

CLEARING A PATH FOR REGULATORY COMPLIANCE: AN UPDATE OF NRC MIXED WASTE ACTIVITIES

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ABSTRACT

Since the mid-1980's, the U.S. Nuclear Regulatory Commission (NRC) and U.S. Environmental Protection Agency (EPA) have cooperated in seeking solutions to issues associated with the joint regulation of radioactive mixed waste. To date, these efforts have produced joint guidance documents on the definition and identification of mixed waste, siting guidelines for mixed waste disposal facilities, and conceptual design guidance for mixed waste disposal facilities. More recent efforts have concentrated on the development of joint guidance documents associated with mixed waste testing and storage. These documents are intended to provide acceptable procedures that can be used by the regulated community in complying with both agencies' requirements, while maintaining radiation exposures as low as reasonably achievable. In addition to guidance development, the agencies are jointly sponsoring the National Mixed Waste Profile. Through Oak Ridge National Laboratory, the agencies solicited information on the volumes, characteristics, and treatability of mixed waste from about 1300 commercial generators nationwide through a voluntary questionnaire. The profile should provide information needed by States, compact officials, private developers, and Federal agencies to help plan and develop adequate treatment and disposal facilities for commercial mixed waste. The same information will also be useful to the Department of Energy as it considers accepting commercial mixed waste for treatment and disposal.

INTRODUCTION

Since the mid-1980's, the Nuclear Regulatory Commission and Environmental Protection Agency have been cooperating to resolve issues associated with the management, treatment, and disposal of low-level radioactive mixed waste. Low-Level mixed waste satisfies the definition of low-level radioactive waste in the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPA) (1) and contains hazardous waste that is either: 1) listed as a hazardous waste in 40 CFR Part 261, Subpart D (2), or 2) causes the waste to exhibit any of the characteristics identified in 40 CFR Part 261, Subpart C (2, 3). Low-Level radioactive waste is defined in the LLRWPA as radioactive material that is not high-level waste, spent nuclear fuel, or byproduct material, as defined in Section 11e (2) of the Atomic Energy Act of 1954 (AEA) (4), and is classified as low-level waste by the NRC (1). Because it contains hazardous and radioactive waste, mixed waste is subject to both NRC's requirements under the AEA and EPA's requirements under the Resource Conservation and Recovery Act (RCRA) (5).

This joint jurisdiction for mixed waste has evoked sharp criticism from mixed waste managers. They have asserted that joint jurisdiction is not necessary to protect the public or the environment and, consequently, it is a waste of resources and an unnecessary regulatory burden. As awareness of the issues associated with joint jurisdiction for mixed waste increased, each agency searched for regulatory alternatives to resolve these issues, including seeking single agency jurisdiction, extensive reliance on the inconsistency provision of RCRA Section 1006(a), and consideration of broad exemptions under RCRA and AEA (4, 5). The search was halted in 1985, when several Congressional hearings encouraged the agencies to seek administrative solutions to joint jurisdiction in a manner that would reduce any unnecessary burden, but not the level

of safety and environmental protection afforded by each regulatory program.

The administrative efforts initiated after the 1985 hearings culminated in the issuance of joint guidance documents on the definition and identification of mixed waste, siting guidelines for mixed waste disposal facilities, and a conceptual design for a mixed waste disposal facility (3, 6, 7). NRC and EPA attempted to integrate the two agencies' requirements through the joint guidance documents in a manner that: 1) made technical sense; 2) provided for adequate protection of human health and the environment; 3) reduced any unnecessary regulatory burden; and 4) addressed important questions that threatened to complicate or unduly delay progress in State efforts to develop new disposal facilities for low-level radioactive waste.

By developing these joint guidance documents, the agencies attempted to clear a path through the morass of differing regulatory requirements and restrictions for generators and managers of mixed waste. The objective of both agencies was, and continues to be, to improve the level of human and environmental protection by facilitating regulatory compliance.

CURRENT EFFORTS

The interagency cooperation that produced the three joint guidance documents is currently continuing with a range of activities, including the National Mixed Waste Profile; development of additional joint guidance to address other important issues; and participation in workshops and conferences that address mixed waste issues. As a parallel effort at the highest levels of both agencies, the Commission and the EPA Administrator have been seeking agreement on a general approach to resolve a number of regulatory issues of mutual interest. The agencies have developed a Memorandum of Understanding (MOU) to provide a mutually acceptable framework for continued and enhanced cooperation in

resolving issues of mutual interest. NRC signed the MOU in December 1991 and EPA is expected to sign in January 1992. This general approach to cooperation has been pioneered, at least in part, by the cooperative efforts between the agencies in resolving mixed waste issues.

National Mixed Waste Profile

NRC and EPA are currently conducting a survey of potential mixed waste generators across the nation as a part of the development of the National Mixed Waste Profile. The agencies are conducting the survey in response to a May 1990 request from the Host State Technical Coordinating Committee (TCC) to compile a national profile on the volumes and characteristics of commercially-generated mixed waste (10). In its request, the TCC stated that this information is needed to help States, compact officials, private developers, and Federal agencies plan and develop treatment and disposal facilities for mixed waste. The survey is being performed for NRC and EPA by the Oak Ridge National Laboratory (ORNL). ORNL conducted a pre-test of the survey questionnaire in September and October 1991 with the assistance of the Appalachian Compact Users of Radioactive Isotopes. The final profile, including projections of the types, volumes, and characteristics of mixed waste, should be completed by June 1992.

Accurate projections of the types and volumes of mixed wastes are necessary to evaluate the need for and design of treatment, storage, and disposal facilities that comply with NRC and EPA requirements, or those of authorized State agencies. States, compacts, generator groups, and NRC had previously completed surveys of the types and generation rates of mixed wastes. As the first step in preparing the Profile, ORNL reviewed these earlier surveys and concluded that although these surveys had provided much useful information, they did not employ consistent survey methods and were conducted for different objectives (11). Therefore, ORNL concluded an additional survey was needed to ensure consistent and relatively complete characterization of mixed waste at the national level (11). ORNL used the existing survey data in developing the sampling scheme for the new survey.

The agencies' intent in conducting the survey was to collect accurate and complete information on mixed waste to provide sufficient information for State, compacts, commercial developers, and Federal regulatory agencies to manage and regulate mixed waste effectively. The agencies did not collect the data for enforcement purposes. Survey responses will be submitted to and retained by ORNL. Survey results are being provided to NRC and EPA without any individual facility identification. The information will also be published in an aggregated form without identifying individual facilities. NRC and EPA are seeking full cooperation of States, compacts, and generators to help ensure that this survey will provide meaningful estimates of the volumes, characteristics, and treatability of mixed waste on a national basis.

Preliminary results from the survey tend to confirm the earlier projections that mixed waste accounts for between 5 and 10% of the total volume of commercial low-level radioactive waste. The survey results compiled to date also indicate that scintillation fluids are the largest mixed waste stream. With the information collected and analyzed so far, it also appears that most of the mixed waste is being generated by the medical and industrial sectors of the nuclear community.

ORNL will compile all of the available survey information by the end of March 1992 as the basis for making projections of the total volumes and characteristics of mixed waste. The projections will be made by appropriately weighing the survey data to reflect the degree to which the data represent the total generation rate of mixed waste in any given sector of the commercial nuclear industry. ORNL will then compile the projections into the National Mixed Waste Profile. NRC plans to publish the Profile for public comment in mid-1992. Depending on the comments received, NRC and EPA may either revise the profile or officially adopt the projections in the draft Profile document. Along with the Profile, ORNL will also analyze the treatability of the mixed waste streams identified in the Profile. The agencies intend that the Profile and the Treatability evaluation will collectively provide sufficient information on the characteristics and volumes of commercial mixed waste for States, compacts, commercial developers, and Federal regulatory agencies to make decisions on the effective disposition of mixed wastes.

Additional Joint Guidance

NRC and EPA are developing additional joint guidance documents on the topics of mixed waste storage and testing. The objective of these documents is to describe acceptable approaches for mixed waste generators to comply with EPA's requirements for testing and storage while complying with NRC's requirement to keep radiation exposures as low as is reasonably achievable (ALARA).

Regarding mixed waste testing, the agencies plan to publish a draft guidance document for public comment in the Federal Register in February 1992. Comments will be compiled with the intent to revise the document accordingly. The agencies will also solicit verbal comments on the draft guidance at a public meeting planned for April 14, 1992, in Washington, D.C. As described in the draft guidance, EPA currently requires generators to determine whether wastes exhibit the characteristic of toxicity (40 CFR 261.24) (2, 12). This determination may be based on the generator's knowledge of the process that produced the waste or by testing the waste using the Toxicity Characteristic Leaching Procedure (TCLP) (12). Testing using the TCLP may identify more low-level wastes as mixed waste than have previously been identified because the TCLP includes a larger suite of constituents, including organic constituents, than the previous method and because of changes in how samples are prepared prior to testing (12).

The TCLP poses special concerns from a radiation protection standpoint because it requires that samples be at least 100 g and disaggregated by grinding to particle sizes less than 9.5 mm prior to testing (12). Both of these requirements could significantly increase worker exposures unless appropriate precautions are implemented in accordance with the licensee's ALARA program, such as preparation of the samples in a hot cell. However, for very high activity waste samples, these precautionary measures could exceed the reasonable range and require extraordinary efforts to comply with the TCLP protocol verbatim, while keeping worker exposures ALARA. Consequently, the agencies are developing guidance to describe acceptable practices that would appropriately reduce potential exposures, yet satisfy the intent of the testing requirements. The draft guidance stresses that mixed waste generators should use the flexibility built into the

RCRA requirements, including reliance on generator knowledge and use of surrogate materials whenever possible.

NRC and EPA are also currently developing a joint guidance document that addresses important issues associated with safe storage of mixed waste. Given the current lack of treatment and disposal capacity for most types of mixed waste, most mixed waste generators are being forced to store the waste until adequate capacity is developed (13). Temporary storage of mixed waste for brief periods can be routinely accommodated by most licensees as an adjunct to effective radiation protection and operational programs under existing NRC and Agreement State licenses.

However, as the length of storage and the volume of stored waste increases, potential problems associated with storage of mixed waste increase. This is particularly true when the waste is stored on site for greater than 90 days, at which time EPA requirements for a storage permit may become effective (14). In contrast to NRC's general performance requirements for generators in 10 CFR Parts 20, 30, 40, 50, and 70 (15-19), EPA has developed specific requirements for acceptable storage of hazardous waste (9). Compliance with these requirements could complicate compliance with NRC requirements and license conditions, as well as licensee programs for maintaining radiation exposures ALARA.

In addition, because some mixed wastes are currently covered by the Land Disposal Restrictions (LDRs), storage of such wastes may be explicitly prohibited (20). The Hazardous and Solid Waste Amendments Act of 1984 amended RCRA by, among other things, prohibiting the storage of hazardous waste subject to the LDRs "unless such storage is solely for the purpose of accumulating necessary quantities of waste to facilitate proper recovery, treatment, or disposal" (RCRA Section 3004(j) (5) and 40 CFR 268.50(a)(1) (20)). Thus, in the absence of mixed waste treatment and disposal facilities, mixed wastes cannot be treated, stored nor disposed. This "Catch 22" that generators of mixed waste potentially face was described in detail in a 1989 assessment of low-level waste management prepared by the Office of Technology Assessment (13).

On August 29, 1991, EPA announced in the Federal Register an enforcement policy for the storage prohibition at Section 3004(j) of RCRA for facilities that generate mixed waste (21, 20). In accordance with the policy, EPA will ascribe low enforcement priority to violations involving the storage of mixed wastes subject to the LDRs under certain conditions. The policy outlines what EPA considers to be indicators of environmentally responsible operation in determining the civil enforcement priority of storage violations at particular mixed waste generator facilities. The policy also details those wastes and generators to which the policy applies and the duration of the policy.

In addition to EPA's enforcement policy that addresses the general dilemma associated with the LDRs and the current lack of adequate treatment and disposal capacity for most mixed wastes, the joint guidance document on storage is intended to address specific issues that are associated with on-site storage of mixed waste. Storage of mixed waste is likely to be necessary at some generator facilities for an extended period of time until adequate treatment and disposal capacity can be developed. Given this obvious need for extended storage, the purpose of the guidance document is to assist generators in identifying acceptable approaches to resolve specific

issues in a manner that complies with the requirements of both agencies. Included among these issues are those associated with inspection and surveillance of waste in storage, waste compatibility and segregation, storage container requirements, and time limitations on storage of mixed wastes without an EPA permit. For each issue, the agencies are attempting to identify acceptable practices that comply with both EPA and NRC requirements in a manner that maintains occupational and public exposures ALARA.

The agencies are currently completing a revised draft of the joint guidance document and intend to publish a draft for public comment in March 1992. Based on the comments received, the agencies will make appropriate revisions and issue a final version of the joint guidance document during the summer of 1992.

OTHER ACTIONS

The Department of Energy (DOE) is considering acceptance of commercially generated mixed waste for treatment and disposal at DOE facilities (22). DOE initiated consideration of this option in late 1990 and has since been working with the States in exploring the merits and viability of this approach. Although the volumes and characteristics of commercial mixed wastes are still uncertain, available data indicate that DOE produces far more mixed waste than commercial generators. Thus, transfer of commercial mixed waste to DOE for treatment and disposal could provide an effective and efficient solution to the mixed waste issue for commercial generators. It could also reduce or eliminate the need for developing State, compact, and private mixed waste treatment and disposal facilities. However, DOE acknowledges that the Department currently lacks sufficient capacity to manage its own mixed waste and that concentrated efforts over the next several years will be required to bring the Department's current operations into compliance with RCRA (23).

The commercial nuclear industry has also initiated actions that could profoundly affect the management and regulation of commercial mixed waste. On November 27, 1991, the Edison Electric Institute (EEI), American Public Power Association, National Rural Electric Cooperative Association, and many individual electric utilities petitioned the U.S. Court of Appeals for the District of Columbia to review EPA's determination that storage of mixed waste violates the LDR prohibition on hazardous waste storage (24). The petitioners assert that EPA made this determination in conjunction with its August 1991 enforcement policy on mixed waste storage (21). According to the petitioners, EPA's determination forces petitioner utilities into immediate noncompliance with no possible means to come into compliance because adequate treatment and disposal facilities are not currently available. In addition, the petitioners claim that EPA's prohibition against storage of LDR restricted mixed waste is unreasonable because compliance with the prohibition is impossible. The request for expedited consideration is grounded in the May 1992 expiration date of the national capacity variance for land disposal of mixed waste containing listed hazardous wastes, as described in EPA's "third thirds" rule (25).

In addition, on January 13, 1992, the Utility Solid Waste Activities Group submitted a rulemaking petition to the EPA Administrator requesting that EPA amend its hazardous waste regulations to establish a separate small quantity

generator exemption for mixed waste (26). The petition also requests EPA to amend its regulations to allow qualified facilities to accumulate mixed waste on-site pending the development of adequate treatment or disposal capacity for mixed waste. In addition, the petition requests that EPA declare such storage of mixed waste to be a legitimate practice under the LDR storage prohibition. EPA is presently considering both this petition for rulemaking and its response to the EEI petition for review of its determination on mixed waste storage.

Another action that could have a significant effect on the management and regulation of commercial mixed waste is the December 6, 1991 decision by the Court of Appeals for the District of Columbia that EPA issued its "derived from" and "mixture" rules without adequate notice and opportunity for public comment (see *Shell Oil vs. EPA*, No. 80-1532, slip op., D.C. Cir., December 6, 1991). Consequently, the court vacated these two provisions of EPA's regulations that define hazardous waste. In accordance with these provisions, EPA defines as hazardous any waste that is mixed with or derived from a waste listed as a hazardous waste. As much as 25% of waste regulated as hazardous could be affected by the Court's decision (27). The impact of this decision on regulation of hazardous and mixed waste, however, will depend on the regulatory regime in place in individual States and EPA's actions in repromulgating these two provisions. If the States have already adopted comparable provisions through appropriate administrative procedures, the impact of the Court's decision on the regulation of hazardous waste, and mixed waste in particular, may be minimal given the strong role of the States in the RCRA regulatory program.

NRC and EPA will continue to cooperate in responding to these and other actions to seek resolutions to issues associated with the management and disposal of commercial mixed waste. Through these and other cooperative efforts, the agencies hope to clear a path for regulatory compliance and, thus, continue to maintain and enhance the protection of the public and environment from hazards associated with commercial mixed waste. In order to help identify the obstacles that need to be cleared from the path, NRC and EPA require assistance from the regulated community, States, and the public. The agencies especially welcome comments and suggested resolutions from members of the regulated community, trade organizations, professional and technical societies, State and local governments, Federal agencies, and public interest groups.

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