions for the proposed repository, the proposed rule's Section 63.115 does not assure adequate protection for future generations of humans who would be exposed to radionuclide leaks from Yucca Mountain. To better protect all the people in the area of expected greatest exposure, the hypothetical "maximally exposed individual" among a group or family of subsistence farmers should be used, as is conventional for radiation protection standards. Assuming the average member of the group representing the mean value of the group's variability, as the rule now proposes, only results in some people being less protected than others by design. Also, a potential consequence of this approach is that some future individuals in the group, assumed today to be adequately protected, will in the future receive radiation doses that violate the regulatory limit because the variability within the group will have increased over the extremely long time periods that the wastes remain hazardous.

The NRC has traditionally used the maximally exposed individual - with the usual inadequate definition of "individual" as the Standard Man. Only in the radiological criteria for decommissioning did NRC use the average member of the critical group. Nuclear Information and Resource Service and many members of the public in communities host to the NRC licensees under question in that rule, opposed this formulation of who is to be protected. We oppose it here. By definition, the maximally exposed individual is excluded from consideration. This is not protection of the biosphere. We once again affirm that radiation protection standards must be made to protect those most vulnerable parts of the Human organism's life cycle, which is the fetus. We also call for the protection of other species who may or may not be more susceptible than the human inutero. Use of the individual who draws water from deep wells and raises both crops and animals and consumes cultivated and wild foods and spends at least 12 hours a day out doors and lives very close to the Mountain will most adequately protect the present day habits of Western Shoshone and other Native Americans who live with a tradiational life style and will be under represented or excluded from any average critical group formulation based on DOE and NRC's concepts of today's demographics.

Further, we challenge the use of Total Effective Dose Equivalent (TEDE) in the formulation of a standard for Yucca Mountain repository. This methodology of "book-keeping" radiation doses is yet one more example of a mechanism that the NRC is using to progressively relax permissible radiation exposure levels. The mere fact that a 25 millirem exposure in millirems is now reported as 15 millirems TEDE indicates that this is not a trivial increase in health risk associated with how the regulator calculates the dose attributed to the same amount of radiation exposure.

Any radiological standard for a nuclear waste repository should consider the impact of the repository on the population. If the Congress of the United States sees fit to only protect at the level of the individual it is still possible for the regulator to require disclosure of the potential impacts of the repository at the population and global level. This information should be included in any regulation written for Yucca Mountain.

The NRC's regulatory approach under the proposed rule is not appropriate for assuring long-term safety of the repository into the distant future. The already established sub-system performance requirements in 10 CFR Part 60 address at least some of the uncertainty about future repository performance by requiring intermittent checks on the safety of the repository after its closure, and through evaluation of the effectiveness of the individual natural and engineered components of the multiple barrier system. DOE has already established what defense in depth through multiple barriers in a geologic repository means, in its Final Environmental Impact Statement on the Management of Commercially Generated Radioactive Waste (1980). That statement, issued 20 years ago, has already established that geologic barriers be expected to

isolate the waste for at least 10,000 years in a repository, and perhaps for thousands of years beyond that. It also established that engineered barriers completely isolate waste within the disposal package for the first 1,000 years, during which time most of the intermediate-lived fission products would decay. Any repository licensing rule must at the very least explicitly meet this minimal standard for defense in depth through multiple barriers to achieve waste isolation.

Unfortunately, such optimistic assumptions about geologic and engineered barrier performance have no basis in reality. Scientific studies of water travel rates at Yucca Mountain call into question the assumption that the geologic barriers can isolate the waste for 10,000 years. Rainwater containing radioactive chlorine from the atom bomb tests in the Pacific have reached deep down beneath Yucca Mountain in less than 50 years. Yucca Mountain seems to be much less isolated from the biosphere than many had hoped.

In addition, engineered barriers cannot be expected to perform perfectly for 1,000 years, based on experiences over the past decade alone. Even a brief look into high-level radioactive waste storage cask performance during the 1990's reveals a long list of failures, defects, and unpleasant surprises such as explosions.

The casks used at Davis Besse nuclear plant in Ohio have walls that are too thin, violating design specifications.

VSC-24 casks at Palisades nuclear plant in Michigan and at Arkansas One have defective welds that are significantly cracked. The cracks result in loss of the inert gaseous helium atmosphere meant to preserve the fuel rods. Fuel rod deterioration raises the specter of increased handling and transportation difficulties and dangers in the future. The consequent NRC investigation of Sierra Nuclear Corporation, the VSC-24 cask manufacturer, revealed an operation so shoddy, so lacking in even rudimentary quality control and quality assurance, and so unconcerned about safety and regulations, that NRC threatened to shut down VSC-24 manufacturing immediately.

At Point Beach nuclear plant in Wisconsin in 1996, an unforeseen hydrogen gas build-up within a fully-loaded VSC-24 cask, ignited by a welding torch during the lid sealing operation, caused an explosion powerful enough to dislodge the cask's three ton lid. The chemical reaction that generated the explosive gas, between the boric acid in the spent fuel pool water and the zinc lining inside the cask, is known to many high school chemistry students, and yet evaded the notice of all the engineers, scientists and regulators at the cask manufacturer, the NRC, and the utility.

Despite this, the NRC and utilities seem not to have learned safety lessons from the explosion at Point Beach. Just this month, two separate hydrogen "burn" events at Palisades during loading of a VSC-24 cask yet again revealed that administrative and regulatory controls are desperately lacking.

Given this long record of failures, defects, and unexpected events during the past several years alone, how can DOE and NRC assume that engineered barriers will perform 100% perfectly at the proposed Yucca Mountain repository for 1,000 years? There is no evidence to support such an assumption.

And yet, at 63.43 on License specification, the proposed rule does not limit the thermal energy output of high-level radioactive waste per unit area of the repository emplacement area, which is a critical design and safety shortcoming. Not only would the heat affect the mountain's rock, it could also affect the waste containment casks. This is all the more important because the rule, at Section 63.21.c.2 (page 8669) assumes that the repository would be filled to maximum capacity. The assessment of thermal loadings under consideration, at section 63.21.c.6, should not be done after vast quantities of waste are already concentrated within the proposed repository: Yucca Mountain's rock may not be capable of withstanding and containing such high levels of thermal heat and radioactivity without breaking down, and leaking

large quantities of radionuclides at a fast rate through fractures into the groundwater below, and thus into the biosphere.

A pattern seems clear, that the DOE and now the NRC are trying to weaken and curtail the standards so that Yucca Mountain can still qualify for the national repository, despite its severe shortcomings. Such shortcuts on science and safety are an abrogation of federal responsibility to protect the public and the environment for future generations. If the intention of NRC's proposed rule is to establish, ahead of EPA, a repository safety standard that accommodates DOE's present estimation of the repository's future performance, this violates the regulatory goal of objectively determining whether the proposed Yucca Mountain repository can be demonstrated to provide reasonable assurances of safety.

Further, the reliance exclusively on a total system performance assessment to demonstrate compliance with the post closure dose limit makes it extremely difficult for members of the public to have confidence in the demonstration of compliance. The removal of objective criteria such as ground water travel time and other subsystem performance criteria leave all information and data open to interpretation. There is no confidence that basic data, including the crustal expansion measurements will be available prior to construction license. The possibility that the repository could be fully loaded before parameters are objectified which could drastically affect the system performance is not only dangerous and wrong-headed, it leaves open the potential for the wanton squander of the only funds available for long term disposition of this material on a site that is almost certain to fail, if it were required to meet the few existing objective criteria.

Another weakness in the proposed rule is that it seriously underestimates the potential dangers associated with future, unpredictable human intrusions over the next several centuries or millennia which could breach the proposed repository at Yucca Mountain. Why are the hazards to the intruders and to the public from the material potentially brought to the surface not to be considered? The extreme potential adverse health consequences associated with such a possibility demand that it be considered. In addition, the possibility of multiple intrusions and their frequency and locations must be considered. Human intrusions resulting from exploration for or extraction of underground natural resources are not only possible, but may be likely over the course of centuries to come. As resources become scarcer on Earth, as exploration/extraction technologies advance, and as new demands emerge for raw materials for new technologies not in demand today, promising regions will be periodically re-visited for mining. Mining for underground natural resources is a time-honored Nevada tradition. Mining could very likely continue even into the distant future. Thus, multiple boreholes breaching waste containers that go unsealed at different locations over a timeframe spanning centuries or millennia could have a very significant adverse affect on waste isolation at Yucca Mountain. Such boreholes could become pathways for increased amounts of water to reach the high-level waste, increasing the amount of radionuclides that leak and the rate at which they enter the biosphere. The proposed rule does not adequately address these issues.

Yet another lowering of safeguards under the proposed rule involves gutted administrative controls. Despite the complexity and decades-long process involved with the Yucca Mountain repository proposal, this NRC rule would weaken or undo the requirement that DOE systematically record its decisions that significantly concern safety, how those decisions were made, and what factors influenced them. Given the grave potential consequences of licensing an unsafe facility and radiation leakage from a repository, systematic accountability on scientific and engineering decisions related to safety must be upheld. DOE must be held to the requirements of Appendix B of

10 CFR Part 50, especially considering DOE high-level waste program's troubled history.

In conclusion, it is urgent that this proposed rule be withdrawn. After EPA promulgates its mandated standards for the proposed Yucca Mountain repository, then the NRC can and should make modifications to its repository licensing rule (10 CFR Part 60). If all the DOE is seeking is, essentially, guidance on the general parameters of new licensing rules, then the DOE has the guidance it seeks. If, however, the motivation behind rushing the NRC to set the standard before the EPA was to lower the standard so that Yucca Mountain, despite its disqualifying shortcomings, would still qualify for repository licensing, then this is, of course, completely unacceptable. Standards exist in the first place so that an unfit location will not be licensed as the repository.

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