

MEMORANDUM FOR: Dad... Moeller, Chairman
Advisory Committee on Nuclear Waste

May 4, 1993

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: RECOMMENDATIONS AND FINDINGS ON SOURCE TERM AND OTHER
LOW-LEVEL WASTE CONSIDERATIONS

I am responding to your letter dated March 31, 1993. In that letter, the Advisory Committee on Nuclear Waste (ACNW) provided a number of recommendations and identified a number of findings regarding the analysis of the source term and performance of low-level radioactive waste (LLRW) disposal facilities.

A good understanding of LLRW characteristics and analyses of the performance of LLRW disposal facilities will be very important to the Nuclear Regulatory Commission and Agreement States in licensing LLRW disposal facilities. In addition, it will be helpful in demonstrating to the public our confidence in the safety of these facilities. The Division of Low-Level Waste Management and Decommissioning, within the Office of Nuclear Material Safety and Safeguards, has been working on improving our level of knowledge in both of these key areas through the development of a uniform manifest system and a branch technical position on performance assessment of LLRW disposal facilities.

Specific responses to your recommendations and findings are enclosed. If you have any questions, please contact Paul Lohaus on (301) 504-2553.

James M. Taylor **Original signed by**
Executive Director **James M. Taylor**
for Operations

Enclosure:

Responses to ACNW Letter

cc: The Chairman, Commissioner Rogers, Commissioner Curtiss, Commissioner Remick, Commissioner de Planque, SECY, OGC, OPA, OCA

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Specific responses to your recommendations and findings are enclosed.
If you have any questions, please contact Mark Thaggard on (301) 504-2568.

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**RESPONSES TO THE ADVISORY COMMITTEE ON NUCLEAR WASTE
RECOMMENDATIONS AND FINDINGS ON SOURCE TERM AND
OTHER LOW-LEVEL WASTE CONSIDERATIONS**

By letter dated March 31, 1993, the Advisory Committee on Nuclear Waste (ACNW) provided a number of recommendations and identified a number of issues that need to be addressed in analyzing the source term and performance of low-level radioactive waste (LLRW) disposal facilities. The following is a response to these recommendations and findings.

SOURCE TERM

1. *Staff should ensure that the data being collected through the Manifest System can be used for analyses covering the full range of environments likely to be found in the various LLW disposal facilities.*

Staff agrees that the manifest tracking system should provide the information needed in analyzing waste characteristics within LLRW disposal facilities, and it would be useful to have this information cover the full range of environments likely to be found in the various LLRW disposal facilities. Staff believes that, with minor improvements, current manifest information, as required by 10 CFR 20.311, is suitable for what is needed in performance assessment source term evaluations. The information contained in current manifests is generally suitable for our current proposed method for analyzing the source term, which is conservative.

The proposed uniform manifest, which is scheduled for rule-adoption this fall, should improve upon the current manifest system by requiring storage of certain information (particularly information likely to be needed in a performance assessment analysis) in a computer database. In addition, standardized waste, waste form and container description codes will improve our understanding of the type of waste being disposed of, and their containers. Under the proposed new manifest system, it is also envisioned that more descriptive waste and container description codes can be incorporated into the system, at a later date, without the need for a rule change, as the results from our work in performance assessment are factored into the information needs.

In addition under a technical assistance contract with Pacific Northwest Laboratory (PNL), the Division of Low-Level Waste Management and Decommissioning (LLWM) plans to have PNL look into the likely chemical environments in LLRW disposal facilities. This work will assist us in developing better source term analyses, if they are needed.

Enclosure

The practice by the NRC staff to provide definitive guidance to several of the states in the design of LLW source term surveys should be continued.

Nuclear Regulatory Commission staff will continue to provide information, such as NUREG-1418 ("Characteristics of Low-Level Radioactive Waste Disposed During 1987 Through 1989"), NUREG-5938 ("National Profile on Commercially Generated Low-Level Radioactive Mixed Waste"), and the uniform manifest, which States can use in the development of LLRW source term surveys. Some States (such as Massachusetts) have used the draft uniform manifest forms to guide their determination on the specific type of information needed in the survey. Through organizations such as the Low-Level Waste Forum and Host State Technical Coordinating Committee, States have been very involved in the development of the uniform manifest rule. The NRC intends to keep States and compacts informed through the final rule development and implementation process and will be inviting States, that specifically commented on the proposed rule, to a public meeting tentatively scheduled for June of this year.

2. ***The program of the NRC staff to encourage submission, review, and approval of a topical report on improved methods for estimating the quantities of certain key radionuclides should be expedited [paraphrased].***

It is widely believed by both the NRC and many of the Agreement States that current estimates of certain radionuclides are too high. The NRC has been informally requested to review the appropriateness of using the Vance 3R-Stat model for estimating the inventory of certain key radionuclides such as ¹²⁹I and ⁹⁹Tc; this model, if determined to be appropriate, will be helpful to LLRW site developers in demonstrating compliance with the regulations. However, a detailed review of a code such as the Vance 3R-Stat model will require a considerable amount of staff effort; therefore, the NRC has encouraged submission of the code as a topical report. To date, the vendor has not been willing to do this. Currently, the Department of Energy (DOE) is reviewing the idea of submitting the code as a topical report, as part of its responsibility to provide technical assistance to LLRW Host States.

Other codes may also offer the potential of providing better estimates of certain radionuclides. The Electric Power Research Institute has indicated that it will make a decision sometime this spring on whether to submit their RADSOURCE code as a topical report.

As more States are moving farther along with their waste disposal plans, identification of the need for these type of codes has intensified. The NRC will continue to work with anyone wishing to pursue full NRC review of a code that will help to provide better estimates of disposed radionuclides. We expect that the need for such a code will expedite the submittal of one or more suitable codes as a topical report.

One item of information that should be included in the Manifest System is whether quantities of specific radionuclides are based on measurements or estimates [paraphrased].

Staff does not believe that it is necessary to specify whether radionuclides are estimated from acceptable "scaling" programs. Radionuclides such as ¹²⁹I and

⁹⁹Tc, where scaling factors are based on lower limits of detection, are reported (and will continue to be reported under the proposed new manifest system) in a manner to indicate this limitation. As previously indicated, it is generally accepted that scaling in this manner overestimates total quantities of these nuclides; this is one of the reasons why staff has supported the submission of topical reports on alternative approaches such as 3R-Stat or RADSOURCE. Use of such values will lead to conservative results in performance assessment analyses.

3. *Attention needs to continue to be given to improving both the models and the data used for assessing environmental transport.*

LLWM is developing a Branch Technical Position (BTP) on performance assessment of LLRW disposal facilities. This BTP will address issues of uncertainty in analyzing the transport of radionuclides through various environmental pathways (e.g., air, groundwater, and surface water). The current plan is to have this document out for public comment by the end of this fiscal year. The ACNW is scheduled to be briefed in August.

OTHER CONSIDERATIONS

1. *NRC staff should institute an aggressive program of regulatory support to the states involved in site screening and site characterization.*

In 1986, NRC issued guidance to States and compacts on the availability of NRC regulatory assistance. Internal guidelines on providing technical assistance were developed in 1988 and revised in 1990. As stated in these guidelines, the NRC's role in providing assistance is limited because of the nature of the Atomic Energy Act. However, the NRC will continue to provide technical assistance to the States, when requested.

LLWM has already provided some assistance to a number of States involved in site selection and site characterization. For example, it has provided technical assistance to New Jersey and Ohio in their efforts to develop siting criteria, and to Connecticut, Vermont, and California in their development of site characterization plans.

2. *Waste processing holds promise for more definitive performance assessments of LLW disposal facilities with attending increases in confidence about the protection of the health and safety of the public [paraphrased].*

We agree with your statement that waste processing (if adequately controlled) not only has the potential for creating a more stable waste and thus safer waste, but also a much more unified waste. A more unified waste will improve potential licensees' ability to characterize what is in the waste; this should allow much more realistic performance assessment source term analyses.

3. *The NRC staff should encourage the states to take advantage of the Performance Assessment Center at INEL [paraphrased].*

NRC staff will make States aware of what is available at the Performance Assessment Center (PAC) as the opportunity arises. Most States are aware of

what the PAC offers because staff at the National Low-Level Waste Management Program, at Idaho National Engineering Laboratory (INEL), regularly sends out publications and other materials. In addition, a number of States are using the computer facilities (via modem) and computer codes at the INEL.

4. *Texas has established a BRC limit which has allowed disposal of some radioactive waste in municipal landfills with no apparent detrimental health effects.*

The NRC published a proposed policy statement, on July 3, 1990, to establish a rule for exempting certain practices from regulatory control if they involved small quantities of radioactive material. This policy statement was revoked last year by passage of the Energy Policy Act. NRC is currently holding workshops with members of the public, industry, State/local governments and other agencies to discuss considerations on establishing radiological criteria for the decommissioning of NRC-licensed facilities and sites.

5. *The NRC staff should be encouraged to tabulate and report mishaps that occur in the management and disposal of LLW.*

A generic letter (Generic Letter 91-02) was issued on December 28, 1990, requesting all operators of LLRW disposal sites, waste processors, and all holders of licenses for nuclear fuels, nuclear materials and nuclear power reactors to voluntarily submit information regarding mishaps of LLRW forms prepared for disposal. Staff evaluates this information as it is received for relevance to the program and need for any changes. Only a few reports are received each year and copies of the reports are shared with the Agreement States.

6. *An overabundance of LLW disposal facilities, each operating on a part-time basis, could lead to health and safety problems.*

Either the NRC or the Agreement State having regulatory jurisdiction is responsible for determining that any new site licensed meets the requirements of 10 CFR Part 61 or the equivalent Agreement State regulations. NRC staff believes that a facility which is sited, designed, operated and closed under the provisions of Part 61 will ensure protection of the public health and safety and the environment. As a part of any individual licensing action, specific issues, such as part-time operation, will have to be carefully considered and assessed as to their potential impact on safety and environmental protection.