UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CHAIRMAN

June 18, 1979

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The Honorable Adlai E. Stevenson, Chairman
Subcommittee on Science, Technology and
Space
Committee on Commerce, Science, and
Transportation
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

Thank you for your March 9, 1979 letter on low-level waste (LLW) disposal and your constructive suggestions on ways to better assure the safe disposal of LLW. I would like to take this opportunity to discuss several of your comments and also to review our program to develop regulations and criteria for LLW disposal.

The Commission has recognized for some time the difficulties involved with use of the term "low-level waste" as it is currently defined, in that it does not portray all the various forms and types of waste which may be disposed of as LLW. As you point out, LLW in some cases can contain high amounts of activity (e.g., discarded medical teletherapy sealed sources). To better define LLW, we are developing a radioactive waste classification system regulation along the lines suggested in your letter. That is, the regulation will require that waste be disposed of only by methods which assure confinement of the waste such that potential exposures to man will not exceed acceptable levels and will be as low as reasonably achievable. The performance criterion you suggested, namely that waste disposal never produce a measurable increase in population radiation exposure, is a worthy goal, and every reasonable effort to obtain it should be made. However, it must be recognized that failure to meet it does not necessarily imply that the public health and safety are not being adequately protected. Physical and chemical properties of the waste (e.g., radiotoxicity, half-life, mobility) will be factors in determining the disposal method which can safely be used for a given type and quantity of waste. In August 1978, a Federal Register Notice was published about the classification system, a copy of which is enclosed along with a copy of NUREG-0456, "A Classification System for Radioactive Waste Disposal - What Waste Goes Where", mentioned in the notice.

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The NRC's ongoing LLW management program includes an examination of alternative disposal methods to shallow land burial. Based on an initial screening, five methods of disposal have been identified for further study (improved shallow land burial, emplacement of wastes in mined cavities, disposal of wastes into ocean waters, emplacement of waste in engineered structures and intermediate depth burial; about 30 feet of cover as compared to 4-6 feet of cover for shallow land burial). A final report of this study is expected to be published shortly.

Thus, your comments about disposal of ^{137}Cs, ^{90}Sr, ^{60}Co, ^{3}H, and ^{14}C are being analyzed through our program. Through the combination of the waste classification studies and the analysis of alternative disposal methods, we expect to develop regulations that assure the proper disposal of all forms of LLW.

You specifically mention long-term site maintenance and surveillance in your letter. In this regard, one should distinguish between active controls such as maintenance of facilities and restrictions to physical access to the disposal area by means of fences, guards, etc., and passive controls such as record keeping and land use prohibitions. In addition, radiological monitoring can be used to check on the performance of the disposal facility. While the primary means for adequately protecting the public health and safety are the multiple natural and engineered physical barriers to radioactive waste migration, these active and passive controls provide an additional level of protection within our "defense-in-depth" approach. Thus, although we would expect and probably require both active and passive institutional controls and a monitoring program to be in effect for some time after the final closure of the waste repository, the repository will be designed and sited so that earlier termination of these controls or of the monitoring program will not of itself cause an undue risk to the public health and safety. Although we have not yet defined a specific institutional control period, we presently use 150 years in our analyses. This is sufficient time for many of the waste isotopes to decay to relatively safe levels.

You also note in your letter that there is currently no attempt to prevent the migration of radioactive material into the soil of a shallow land disposal site. A conservative assumption (presently) used by the staff in its analysis of existing shallow land burial sites is that no containment credit is given to the form of the waste, its container, or site engineering design. However, current practices used at

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the sites are directed at limiting the migration of material away from the burial trenches. Generally, only solid radioactive waste is accepted for disposal, the trenches are designed to minimize water infiltration and soaking of waste, and corrective measures have been taken based on past experience to minimize the contact of water with waste since water is the principal cause of migration. In developing our requirements for future LLW disposal, we recognize that waste form, the container, and other engineered measures can be utilized to reduce waste migration. You have suggested that any such engineered barrier be effective for no less than twenty half-lives of the waste. We certainly agree that the half-life is a design parameter that must be considered; however, as we pointed out earlier in this letter, it is most effectively considered in conjunction with other properties of the waste such as mobility and radiotoxicity.

We plan to publish proposed LLW regulations addressing waste form, packaging, site suitability, design, operations and post-closure surveillance and monitoring in the Fall of 1980. A goal of our LLW program and regulations is to assure potential population exposures from LLW disposal are kept to levels as low as reasonably achievable. An advance notice of proposed rulemaking asking for comment on the development of the supporting environmental impact statement for the regulations was recently published. (Enclosed is a copy of this notice). Your comments and suggestions will be incorporated into the public record for this rulemaking proceeding and will be used in the development of the supporting environmental impact statement.

Thank you again for your views on disposal of LLW.

Sincerely,

Original Signed by
Joseph M. Hendrie

Cleared with all Cmrs, by SECY C/R
Retyped in SECY to incorporate Cmr. comments

Joseph M. Hendrie

Enclosures:
1. FRN, August 1978
2. NUREG-0456
3. NUREG-0240
4. Advance Notice of Proposed Rulemaking

cc: Senator Harrison Schmitt

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