

A UPDATE OF NRC MIXED WASTE ACTIVITIES

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ABSTRACT

This paper presents an overview of the Nuclear Regulatory Commission's (NRC) mixed waste activities. It describes past efforts to assist the regulated community and details the current status of NRC and Environmental Protection Agency (EPA) joint guidance documents and workshops, and the development of a national profile on the volumes, characteristics, and treatability of commercially generated mixed waste. Areas of concern including mixed waste testing and storage requirements are discussed and future efforts by NRC are outlined.

BACKGROUND

Mixed waste is waste that satisfies the definition of low-level radioactive waste in the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPA) and contains hazardous waste that is either: (1) listed as a hazardous waste in 40 CFR 261, Subpart D; or (2) causes the waste to exhibit any of the characteristics identified in 40 CFR 261, Subpart C. 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, and is classified as low-level waste by the U.S. Nuclear Regulatory Commission (NRC).

Various statutes at least partially address mixed waste. Briefly they are:

a. The Atomic Energy Act (AEA) of 1954: This law established the Atomic Energy Commission (now NRC) as the Federal agency having responsibility for the regulation of source, special nuclear, and byproduct material.

b. The Solid Waste Disposal Act (SWDA) of 1965: This was the first Federal solid waste statute. It was enacted for the primary purpose of improving solid waste disposal methods.

c. The Resource Conservation and Recovery Act (RCRA) of 1976: This amendment to the SWDA was enacted as a framework for the management of both hazardous and non-hazardous waste.

d. Hazardous and Solid Waste Amendments (HSWA) to RCRA (1984): These amendments to RCRA established the Land Disposal Restrictions treatment standards for waste before land disposal and schedules under which the Environmental Protection Agency (EPA) must develop these treatment standards.

e. The Low-Level Radioactive Waste Policy Amendments Act (LLRWPA) of 1985: These amendments established deadlines for States and Compacts to de-

velop new disposal capacity for low-level radioactive waste.

NRC/EPA JOINT JURISDICTION OVER MIXED WASTE

NRC and NRC Agreement States regulate the commercial use and disposal of source, byproduct, and special nuclear material, as defined in the AEA. EPA and EPA Authorized States regulate the storage, treatment, and disposal of materials that contain hazardous chemical components, as defined in RCRA. Mixed waste, because it contains both a radioactive component and a hazardous component, is subject to the requirements of both the AEA and RCRA. This joint jurisdiction over mixed waste has evoked comments from the Federal, State and private sectors, based, in part, on the idea that there may be inconsistencies in the specific requirements of RCRA and the AEA. Although no literal inconsistencies have been found between the requirements of RCRA and the AEA, to date, NRC recognizes that there may be concerns about the application of NRC and EPA regulatory requirements. NRC considers joint jurisdiction to be unnecessarily burdensome and wasteful. However, without further legislation, joint jurisdiction over mixed waste will continue. In response to an inquiry by Congressman Morris Udall, NRC Chairman Carr outlined this position on joint jurisdiction, but recognizing the constraints imposed by current legislation, stated, "It is our hope that the joint approach to the mixed waste issue that we and the EPA have established will lead to the successful development and operation of mixed waste disposal facilities as the States move forward to carry out their responsibilities under the LLRWPA of 1985. We are committed to making this approach work. If the joint approach proves unsuccessful, however, it may well be that further legislative consideration of this matter will be necessary to achieve the objectives of the LLRWPA."⁽¹⁾

The NRC and EPA staffs have been working to resolve the issues of concern that generators and storage, treatment, and disposal facility operators have about the application of both agencies' regulatory requirements to mixed waste. To this end, NRC and EPA are developing joint guidance documents, hosting workshops for Federal and

State regulators, and sponsoring the development of a national profile on mixed waste volumes, characteristics, and treatability.

OVERVIEW OF JOINT NRC/EPA GUIDANCE

There are presently six guidance documents that have been published or are being developed by the NRC and EPA staffs. The concept of joint guidance documents arose early in the NRC/EPA interactions as a methodology by which those areas of overlapping regulatory responsibility could be addressed. A description and the present status of each guidance document follow.

3.1 Published Guidance

- "Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste" This guidance was first published for comment in April 1987, and the final guidance was published in October 1989. It is intended to help commercial waste generators identify mixed low-level waste. It provides the generator with a definition of mixed waste and a step-wise system to determine if the waste meets this definition. The guidance allows the generator to determine the status of the waste based upon his knowledge of the materials and process involved in the waste generation, or by testing the waste.
- "Combined NRC/EPA Siting Guidelines for Disposal of Mixed Low-Level Radioactive and Hazardous Waste"

This guidance was published in June 1987 to address the concern that confusion about mixed waste disposal siting requirements could hinder development of future low-level waste disposal sites and compliance with the milestones established under the LLRWPA. By combining the existing technical requirements, standards, and guidance of both agencies, NRC and EPA formulated 11 guidelines intended to help States and compacts develop siting plans for low-level waste disposal facilities that may receive mixed waste. These guidelines address the geologic and hydrologic characteristics of a site, identify technical as well as legal disqualifying features for potential sites, specify that a disposal site should provide a stable foundation for engineered containment structures, and place primary emphasis, for determination of site suitability, on ensuring that the

long-term performance objectives of 10 CFR Part 61 will be met.

- "Joint NRC/EPA Guidance on a Conceptual Design Approach for Commercial Mixed Low-Level Radioactive and Hazardous Waste Disposal Facilities"

This guidance offers a conceptual design that satisfies EPA's prescriptive requirements for liners and leachate collection systems and NRC's performance based requirements for the minimization of contact of the waste with water. A design of this type should be able to satisfy the long-term stability requirements of NRC and the 30-year maintenance requirements of EPA. This guidance was published in August 1987.

3.2 Guidance Documents under Development

- Requirements for Mixed Waste Storage
This guidance will address the problems imposed by EPA's hazardous waste storage requirements and the provisions in generators' radioactive materials licenses that may allow for the decay of radioactive material as an acceptable method of disposal, as well as the provisions of the generators' As Low As Is Reasonably Achievable (ALARA) Program. A first draft is under review by NRC and EPA.
- Procedures for Mixed Waste Characterization
This guidance will address the special procedures necessary for hazardous waste characterization and the need to consider occupational exposures during testing. The review of the second draft is underway at EPA and NRC.
- Licensing/Permitting Mixed Waste Disposal Facilities
This guidance will be developed for the purpose of allowing an individual to submit a single application for both an NRC license and an EPA permit. The intent of such guidance would be to develop a single permitting or licensing process for mixed waste facilities. A scope-of-work document has been developed by EPA, but, to date, a publication target has not been established.

A guidance document on the inspection of mixed waste disposal facilities, which has been under development, is in the process of being rewritten as an EPA inspectors' handbook for radioactive materials.

WORKSHOPS

NRC and EPA have sponsored and will continue to sponsor workshops and meetings to inform Federal and State regulators of the requirements of RCRA and the AEA

and of the issues involved in mixed waste management. A description of current and planned workshops follows.

- **EPA Permit Writers Workshops**

These workshops are primarily for EPA permit writers and inspectors, but are open to NRC and State personnel, as well. The workshops are directed toward those individuals who routinely deal with mixed waste issues on a daily basis. To-date, these workshops have been held in Santa Fe, NM, on November 27-28, 1989; Chicago, IL, on March 6-7, 1990; Washington, D.C., on May 14-15, 1990; Denver, CO, on June 19-20, 1990; Buffalo, NY, on July 31-August 1, 1990; and Oakland, CA, on September 5-6, 1990. Workshops included site visits to Los Alamos and Argonne National Laboratories, the Rocky Flats Plant, and the West Valley Demonstration Project.

- **NRC Regional Inspectors Workshops**

These workshops are currently under development at NRC. The focus of these workshops will be to familiarize NRC inspectors with the requirements of RCRA, so that they will understand the problems associated with mixed waste management. The workshops should provide NRC inspectors with enough knowledge of RCRA to recognize a potential hazardous waste problem at the NRC licensees' facility and alert their EPA counterparts to the potential problem. A similar arrangement exists with the Occupational Safety and Health Administration.

- **NRC Agreement State Regulators Workshops**

NRC is providing and will continue to provide speakers at workshops sponsored by Agreement State regulatory agencies. The most recent workshop at which NRC provided a speaker was held by the State of Florida on November 27-29, 1990.

- **National Host State Meeting**

On May 16-17, 1990, the first meeting of States that will host low-level radioactive waste disposal facilities was held in Washington, D.C. In addition to representatives of the Host States, the meeting was attended by representatives of NRC, EPA, The Low-Level Radioactive Waste Forum, disposal site operators, and contractors. The meeting was largely an information exchange forum between the States and Federal regulators. The meeting provided EPA and NRC with sug-

gestions on future guidance, and it was suggested that another meeting be held in the future.

NATIONAL MIXED WASTE PROFILE

In May 1990, NRC and EPA received a request from the Host State Technical Coordinating Committee (TCC) to compile a profile on the volume and characteristics of commercially generated mixed wastes.(2) The TCC believed 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. NRC agrees with the TCC position and thinks that current information on mixed waste quantities and characteristics is inadequate. In July 1990, NRC met with EPA, the Department of Energy (DOE), and Oak Ridge National Laboratories (ORNL) to discuss ORNL's capability to conduct this type of project. As a result of this meeting, and continued discussions between NRC, EPA, and DOE, a Standard Order for DOE Work was submitted to ORNL in August, outlining the Scope of Work (SOW). The purpose of the profile, as stated in the SOW, is to reduce uncertainties with respect to the volumes, characteristics, and treatability of commercially generated mixed waste. NRC intends to coordinate this activity with the TCC, on a routine basis, so that the end result of the study is responsive to the needs of the TCC members. Results of the project will be published as a NUREG and will be available for use by the public. The project is divided into three phases. The tasks and subtasks associated with each phase of the project are detailed below.

Phase 1 of the project will consist of an evaluation of existing data on mixed waste volumes and characteristics, to determine if these data are adequate to use as the basis for a national mixed waste profile. Phase 1 will include a literature search for data on mixed waste, focusing primarily on results from past mixed waste survey reports. A summary of problems encountered and lessons learned from past surveys will also be included. Phase 1 will also identify the basis for determining the adequacy of the data, identify the data parameters and information configurations for a mixed waste profile, and propose a method of compiling the existing data, if it is determined that the existing data are adequate to meet the stated objectives of the profile.

Phase 2 of the project will be implemented if it is determined that the data from previous surveys are not adequate to compile a national mixed waste profile. Phase 2 of the project consists of three tasks. The first task involves the development of a data collection plan. This will include a formal statement of the objective and scope of the plan, a description of the approach and method of data collection, a description of the type of data to be collected, an estimate of the impact on the survey population, a description of the

specifications of the computer database, and a description of the data analysis to be performed.

The second task will be to develop the tool or tools needed to collect the data. This task will require a proposal of the data parameters, information configuration, and the tool(s) to be used to conduct the survey. It will also require that the tool(s) be tested on a limited sample population and, if necessary revised before finalization. The third task will be the actual collection and analysis of the survey data. Presently, the survey population size and makeup are being evaluated and as such cannot be outlined here.

Phase 3 of the project will consist of the preparation of a national mixed waste profile report. This report, which will be published in NUREG form, will identify mixed waste volumes and characteristics, treatment technologies, and organizations offering these waste treatment technologies. It is estimated that the entire project will take between 12 and 18 months to complete.

The project was initiated on September 17, 1990, and is presently nearing completion of the first phase. ORNL has reviewed over 50 surveys and reports prepared by States, compacts, national laboratories and private concerns dealing with mixed waste volumes and characteristics. ORNL is currently in the process of preparing its evaluation of the adequacy of this data as the basis for compiling a national mixed waste profile. This task is expected to be completed in February 1991. If it is determined that the data from existing surveys is not adequate to use as a basis for compiling a national mixed waste profile NRC, EPA, and ORNL are considering three options for Phase 2. These options consist of performing a complete survey of low-level radioactive waste shippers, conducting a limited survey of low-level radioactive waste shippers or using existing data where adequate and supplementing this data with surveys targeted to fill gaps in the data.

The preceding sections have described the activities that NRC and EPA have undertaken to address the issues surrounding mixed waste. The following outlines current mixed waste uncertainties and summarizes the future mixed waste activities, as envisioned by NRC.

PRINCIPAL MIXED WASTE UNCERTAINTIES

- Volume of Mixed Waste

Information on the volume, characteristics, and treatability of mixed waste needs to be updated and correlated to assist those individuals making decisions on future mixed waste disposal needs. Issues such as the total volume of mixed waste that must be disposed of complicate the siting of disposal facilities, and storage and disposal of waste within compacts. Until this type of information is readily available, coordination of plans for dis-

posal facilities on a national scale may be delayed. It is expected that the survey outlined above will satisfy this need.

- Storage of Mixed Waste

Concerns exist over the compatibility of EPA storage requirements for RCRA wastes with NRC's requirements for storage of radioactive material. EPA regulations prohibit the storage of waste, with a few exceptions, for periods of greater than 90 days. NRC regulations do not prohibit the storage of radioactive waste. However, storage is not considered an alternative to disposal. EPA requires waste storage containers to be inspected weekly and waste storage tanks to be inspected daily. NRC recommends, in Generic Letters 85-14 and 81-38 and in Information Notices 90-09 and 89-13, that stored waste be inspected at least quarterly. EPA recently announced in the Federal Register (55 FR 22520 June 1, 1990) that they were in the process of developing a policy statement for the storage of mixed waste. At the time of submission this policy statement had not been issued.

- Mixed Waste Testing and the Toxicity Characteristic Leaching Procedure

Concerns exist over the possibility of increased exposures due to the EPA requirements for waste characterization. RCRA does not specifically require testing for a hazard determination. The generator may apply his knowledge of the materials and the process that produced the waste to determine if the waste would be considered hazardous. If sufficient information is not known about the waste, the generator would then be required to test the waste. EPA has adopted the Toxicity Characteristic Leaching Procedure (TCLP) as the test for the characteristic of toxicity (55 FR 11796 March 29, 1990). This test may lead to increased exposures through: (1) exclusion of the Structural Integrity Procedure and the requirement for particle size reduction; (2) additional handling during preliminary testing; and (3) the increased number of samples that may need to be taken for the preliminary testing. The requirement for particle size reduction may also provide additional surface available for the leaching of hazardous material. EPA may allow the use of "surrogates" which may help reduce exposures, and the adoption of a "cage insert" may remove the need to perform particle size reduction. These