



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

December 10, 1980

12-13-12-1980

Honorable John F. Ahearne
Chairman
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: WASTE CONFIDENCE RULEMAKING - STORAGE AND DISPOSAL OF NUCLEAR
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Dear Dr. Ahearne:

In your letter of January 9, 1980 to the Advisory Committee on Reactor Safeguards, you requested our participation in the proposed rulemaking to reassess the degree of confidence of the Nuclear Regulatory Commission "...that radioactive wastes produced by nuclear facilities will be safely disposed of, to determine when such disposal will be available, and whether such wastes can be safely stored until they are safely disposed of." You proposed that our participation be in the role of commenter and adviser to the Commission after the statements and cross-statements had been filed by the parties to the proceeding. You asked that we give particular consideration to the identification of those issues raised by the parties which we believe need further attention.

In the preparation of our response, we reviewed the statements and cross-statements listed below and had the benefit, during the 248th ACRS meeting on December 4-6, 1980, of discussions with representatives of the Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC). We also held Subcommittee meetings in Washington, D. C. on October 3, 1980 and November 13-14, 1980 during which members of the public and representatives of DOE and NRC made presentations.

Because existing directives indefinitely defer the reprocessing of spent commercial nuclear fuel in the U.S., the waste confidence rulemaking was initiated with an arbitrary decision that spent fuel would be the representative nuclear waste to be considered in this proceeding. This decision has been challenged by several participants in the proceeding. However, it has the advantage of forcing consideration of a wider range of waste storage and disposal problems because larger amounts of long-lived heavy elements (actinides) must be assumed present than is the case with waste from reprocessed fuel.

We will address each of the three issues raised in the proposed rulemaking individually. In considering these issues, we believe it is important to note that the U.S. Environmental Protection Agency, which has the responsibility at the Federal level, has not yet published standards for the environmental impact of disposal of nuclear waste. In addition, we believe

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that consideration of these issues would benefit from a careful assessment of the relative risks of the various steps within the overall fuel cycle in order to place into perspective the risk from the waste disposal step. Such an assessment should include a comparison of the risks associated with the disposal of spent fuel as contrasted to solidified high level reprocessing wastes.

1. "Reassess Commission confidence that radioactive wastes produced by nuclear facilities will be safely disposed of."

Whether wastes will be safely disposed of may be said to have two quite different components: the purely technical, which would determine whether safe disposal can be accomplished; and the institutional or political factors which will govern whether, or when, some action -- even if technically feasible -- will be taken. Considering first the technical aspects, we believe that safe disposal of radioactive wastes is reasonably assured by the present state of knowledge. Research in this country and abroad, notably Sweden, has shown that engineered packages for nuclear waste can be expected to remain intact in suitably sited geologic repositories for at least 1000 years.

We are confident that, in addition to the long containment against radioactive release provided by the engineered waste package, geological isolation can be expected to be effective in the longer time period of tens of thousands of years. Because, after 1000 years, decay of the dominant radioactive constituents represented by the fission products will have occurred, the geological barrier could then be reasonably relied upon for the remaining burden of isolation. In addition, because nuclear wastes lack sufficient concentrated latent energy to produce sudden and damaging effects by accident or malfunction, there should be ample time for measures to mitigate consequences from unexpected events. Therefore, even if the engineered package failed completely after 1000 years, there is still reasonable assurance that radionuclides would not reach the biosphere at unacceptable rates. The present state of knowledge allows the building of a waste repository in one of several known locations which meet the geological isolation requirements to prevent unacceptable rates of radioactive releases to the biosphere.

In our review of disposal of radioactive waste in geologic repositories we did not find any basic technical issues that, in our opinion, would require further attention prior to a rulemaking finding of confidence. However, we did find that some sociopolitical issues are in need of further attention as discussed below in item 2.

Therefore, we believe that safe disposal of radioactive wastes is reasonably assured from the technical standpoint. We believe that what is needed is an expeditious resolution of legal and political issues concerning site selection and acquisition.

2. "Determine when any such disposal will be available"

We believe that the DOE estimate for completion of a waste repository by 1997-2006 is technically achievable. However, the major problem in forecasting an availability date is sociopolitical. Until the issue of consultation and concurrence among federal, state and local authorities is better resolved and the licensing/litigation process as well as standards setting by EPA and NRC is better defined, we believe that trying to forecast a firm availability date for a repository is futile in the absence of action by Congress.

3. "Whether such wastes can be safely stored until they are safely disposed of"

In our review of whether waste in the form of spent fuel can be safely stored pending its safe disposal, we assume initially a required storage duration of about 30 additional years, that is, until about the year 2010. This is consistent with the date of 1997-2006 when DOE has stated that it will have disposal facilities in operation. As discussed below, we believe that safe interim storage well beyond 30 years can be provided should it be required.

The safety and practicality of interim storage of spent fuel has already been demonstrated for periods of 15-20 years. We believe there is no reasonable doubt that, with continued maintenance and surveillance, safe storage could be continued very much longer barring the occurrence of an unanticipated catastrophic external event. The reason for this confidence is not only the demonstrated performance cited above but the compelling logic that fuel and cladding materials which maintain their integrity under the severe environments of operating reactors will be essentially inert in the relatively benign environment of a storage water basin where the governing corrosion and diffusion rates are at least a few orders of magnitude less. Additionally, a spent fuel storage basin, unlike an operating reactor, has so little latent energy that it is much less subject than an operating reactor to sudden and possibly damaging effects by accident or malfunction. If, in spite of all expectations, an accident should occur, there should be time to deal with it and prevent any serious consequence.

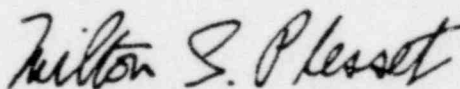
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An alternate method of storage, dry storage, has been extensively studied in the U.S., Canada, Europe, and elsewhere with satisfactory results. Although this method lacks the extent of demonstrated use compared to the water basin storage, we believe it warrants serious consideration because with longer aged spent fuel a simpler and more passive design is possible. Therefore, dry storage is even less susceptible to malfunctions.

Based on our review of storage of spent fuel for extended periods of time we did not find any important issues that require further attention. We, therefore, conclude that a high degree of confidence is justified that spent fuel can be safely stored until a facility for its safe disposal is available.

In conclusion, we believe that the issues and concerns about storage and disposal of nuclear waste have been adequately addressed and that the Commission should have a high degree of confidence that (1) radioactive waste can be safely stored until ultimate disposal is available, (2) disposal facilities can be made available, and (3) a disposal facility availability date by about the year 2000 can be met from the standpoint of technical considerations.

Sincerely,



Milton S. Plesset
Chairman

References:

1. DOE/NE-0007, "Statement of Position of the USDOE, In the Matter of Proposed Rulemaking on the Storage and Disposal of Nuclear Waste (Waste Confidence Rulemaking)", dated 4/15/80.
2. American Institute of Chemical Engineers Statement dated 6/23/80.
3. Mississippians Against Disposal (M.A.D.) Statement dated 7/1/80.
4. Scientists and Engineers for Secure Energy (SE₂) Statement dated 7/1/80.
5. American Nuclear Society Statement dated 7/3/80.
6. Tennessee Valley Authority Statement dated 7/7/80.
7. State of South Carolina Statement dated 7/7/80.
8. State of Vermont Statement dated 7/7/80.

9. State of Ohio Statement dated 7/7/80.
10. Atomic Industrial Forum Statement dated 7/7/80.
11. Robert Abrams, Attorney General of the State of New York, Statement dated 7/7/80.
12. Edison Electric Institute Statement dated 7/7/80.
13. New England Coalition on Nuclear Pollution dated 7/8/80.
14. William A. Lockstet Statement dated 7/8/80.
15. State of Delaware Statement dated 7/3/80.
16. State of Minnesota Statement dated 7/8/80.
17. Participant Sensible Main Power Statement dated 7/7/80.
18. Bechtel National Inc. Statement dated 7/3/80.
19. Neighbors for the Environment, Eugene Cramer Statement dated 7/4/80.
20. United States Geological Survey Statement dated 7/7/80.
21. Natural Resources Defense Council Statement dated 7/9/80.
22. State of Illinois Statement dated 7/7/80.
23. Wisconsin Geological and Natural History Survey Statement dated 7/10/80.
24. Ocean County and Township of Lower Alloway Creek Statement dated 7/10/80.
25. Marvin I. Lewis Statement dated 7/10/80.
26. California Energy Commission Statement dated 7/7/80.
27. Safe Haven, Ltd. Statement dated 7/11/80.
28. State of Oklahoma Statement dated 7/9/80.
29. James C. Maloro (NRCS) to Samuel J. Chilk (NRC).
30. State of Minnesota Statement Correction dated 7/9/80.
31. Request from Wisconsin's Environmental Decade, Inc dated 7/9/80.
32. California Department of Conservation Statement dated 7/7/80.
33. David Deese, State of Wisconsin's Statement dated 7/8/80.
34. United States Geological Survey Statement Correction dated 7/22/80.
35. Environmental Coalition on Nuclear Power Statement dated 7/22/80.
36. General Electric Company Statement dated 7/7/80.
37. DOE/NE-007, Supp 1, DOE Cross-Statement dated 9/5/80.
38. Attorney General of the State of New York Cross-Statement dated 9/3/80.
39. Atomic Industrial Forum, Inc. Cross-Statement dated 9/5/80.
40. Consumers Power Company Cross-Statement dated 9/5/80.
41. Tennessee Valley Authority Cross-Statement dated 9/5/80.
42. State of Delaware Cross-Statement dated 9/5/80.
43. California Energy Commission Cross-Statement dated 9/5/80.
44. State of Minnesota Cross-Statement dated 9/8/80.
45. State of Ohio Cross-Statement dated 9/8/80.
46. General Electric Company Cross-Statement dated 9/5/80.

47. California Department of Conservation Cross-Statement dated 9/5/80.
48. American Institute of Chemical Engineers Cross-Statement dated 9/3/80.
49. Niagara Mohawk Power Corp., Omaha Public Power District, Power Authority of the State of New York and Public Service Company of Indiana Cross-Statement dated 9/5/80.
50. United States Geological Survey Cross-Statement dated 9/5/80.
51. Environmental Coalition on Nuclear Power Cross-Statement dated 9/10/80.
52. State of Illinois Cross-Statement dated 9/5/80.
53. Marvin I. Lewis Cross-Statement dated 9/11/80.
54. New England Coalition on Nuclear Pollution and Natural Resources dated 9/10/80.
55. William A. Lockstet Cross-Statement dated 9/15/80.
56. Notice of Appearance, Consumers Power Co., dated 9/4/80.
57. Association of Engineering Geologists Position Statement dated 8/1/80.
58. Chase R. Stephens (NRC) to Emilio E. Varanini, III (Calif. Energy Comm.) letter dated 8/26/80.