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

July 24, 1996

The Honorable Shirley Ann Jackson
Chairman
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

Dear Chairman Jackson:

SUBJECT: ELEMENTS OF AN ADEQUATE NRC LOW-LEVEL RADIOACTIVE WASTE PROGRAM

You have expressed interest in our view of what constitutes an adequate low-level radioactive waste (LLW) program. This topic was discussed by the Advisory Committee on Nuclear Waste (ACNW) in connection with its report to the Commission on SECY-95-201, "Alternatives to Terminating the Nuclear Regulatory Commission Low-Level Radioactive Waste Disposal Program," July 31, 1995. In addition, the Nuclear Regulatory Commission's (NRC's) LLW program has a direct link to decommissioning and the Site Decommissioning Management Plan (SDMP) program. This report relates the comments of the ACNW and its continued deliberations to a practical template.

Several fundamental assumptions emphasized in the introduction will help clarify the structure and priorities found in this description of a LLW program. This letter, as the subject implies, only addresses what the Committee believes are the "elements" of an adequate NRC low-level radioactive waste program. It is not intended to be a comprehensive program, the ideal program, or anything more than the subject of the letter implies. Neither have we attempted to specifically relate the elements to activities that are already a part of the current NRC program. We decided that the concept would be clearer if we stuck to the principle of describing the program elements without the interruption of frequent reference to current practices and activities. The Committee is aware that many of the elements noted are involved in the current program. In addition, the content and structure of an adequate program are outlined without the constraints of budget or politics. Further, this description is focused only on a NRC program. Programs under the jurisdiction of Agreement States will, of course, have a structure and scope determined by the individual State within the compatibility and adequacy criteria of the NRC. Such programs may differ from those identified here.

EXECUTIVE ABSTRACT

A program on LLW that is believed to be adequate to meet the responsibilities of the NRC is described. This description is based on selected fundamental principles and a view of the role of the NRC in its relation to the public, the states, and licensees. An adequate program must have elements that include staff capabilities; protocols related to standards, regulations, licensing; evaluation of technical and programmatic factors and documents; research; communication with the public; and interaction with other groups. This description presents a framework of a LLW program rather than simply reinstating activities that have been reduced by budget pressures.

1. INTRODUCTION

The NRC LLW program represents a most important interface between NRC and the public. The current absence of LLW facilities has forced the waste to be dispersed in thousands of interim storage location places that are generally much less secure than the storage areas for spent nuclear fuel. The LLW is generated and stored in a large variety of locations that are closer to the population and groundwater aquifers than any other major source of regulated radioactive materials. The nuclear waste issues, as conveyed to the public, have no closer general association with public health and safety than through LLW management. Therefore, the Commission should assign very high priority to the maintenance of a competent LLW program with a focused structure. In this context, the elements of an adequate LLW program are described, one that accomplishes the goals required by the mission of the NRC and responds to the impact on and importance to the public of this phase of nuclear activities.

The underlying assumptions on which a program is based define the scope and objectives of the program. This description of an adequate LLW program is based on the following assumptions including: (1) an Agreement States program has been established through revision of the Atomic Energy Act of 1954, as amended (AEA), (2) the goal of the NRC's LLW program is the protection of public health and safety and of the environment, and (3) the role of the Federal Government is to provide a centralized, demonstrably qualified, and highly responsive source of regulatory concepts, activities, and audits to which the public and governmental entities can turn for a satisfactory model and in case of questions, doubts, or concerns. The elements of an adequate LLW program are, by this definition, not limited by budgetary constraints or by political divisions. However, the "adequate" nature of the LLW program can be contrasted to an "ideal" program by budgetary constraints. The present description does not address specific budgetary issues for several reasons, not the least of which is our lack of experience with NRC budget processes.

In addition, the adequate program is not intended to interact with Agreement States programs except in a supportive manner or, as now practiced, when evaluations are required. Finally, elimination of parts of the described program can be expected to have a negative effect on the adequate nature of the remaining program.

2. BASES OF THE PROGRAM

(a) Objective

An adequate NRC LLW program ensures that the processing, storage, and disposal of LLW, as it is defined in 10 CFR Part 61, are carried out in accord with other NRC regulations (e.g., 10 CFR Part 20) and that the current and future impact of such activities will not represent an excessive risk to the affected population or the environment. This objective extends to all LLW-related activities within the jurisdictions of the NRC.

(b) Scope

For the purpose of this limited description, the primary scope of the LLW program includes all activities, regardless of agreements (e.g., Agreement State contracts) or coordination (e.g., compacts) among participants that involve the processing, temporary storage, transportation, and disposal of LLW. Also, it would be desirable to include in an adequate LLW program a modest amount of attention to "greater than class C" (GTCC) waste as defined in Part 61 and to "mixed waste." Under such an expanded scope, other wastes that would be included in an adequate LLW program are naturally occurring and accelerator produced radioactive material (NARM) and naturally occurring material (NORM), wastes from uranium recovery and processing, wastes that are formed by the inadvertent concentration of contaminants (e.g., sewage, bag house dust), and wastes derived from decontamination and decommissioning activities[1].

3. COMPONENTS OF AN ADEQUATE LLW PROGRAM

The components of an adequate LLW program include standards, regulations, licensing, enforcement, evaluation, communication, technical support and technical resources, research, and activities with other entities. The distinction between an "adequate" and an "ideal" LLW program is likely to be in the scope and completeness of execution of the LLW components. In order to be classed as adequate, the LLW program needs to contain those elements and

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[1] Some of these wastes are precluded from NRC attention by various Acts of Congress. If there is a desire to frame a LLW program that is adequate but circumscribed under current laws, then such materials as defined in restricting legislation would be excluded from the scope. However, it is clear that the public draws no artificial distinctions such as made by Congress about the jurisdiction over the various kinds of relatively benign radioactive materials.

subelements that are critical (or believed to be critical by the public[2]) to the NRC'S public protection role. Program components at the "adequate" level are briefly described below.

(a) Standards

An adequate LLW program must have available to it generally applicable environmental standards, preferably expressed in terms of risk. The standards for groundwater protection should address the risk at the edge of any disposal facility in terms appropriate to this point of enforcement. In addition, the standards for exposure of the general population and occupational workers should be available in terms of risk that is in concert with risk standards found in other regulations. The present standards may be acceptable, except that Environmental Protection Agency (EPA) groundwater standards include resource protection that is not directly relevant to public health and safety[3]. The protocol for a working relationship between the NRC and the EPA needs to be developed, perhaps using the current interaction on the Yucca Mountain standard as a model.

(b) Regulations[4]

The regulations, specifically Parts 20 and 61, should be re-examined and revised so that their principal, obvious outcome is the protection of public health and safety when advanced concepts (e.g., above-grade vaults, advanced waste forms) of LLW disposal are utilized. The NRC should have in place regulations that identify minimum site characteristics for an acceptable LLW disposal facility location. There should be very few unequivocal disqualifying site attributes, and the site characteristics should be developed while mindful of the variety of disposal techniques likely to be submitted by prospective practitioners and the wide diversity in proposed facility terrains.

Regulations should identify the performance of a repository related to risk and be coupled to a time frame[5] over which an applicant

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[2]This is an important, albeit perhaps nontechnical, criterion not to be overlooked.

[3]The distinctions made by the USEPA should, in an ideal situation, be rectified.

[4]The provisions listed can be installed in revised regulations (Parts 61 and/or 20) or could be formulated in Regulatory Guides, technical position papers, or other documents. The selection of the avenue should be based on the extent to which the provisions are necessary to the protection of the health and safety and the environment and the extent to which alternative processes could accomplish the same goal.

[5]This would require revision to Part 61 since at present there is no time limit for showing compliance with the 25/75/25 mrem/y dose. The matter of time limits for demonstration of compliance with regulations is still being discussed by the ACNW.

must demonstrate compliance. To be considered adequate, a LLW program should include regulations so structured that anticipated LLW disposal licensees (now largely but not exclusively in Agreement States) would be able to use the regulations as guides for demonstrating their compliance. Further, the regulations should identify the "as low as reasonably achievable" (ALARA) process as part of the basis for performance of a LLW disposal facility and should ensure that the ALARA concept is employed, not as a numeric goal or quasistandard, but as a process [6]. In order to be a useful guide, the regulations should (1) state the limits of contamination of groundwater at the accessible environment[7] (e.g., the EPA drinking water limit for appropriate aquifers), (2) state the limits on airborne contamination as measured at the site boundary, (3) refer to 10 CFR Part 20 for occupational exposure limits, and (4) set the limits to the contamination of the soil at the site. The regulations should be carefully crafted to allow applicants flexibility in reaching the desired goals. Agreement State regulations should be compatible. The NRC LLW staff should, however, be prepared to evaluate the proposals of applicants that elect to follow paths other than regulatory guides or position papers while claiming to arrive at the required level of protection of public health and safety. In order to maintain the LLW program in the adequate range, the NRC staff should be prepared to examine and modify the regulations as experience dictates. In addition, the NRC staff should exercise the capability to examine and evaluate the regulations of other entities, such as Agreement States[8]. Also, the internal organization structure of the NRC that deals with Agreement States should ensure that the technical experts from the Office of Nuclear Material Safety and Safeguards (NMSS) are directly available to help the Agreement States. Small teams of experts in technical and licensing matters could be drawn from various divisions and groups by matrix management. The role of the Office of State Programs should be defined to ensure such NMSS participation.

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[6]The ALARA concept poses some difficulties when the process of defining compliance with regulations is described to the public. Nevertheless, the ALARA concept as a process can be used as a powerful tool in the regulatory arena and should be retained in LLW regulations.

[7]Risk levels in regulations should take into account the irreversible nature of contamination in certain situations, e.g., groundwater supplies from major aquifers. The exact means for taking this into account is not clear but the EPA ground water report gives some indication of what could be used as a starting point.

[8]The potential conflict of this recommendation with the apparent NRC position on its Agreement State relationships (i.e. NRC has relinquished authority) is recognized. However, if the NRC is to be viewed as the competent entity that assures public protection, the NRC must be prepared to intervene in a deficient operation, regardless of the agreement status. This is believed to be a requirement for an adequate program.

(c) Licensing

The NRC staff should be capable of managing, with internal expertise, all important aspects of licensing a LLW facility. Similar capability must exist for the approval (e.g., review of topical reports) of concepts, equipment, and processes. Procedures for licensing, i.e., requirements for documentation and associated information, should be defined in available documents. These should detail the considerations to be used by the NRC staff in the review process. The details of compliance determination strategies and methodologies should be defined in guides except in those rare instances where rulemaking is required when focused (e.g., singular) protocols are deemed to be optimal (should be rare) or to avoid excessive and unproductive legal arguments at the time of processing the license application.

This implies that the LLW staff in an adequate program largely has technical capability no less than any applicant or intervenor[9]. Such competence can be obtained by employing qualified personnel maintained by, for example, continuing scientific and technical activities. The latter is a necessary part of maintaining a capable staff for an adequate LLW program.

(d) Enforcement

An adequate LLW program should contain NRC inspection and enforcement activities to ensure that public health and safety is unequivocably protected. The public must be able to see the enforcement of the NRC regulations. Further, the evaluation of the compatibility and adequacy of Agreement State programs must contain provisions measuring the quality of the enforcement process as well as the use of evaluation criteria that are directly related to public health and safety, e.g., number of incidents, number of overexposures, and violations of technical specifications leading to excessive risks.

(e) Evaluation

Evaluations can be divided into several parts. The NRC staff must have sufficient technical skill (see (c) above and footnote 9) and sufficient working knowledge to evaluate the submissions of potential licensees. This includes information about site characteristics, as well as disposal and operating systems. Further, the NRC staff must be able to support Agreement State activities by providing requested technical evaluations. Such support will likely involve negotiation about the extent, timing, and costs. The NRC LLW staff must remain cognizant of activities

[9]This may be perceived as too stringent, especially in times of budgetary stress. On the other hand, the public view of the necessary technical quality of those charged with protecting its health and safety may well demand such a level of competence.

in Agreement States and should provide requested comments and advice, especially when recognized deficiencies could lead to an unsatisfactory outcome.

The NRC LLW program staff should have the capability to evaluate all aspects of the performance of LLW facility licensees. In addition, incidents that result in serious violation of the technical specifications of a LLW facility, provide indications of important deficiencies in the control of wastes, result in excessive exposures of personnel, or result in offsite contamination in excess of predetermined levels should be investigated and evaluated by the NRC LLW staff. In this role, the NRC LLW staff as the technically competent and vigilant Federal oversight agency should seek to ensure the protection of public health and safety.

(f) Communication With the Public

The adequate LLW program must be able to communicate, in terms clear to the public, the actions and their consequences of evaluating applications, granting licenses, evaluating Agreement State programs, rectifying deficiencies in licensee and Agreement State activities, etc. The NRC staff needs to communicate regularly with Agreement States and licensees. The interactions should be designed to address technical issues and to ensure that misconceptions and misunderstanding of LLW regulations or the NRC role in their application are corrected in a timely manner. In order to ensure this process is effective, staff size and capabilities must match the needs and the results of evaluation of the outcome of the interaction processes. The use of small interdisciplinary teams (see (b) above) may be an effective paradigm. Public perception of NRC activities should reflect the basic mission of the NRC, i.e., protection of public health and safety and the environment. Regular reporting to the public on all facets of LLW disposal and management should be part of an adequate LLW program.

(g) Technical Support

The NRC must be able to provide technical support to licensees and Agreement State programs when requested and also when such support appears to be required. As already noted, technical evaluations and support in the prelicensing stage should include evaluation of applications, identification of deficiencies in analyses and data acquisition, etc. The NRC staff should be able to formulate peer review process protocols for LLW technical issues that would aid the potential licensee or Agreement States in developing a sound and defensible technical basis for license applications. Technical support from an adequate program must also be functioning during the operational and closure phase of LLW facilities. An adequate LLW program should evidence coordination between the LLW staff and operating materials licensees.

(h) Research

An adequate NRC LLW program may encompass research activities. However, the LLW program need not involve a research component, except that the maintenance of technical skills of the staff could be implemented in part by research programs, and except in instances where important research broadly related to LLW is not being done by other groups. Research activities must specifically address problems noted in evaluation of LLW disposal facility sites or that have been identified through internal and external performance evaluation of the LLW systems. Research on site- or facility-specific problems need not be part of an adequate LLW program. In the absence of a suitable research program, the NRC LLW technical staff needs to be provided with scientific and technical growth through other avenues.

(i) Interfaces

An adequate LLW program should have identified points of contact with other agencies and organizations, as well as within the NRC. The former include the EPA regarding standards and mixed wastes, the Department of Energy (DOE) regarding GTCC disposal and Agreement States. Sound agency management will define the extent and distribution of such contacts.

4. OTHER ACTIVITIES IN AN ADEQUATE LLW PROGRAM

In SECY-95-201, the NRC staff presents in Table 1 the options considered in the SECY paper and the activities for a number of elements. We comment here on their relevance to an adequate LLW program.

(a) Rulemaking will be needed both initially to develop functional bases for the adequate LLW program and occasionally thereafter to correct and expand regulations as the need arises. The LLW staff[10] should have sufficient technical capability to evaluate the work of RES and others in the rulemaking process.

(b) The NRC LLW staff will need to be able to respond to petitions in concert with other offices (e.g., the Office of the General Counsel).

(c) The Commission should be able to obtain policy guidance and advice from the LLW staff. That staff can, in the course of normal duties, develop various technical documents that provide guidance to potential applicants, to Agreement State programs, and to others.

[10]The assignment of RES personnel to the rulemaking role may be an unnecessary artifact of previous agency operations. If the LLW staff is competent, interaction with OGC advisors may be all that is necessary.

(d) International activities should be part of an adequate LLW program, owing to the importance of such activities to the U.S. and to the safe use of nuclear technology. The extent to which such activities are pursued needs to be carefully defined, largely because of budget constraints.

(e) Import/export authorization need not be part of an adequate LLW program. This topic can be managed by other Federal agencies in consultation with NRC and DOE.

(f) Emergency access to LLW facilities is not a necessary part of an adequate LLW program and could be managed by another Federal agency.

(g) Assistance to other Federal agencies should be part of an adequate LLW program if the topics so warrant. NRC management should determine the extent of involvement on a case-by-case basis.

We trust these comments are responsive to your request.

Sincerely,

Paul W. Pomeroy
Chairman