

DOE TESTIMONY TO EPA

May 12, 1983, Hearing

Mr. Chairman and Panel Members. I am Michael J. Lawrence, Director of Storage and Acting Deputy Director of the Department of Energy's (DOE) Nuclear Waste Policy Act Project Office. I am pleased to take part in these hearings on the Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High Level and Transuranic Radioactive Waste. As you know, the DOE has already provided written comments on the proposed standards in a letter from W. A. Vaughan, Assistant Secretary, Environmental Protection, Safety, and Emergency Preparedness, dated May 2, 1983. Today I wish to elaborate on specific comments contained in our letter which relate to DOE efforts to provide facilities for the storage and disposal of commercial radioactive waste.

The Department's ability to fulfill its statutory responsibility under the Nuclear Waste Policy Act is closely linked with the requirements being set by the NRC and the EPA. It is critical that standards be set by EPA, implemented by NRC and met by DOE in a manner which ensures public confidence that radioactive wastes are being safely stored and disposed. For this reason, we appreciate this opportunity to comment on the proposed EPA standards, 40 CFR Part 191, particularly from our perspective of having to demonstrate compliance with these standards.

EPA is to be commended for its efforts to develop a regulatory framework for the management and disposal of high level radioactive wastes and spent fuel. The disposal of radioactive material raises a number of social, institutional and technical issues and has the potential for public health risks over time periods far surpassing regulatory or engineering experience. Because such issues are the focus of major public concern, it is essential that the responsible agencies work together in their respective roles to define and implement an effective regulation and repository development program under the Nuclear Waste Policy Act of 1982.

Accordingly, we are committed to continuing an open dialogue throughout the planning, siting, design, construction and operation of geologic repositories now envisioned for commercial waste. We have acquired considerable knowledge from the research and testing conducted over the past several years and the expanding investigations under the Nuclear Waste Policy Act can be expected to further enhance the knowledge we will supply to NRC and EPA.

The Department believes that commercial high level and transuranic wastes and spent fuel can be disposed of safely. However, to accomplish this objective, we believe the licensing process and its application should be recognized in establishing standards and regulations. Our principal concern is that it may be difficult to conclusively demonstrate compliance with the standard given the probabilistic and very long-term nature of the problem.

There will always be some uncertainties. It is of the utmost importance how these uncertainties are dealt with in establishing standards and regulations. In applying conservatism to account for uncertainty, the roles of the applicant, in this case DOE, the implementors of the standard (NRC and DOE), and the developer of the standard (EPA) must all be clearly apportioned in order to prevent multiple applications of conservatism for the same item. EPA's role is to establish a standard which restricts releases to levels which adequately protect public health and safety. The NRC then applies regulations to assure that the applicant's facilities will operate within the specified standards. In turn the applicant who wants to obtain a license will apply additional measures of conservatism to assure that the standard will be met and a license obtained. The Department encourages EPA to consider this multiple agency involvement in setting their standards.

I would now like to address three specific points which we would like EPA to consider:

1. To provide a long term population dose standard as an equivalent alternative to numerical release limits
2. To reconsider the degree of conservatism used to derive the curie release limits in Table 2
3. To remove the Assurance Requirements from the standard.

ALTERNATIVE IMPLEMENTATION APPROACH

DOE believes that the likelihood of successful program execution can be enhanced without diminishing protection of public health and safety by providing the option to demonstrate compliance with either release limits or a long term dose to the population in the vicinity of a repository.

The EPA rule establishes curie release limits at the accessible environment as its primary regulatory mechanism. In order to derive a set of generic allowable release limits, the EPA formulated a hypothetical repository setting based upon a number of assumptions. Actual conditions at sites under consideration may in fact provide more protection and should be allowed to be used as the basis for demonstrating compliance. We find considerable differences among specific sites where we may be able to demonstrate compliance with an equivalent health protection standard, but not necessarily the curie release limits in Table 2. This arises because of the generic way in which the table was derived and the assumptions and models used.

Since there will only be two to three repositories for commercial waste, we encourage EPA to also permit the application of an equivalent health protection standard based on dose to the population in the vicinity of an actual characterized repository site. This would permit DOE to consider site

specific biological pathways where specific health protection standards equivalent to Table 2 values are still met.

Establishment of an alternative health protection standard would also reduce our concerns about the EPA definition of the accessible environment because it would allow doses to be calculated based upon actual site conditions. The proposed EPA definition requires that we determine the curies that pass the extremities of a 10-kilometer "containment box." However, once radioactivity passes through the box, it is not necessarily in the biological environment. Some aquifers are nonusable because of their depth, quantity, or because they are not potable. Analysis may show that some sites may exceed Table 2, but due to low ground water velocities, or long ground water pathways, traces of radioactivity entering the biosphere would result in doses that are extremely low. In effect Table 2 could have been exceeded but compliance with a dose standard based on equivalent protection of public health and safety could have been easily achieved.

One final concern regarding the need for flexibility relates to our written comments to delete Table 1 in the EPA standard. Our concern with Table 1 is simply that it defines all wastes which may go to a repository as high level waste. As such it includes transuranic waste which does not have the heat generation characteristics of high level waste or spent fuel, and also does not require a long container life for the waste package. Clearly, a distinction needs to be made between spent fuel, solidified high level waste and transuranic waste. In addition, the table may include some other waste

which may not be appropriate for disposal in deep geologic repositories, i.e., large hardware components.

In summary, DOE recommends that the EPA rule be revised so that repository performance may be evaluated against either a long-term dose to a population or equivalent curie release limits. DOE also recommends that Table 1 be deleted so as to provide flexibility for use of alternative disposal technologies to safely dispose of a variety of other waste that will be generated in the decades to come.

RELEASE LIMITS STANDARD

The DOE would prefer the use of a small percentage of natural background radiation as a philosophical approach in setting the proposed standard. However, the DOE can accept [REDACTED] the equivalency of the repository to an unmined uranium ore body as the basis for the standard. However, the risks to the public due to naturally occurring ore bodies vary appreciably depending on the assay of the ore and its geohydrologic setting. There are considerable margins of conservatism in relating the health impacts associated with the release limits to the calculated health impacts from the natural ore bodies.

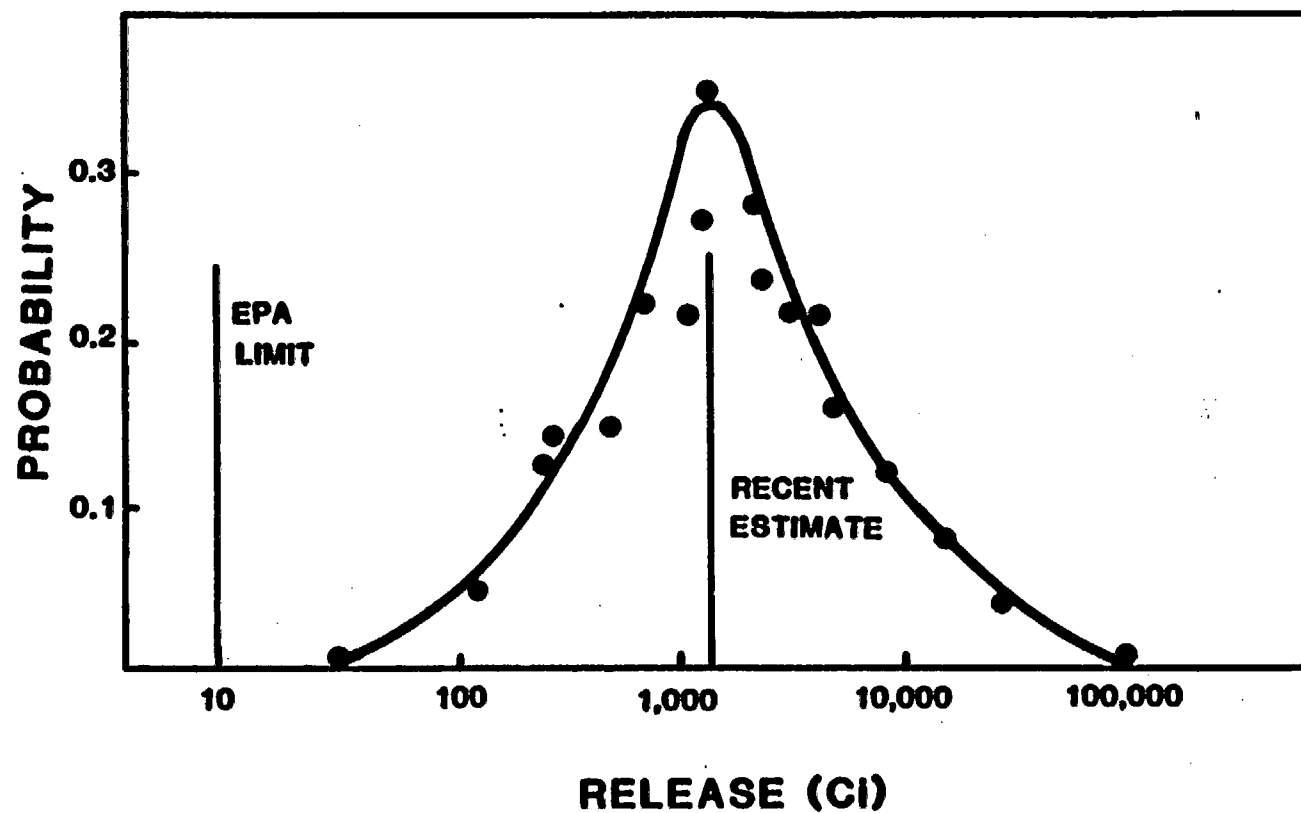
The EPA calculated a range of one to one hundred health effects per year for actual uranium ore bodies. These values are one to three orders-of-magnitude larger than the 0.1 health effects per year used to generate the release limits in Table 2 of Subpart B of the proposed standard. Thus, a high-level waste repository that meets the release limits in Table 2 could have ten to one thousand times less potential health effects than existing uranium ore bodies.

In addition, for most radionuclides, further conservatism in the curie release limits is introduced by virtue of the pathway model, parameters, and assumptions used by EPA to derive the specific isotope release limits in Table 2. Some of the conservatism arises from the use of a generic, site-independent biosphere model which is not representative of actual sites under consideration. DOE's goal is to select a site that would perform better

than EPA's generic site. However, EPA has predetermined some key site parameters in setting the release limits in Table 2. Because we must comply with those release limits, we will not be able to take credit for pathway features within the accessible environment that could further protect public health and safety.

This figure (viewgraph) illustrates these points. The EPA curie release limit for the Am-241 isotope is shown on the left side of the figure. Recent estimates using a detailed and more complex model estimated the release limit to be over a factor of 100 greater than that calculated by EPA for the same assumed health effect. In addition, the spread in the estimated release limits extends three orders of magnitude. The proposed EPA limit for Am-241 does not even fall within the range of curie releases that would take into consideration the variability of data in a generic sense. For most other nuclides results are similar to a greater or lesser degree.

In summary there were substantial and compounded conservatisms used in deriving the EPA release limits. However, if DOE is required to further compound these conservatisms during the licensing process, conclusive demonstration of compliance may not be possible. In light of this we encourage EPA to reconsider the limits set in Table 2.



**COMPARISON OF CALCULATED
CURIE RELEASES TO EPA LIMIT FOR AM-241**

EPA ASSURANCE REQUIREMENTS

My final comments relate to the assurance requirements in the standard. The DOE urges the EPA to delete these requirements from the standard since they are in fact implementing procedures which NRC and DOE are required to develop. In fact, many of these requirements are contained in the NRC's draft rule 10 CFR 60. Moreover, the Department, as required by the Nuclear Waste Policy Act of 1982, is developing a regulation on General Guidelines for Site Recommendation. These guidelines relate to some of the concerns addressed by EPA's assurance requirements.

We also have several technical concerns with regard to specific assurance requirements. In particular criterion (f) dealing with exploration for resources could effectively eliminate some of the sites presently under consideration. The exclusion of all salt domes is explicit in both the rationale for 40 CFR 191 and the draft EIS. Until a full and balanced analysis is made of all factors characterizing the sites under consideration, it is inappropriate to prejudge that salt domes are not suitable for a repository.

Both DOE and NRC have previously recognized that resource exploitation is a potentially unfavorable condition. NRC identifies this as one of the potential adverse conditions in 10 CFR 60.123. Likewise, DOE siting guidelines include this as one of several potentially adverse conditions for

the selection of a site. In each case, it is generally recognized that resource potential must be considered in the context of other favorable and unfavorable conditions of the system, not as an exclusionary, "fatal flaw" criterion. In particular, DOE does not believe that all salt domes are excessively vulnerable to intrusion. Salt is a very commonly available resource and it is difficult to envision a future situation where known reserves would be so limited as to attract massive exploration programs in salt to depths exceeding a quarter of a mile.

Finally, although we support and practice the application of ALARA for operating facilities, we do not consider it appropriate for the siting process since it would be impossible to prove that a selected site was absolutely the best site in the country. The DOE fully agrees with the NRC's statement in the rationale for the proposed 10 CFR 60 technical rule (46 FR 35284) that "ALARA--principles have not been applied to the natural features of a site because they are not amenable to modification once a site is chosen."

DOE intends to reduce long term risk through engineering design to the degree benefits can be clearly derived. We believe ALARA as presently used should not be applied to long term impacts of a repository because the estimates of potential benefits are likely to be very small and uncertain in comparison to their cost.

CONCLUSION

This concludes my formal statement. Let me reiterate that we are in agreement with the objective and intent of the EPA standard and hope that our comments will be useful and constructive. We believe that favorable consideration of these comments will increase our ability to demonstrate compliance with the standard without reducing in any real way the substantial protection of public health and safety which they provide.