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Central Docket Section (LE-131)  
Environmental Protection Agency  
ATTN: Docket No. R-82-3  
Washington, D.C. 20460

Subject: Additional Comments on the Proposed 40 CFR Part 191:  
"Environmental Standards for Management and Disposal of  
Spent Nuclear Fuel, High-Level and Transuranic  
Radioactive Wastes" (47 Federal Register 58196).

Dear Sir or Madam:

On behalf of the Natural Resources Defense Council, Inc., we wish to offer the following additional comments on the proposed 40 CFR Part 191. These comments respond to the specific questions EPA presented for comment in its letter of 19 May 1983 and also to several comments made by DOE.

I. Definition of High-Level Waste: Questions for Comment

(1) Which of the above alternatives [for defining high-level waste] is preferable, or is there another definition that would be more appropriate?

(2) If we use a definition similar to that in the NWPA, should EPA define "sufficient concentrations" through our proposed Table 1, or should we expect the NRC and/or the DOE to make that judgment?

(3) Should we, as many commenters have recommended (e.g., D-52, D-62, D-76), also specifically prohibit dilution of wastes to avoid their classification as high-level waste?

Response:

NRDC believes the definition of "high-level" waste should include the following:

(a) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations;

(b) spent nuclear fuel if disposed of without reprocessing;  
and

(c) other highly radioactive material that the Nuclear Regulatory Commission, consistent with existing law, determines by rule requires permanent isolation.

NRDC supports the use of a table in 40 CFR Part 191 to define the term "sufficient concentrations," rather than permitting the NRC and/or DOE to make that judgment. Determining the concentration levels of wastes that require maximum isolation is an integral part of EPA's standard-setting authority. NRDC believes, however, that more information is needed before it can endorse the specific concentration limits identified in the proposed Table 1, particularly information on the classification of existing inventories under the proposed Table 1. NRDC believes that the use of any table of concentration limits is virtually meaningless without a prohibition on dilution of wastes: thus, a specific prohibition on dilution of wastes must be included.

NRDC rejects DOE's proposed definition of high-level waste (D-47). DOE's proposed definition not only gives DOE discretion to include additional categories of waste in the definition of high-level waste, but permanently excludes spent fuel and transuranic waste from that category. This proposal contravenes the NWPA, which gives the Nuclear Regulatory Commission the sole discretion to determine additional categories of high-level waste, including spent fuel and transuranic wastes, if not already included. As noted above, NRDC supports the inclusion of spent nuclear fuel in EPA's definition of high-level waste.

NRDC supports EEI's recommendation (D-65) to exclude concentrations approved by the NRC for disposal in shallow-land burial sites under 10 CFR Part 61.

## II. Need for Assurance and Procedural Requirements: Questions for Comment

(1) Should we retain the assurance requirements in our proposal, making appropriate changes in the details of these requirements in response to other comments? Or should we remove them entirely and issue only our quantitative containment requirements?

(2) If we should retain the assurance requirements, should we continue to include them in the standards or should we consider issuing them as Federal radiation protection guides -- which could be waived if specific situations warranted in accordance with procedures established under Executive Order 12088?

Response:

NRDC strongly endorses the inclusion of the assurance requirements (§191.14) and procedural requirements (§191.15) in EPA's proposed regulations. These requirements are an integral component of EPA's responsibility to set meaningful limits on radiation exposure or levels, including release limits for radionuclides from high-level nuclear waste repositories. Assurance requirement (b), for example, requires that disposal systems be selected and designed to keep releases to the accessible environment "as small as reasonably achievable." This requirement, known as the ALARA concept, has been included in other EPA radiation exposure standards, including the original 1960 Federal Radiation Council (FRC) guidelines. 25 Fed. Reg. 4402-03 (May 18, 1960). Even though the ALARA requirement is not set forth in explicit numerical terms, it is nonetheless a perfectly acceptable EPA limit on radiation levels.

The additional assurance requirements are essential in this instance to provide confidence that the levels will indeed be kept as low as reasonably achievable. As DOE itself acknowledged, "it is necessary to compensate for the uncertainties associated with the disposal of radioactive wastes" (D-47, p. 5). DOE and NRC retain the desired flexibility in their methods of implementing the assurance requirements, but any proposal to eliminate the requirements -- or to issue them in the form of waivable Federal radiation protection guides -- would place far too much emphasis on the §191.13 containment requirements as a measure of repository safety. The uncertainties surrounding radioactive waste disposal are simply too great to permit such an approach.

The §191.15 procedural requirements set out the assumptions and methods which EPA believes should be used in determining compliance with the containment requirements of §191.13. They require the use of realistic projections, all available information regarding potential radioactive releases, and other conservative assumptions. In essence, they constitute EPA's requirements for measuring compliance with the release limits, not for implementing those limits. EPA is perfectly within its jurisdiction in requiring that compliance be measured completely and conservatively. DOE and NRC should not be free to "implement" the EPA release limits by using performance assessments that, for example, ignore information on human intrusion and other potential releases.

III. Requirements for Long-Term Monitoring: Question for Comment

(1) Should we include such a provision requiring long-term monitoring of a disposal site?

Response:

Yes. NRDC believes such long-term monitoring should be required as long as active controls could be relied upon, although the monitoring requirement should not be used to justify an increased period of reliance upon active institutional controls.

IV. Definition of Accessible Environment: Questions for Comment

(1) Which approach is preferable for use in defining the "accessible environment," and what advantages or disadvantages do the various alternatives have?

(2) If no single alternative is appropriate, are there features of two or more that can be combined into an appropriate definition?

Response:

NRDC still prefers its proposed definition, although we do not object to substitution of the word "groundwater" for "aquifer."

(3) If we were to use a definition with qualitative terms like "potable," "aquifer," or "significant amounts of groundwater," what guidance -- if any -- should we give the implementing agencies on the meanings of such terms?

Response:

NRDC recommends that EPA provide no further guidance regarding these terms. This is best left to the licensing proceeding, where it can be decided on a case-by-case basis, using a complete, site-specific, factual record. If NRDC's proposed definition of accessible environment is used, we doubt that there will be a major dispute regarding this issue, since the distance to the accessible environment would likely be conservatively established.

V. Standards Beyond 10,000 Years: Questions for Comment

(1) Should we adopt a longer period of time for our proposed containment requirements? If so, what time period would be appropriate?

(2) Alternatively, if we retain containment requirements for 10,000 years, should we also require that disposal systems meeting the containment requirements be further compared on the basis of low projected releases over a longer period of time? Such an approach might reflect the increasing uncertainties in projections over longer periods of time.

(3) Besides these alternatives, are there other approaches we should consider to address longer time frames?

Response:

NRDC's position on this matter remains unchanged from our earlier comments. We concur with DOE and NRC that EPA "strengthen" Section 191.13 by adding the requirement that the average releases from disposal systems beyond the 10,000 year period not be greater than those required during the first 10,000 year period. We believe, however, that this concept should be included as a licensing requirement, not simply as a statement of basis for EPA's choice of the 10,000-year regulatory period.

VI. Individual Dose Standards for Disposal: Questions for Comment

(1) Should we include a limit on individual exposure in our standards for disposal, considering the arguments that have been offered in the comments on our proposed rule?

Response:

Yes. The currently proposed standards do not provide adequate protection to the maximally exposed individual, e.g., due to inadvertent human intrusion into the repository. See NRDC's original comments.

(2) If so, should it apply to someone who might attempt to use groundwater in the vicinity of a disposal site sometime in the future?

Response: Yes.

(3) Should it apply only for groundwater at some distance from the repository -- like the distances considered in the potential definitions of the "accessible environment" -- or should it apply to any groundwater source?

Response: It should apply to any groundwater source. We are trying to protect human lives and therefore should not artificially exclude a subset of the population from protection, particularly if it includes the individual who will be subjected to the maximum exposure, or risk.

(4) Would it be adequate to add a qualitative requirement that individual doses should be kept as low as reasonable?

Response: ALARA should be applied across the board. If this requirement is not explicit in the proposed rule, it should be made explicit. This does not, however, dismiss the need for a separate limit to protect the maximally exposed individual.

(5) Would it be adequate to explicitly rely upon other existing individual dose limitations -- such as EPA's drinking water standards or NRC's 10 CFR Part 20 -- for protection regarding groundwater that might be contaminated in the future by disposal systems?

Response: Other standards, e.g., EPA's drinking water standard, may be appropriate; however, we see no basis for believing that a standard as high as 500 mrem/year, or even 5 rem/30 years would be appropriate for protecting individuals some 1000 or more years in the future. Past experience suggests that the "half-life" of the principal radiation protection standards, i.e., the time it takes for a standard to be reduced by a factor of two, is about one decade.

## VII. Need for Quantitative Definitions of Release

### Probabilities: Questions for Comment

(1) Should we replace the quantitative probability definitions in our containment requirements with qualitative terms of the types described by the NRC (H-7) or Benjamin Ross (D-19)?

Response:

NRDC strongly supports the use of quantitative probabilities in defining "reasonably foreseeable" and "very unlikely" releases, as used in the §191.13 containment requirements. Without these probabilistic definitions, NRC and DOE would be

given wide latitude in determining the likelihood of a particular release scenario. The agencies would not be required to back up these judgments with specific, detailed risk analyses or, in fact, with anything other than a claim of "expert judgment." This approach would enable DOE and NRC to avoid analyzing the radiological consequences of a particular release scenario, based on an unsupported, qualitative judgment that the probability of a release is "extremely unlikely." DOE and NRC used this approach in the Clinch River Breeder Reactor licensing proceeding in order to avoid including a core disruptive accident within the plant's design basis.

Although the uncertainties associated with any single probability estimate are very high, NRDC believes a probabilistic approach is essential in order to force DOE and NRC to build a record supporting their performance assessments. It would force the agencies to use a risk analysis approach (an approach NRC recognizes as meritorious) and to gather the requisite data, rather than simply to conclude that the data are not available.

NRDC believes the most reasonable approach would be to require the agencies to estimate the uncertainty associated with the probability of release for each release scenario, and to include as "reasonably foreseeable" and "very unlikely" releases those where the range of probabilities, defined by the uncertainty limits, are within the §191.12(g) and (h) definitions. This approach provides a workable licensing standard that accounts for the presence of considerable uncertainty.

(2) Would our containment requirements be more practical to implement if we used only one set of release limits -- instead of the two that we now have -- and applied them to releases estimated to have more than one chance in 1000 of occurring within 10,000 years (midway between the lower probabilities in the current definitions)?

Response:

No. Such an approach would weaken the containment requirements for both categories of releases, with no appreciable increase in ease of implementation.

Additional Comments:

While NRDC will not attempt to respond to every comment by other organizations and individuals, a few of the DOE comments not covered by the EPA questions are worthy of additional attention.

First, we do not agree with DOE's assessment that the EPA proposed standards are unnecessarily conservative. This criticism is based largely on the erroneous view that annual rather than cumulative health effects are the principal measure of cost. Furthermore, there are examples where the proposed standards are nonconservative, e.g., their failure adequately to protect the maximally exposed individual.

Second, contrary to the DOE view, NRDC believes that the ALARA principle should apply to site selection, a view that is entirely consistent with the NWPA. We do not understand why DOE believes this basic tenet of health physics should not, and cannot, be applied to site selection. We are fully aware that DOE has steadfastly refused to apply the ALARA principle in making a reasonable effort to examine basalt formations beyond the immediate vicinity of the Hanford Reservation. We believe this refusal is the underlying basis for DOE's opposition to this Assurance Requirement.

Third, the main thrust of DOE's request to delete all references to any particular host rock appears to be the removal of the reference to salt domes as an extremely poor host medium because of the potential for human intrusion. It will be interesting to see whether the EPA staff bows to this type of pressure from DOE, the future applicant for a repository license.

Finally, we strongly disagree with DOE's assertion that the requirement that independent barriers be designed separately to provide substantial isolation is "excessively conservative." "Defense in depth" is the linchpin of the historical approach to nuclear reactor safety. Most of the current reactor safety problems, in fact, can be traced to common cause failures. It is ludicrous to think that we can forget about defense in depth when it comes to repository design. The uncertainties surrounding repositories, if anything, require even more defense in depth than that currently applied to reactor design.

Sincerely,



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