ALTERNATIVES TO DISPOSAL OF LOW-LEVEL WASTE IN STATE OR REGIONAL DISPOSAL FACILITIES

Donald J. Silverman
Newman & Holtzinger, P.C.
1615 L Street, N.W.
Washington, D.C. 20036

ABSTRACT

Generators of low-level radioactive waste (LLW) are increasingly faced with denial of access to existing regional LLW disposal facilities, escalating disposal fees and surcharges, and the need for onsite or other storage services. These generators could benefit from careful consideration of available, potentially less costly alternatives to state and regional disposal facilities. This paper outlines some alternatives to state and regional LLW disposal facilities and highlights the principal benefits and limitations of those alternatives. The alternatives discussed in this paper are: (1) disposal pursuant to 10 CFR § 20.2002 (formerly 10 CFR § 20.302); (2) exemptions from Part 20 requirements pursuant to 10 CFR § 20.2301 (formerly 10 CFR § 20.501); (3) direct disposal at uranium mills; (4) processing of alternative feed materials at uranium mills; and (5) reliance on long term storage. The paper also briefly discusses the impacts of the ongoing NRC "enhanced participatory" rulemaking on residual contamination criteria.

INTRODUCTION

Generators of low-level radioactive waste (LLW) are increasingly faced with denial of access to existing regional LLW disposal facilities, escalating disposal fees and surcharges, and the need for onsite or other storage services. These generators, particularly those that: (1) produce or process large volumes of LLW (such as soils, sludges or other materials contaminated with low concentrations of radioactivity); or (2) are planning to decontaminate and decommission their facilities (including licensees covered by the Nuclear Regulatory Commission's Site Decommissioning Management Plan (SDMP)), could benefit from careful consideration of available, potentially less costly alternatives to state and regional disposal facilities. Indeed, with fees and surcharges for the Barnwell facility approaching $300 per cubic foot, some generators may have no choice but to consider such alternatives.

This paper outlines some alternatives to state and regional LLW disposal facilities and highlights the principal benefits and limitations of those alternatives. Generators considering use of one or more of those alternatives should carefully evaluate their availability and effectiveness in meeting their individual needs. The paper also suggests that the NRC and Agreement State regulatory agencies should work to assure maximum availability of alternatives to state and regional disposal facilities consistent with public health and safety considerations, and should not construct unnecessary barriers to such alternatives.

The alternatives discussed in this paper are: (1) disposal pursuant to 10 CFR § 20.2002 (formerly 10 CFR § 20.302); (2) exemptions from Part 20 requirements pursuant to 10 CFR § 20.2301 (formerly 10 CFR § 20.501); (3) direct disposal at uranium mills; (4) processing of alternative feed materials at uranium mills; and (5) reliance on long term storage. The paper also briefly discusses the impacts of the ongoing NRC enhanced participatory rulemaking on residual contamination criteria.

Section 20.2002 Disposal

Section 20.2002 authorizes generators to apply for approval of "proposed procedures, not otherwise authorized in the regulations" to dispose of LLW. No specific technical criteria governing such disposal are provided in the regulation. Instead, section 20.2002 requires that a licensee's application for approval of an alternative disposal method include, among other things, a description of the waste including its physical and chemical properties important to risk evaluation; the proposed disposal methods to be used; appropriate environmental information; a description of the nature and location of other potentially affected licensed and unlicensed facilities; and analyses to demonstrate compliance with applicable dose limits and ALARA.

Thus, under section 20.2002, the licensee will be required to fully address the safety and environmental impacts of the proposed disposal plan and may require a license amendment to carry out the plan, depending upon the provisions of its existing license. If a license amendment is required, there may be an opportunity afforded for a public hearing on the disposal plan.

Wastes typically disposed of under the predecessor to section 20.2002 (section 20.302) have generally been low-activity wastes in relatively large quantities, such as contaminated soils and sewage sludge. Waste concentrations and associated maximum individual doses from such disposals traditionally have been very low (e.g., less than a few millirem). In addition, this provision has generally been used for "once-only" disposals, although some exceptions exist.

There is one critical limitation on the advantages of section 20.2002. Depending on the terms of the particular proposed disposal plan, materials "disposed of" under section 20.2002 may still be subject to further NRC regulation at a later date. It is the NRC's position that, in ruling on a 20.2002 application, it is not making a judgment that the location at which such materials are disposed of is sufficiently free from contamination to permit it to be "released for unrestricted use". Thus, for example, if materials are buried onsite at a licensee's facility under section 20.2002, the NRC will likely require that such materials be reevaluated and addressed as part of the licensee's decommissioning activities. Remediation of the affected area may be required in the future. This particular question, i.e., the treatment of materials previously disposed of under section 20.2002 (or 20.302) will be considered by the NRC as part of its enhanced participatory rulemaking on residual contamination criteria.

On the other hand, a licensee that continues to operate at its facility may feel that it is in its interest to dispose of such materials in this manner and to address the ultimate disposition of materials later in the context of site decommissioning. One method of minimizing, if not eliminating, the need for further remediation is (if possible) to propose disposal criteria that are sufficiently restrictive that they parallel existing NRC standards for release for unrestricted use.

For example, if a licensee has uranium or thorium-bearing soils that it wishes to dispose of under 20.2002 through onsite burial, and can demonstrate that concentrations of radioactive materials will not exceed the levels set forth in the existing Staff guidance (Branch Technical Position on Disposal of Onsite Storage of Thorium or Uranium Wastes from Past Operations" (1975)), Options 1 or 2, then such materials can be disposed of "with no restriction on burial method". Under those circumstances, the NRC is likely to conclude that the area in question would be suitable for release for unrestricted use. Disposal of materials under other technical options set forth in the Branch Technical Position would necessitate some restrictions on burial methods and procedures and some continuing regulatory oversight by the NRC, including possible remediation during decommissioning.

Exemptions

The NRC's standard "exemption" regulation is codified in the new Part 20 at 10 CFR § 20.2301 (and in the old Part 20 at section 20.501). The exemption provision is simple on its face, and authorizes the NRC to grant an exemption from the Part 20 regulations "if it determines the exemption is authorized by law and would not result in undue hazard to life and property." Use of this procedure, although somewhat unusual in the context of LLW disposal, may provide some advantages over section 20.2002.

The technical criteria which the Staff would apply to assure that the proposed method of disposal is safe and environmentally sound would likely mirror those applied under section 20.2002. However, use of the exemption procedure may avoid a potential need for licensing hearings that could be necessitated under section 20.2002. As mentioned above, a request under section 20.2002 may require an amendment of a generator's license. That amendment may provide the opportunity for opponents of the proposed disposal to request a hearing. While the NRC has established streamlined hearing procedures for materials licensing proceedings (10 CFR Part 2, Subpart L) and may issue licenses or amendments even prior to the conduct or completion of such hearings, the hearing process can be lengthy and costly. Under the Atomic Energy Act, on the other hand, there is no right to a hearing on exemption requests, and the NRC would not be required to provide an opportunity for such a hearing.

Direct Disposal at Uranium Mills

In May 1992, the NRC Staff published a notice in the Federal Register requesting comment on a proposed guidance document entitled "Revised Guidance on Disposal of Non-Atomic Energy Act of 1954, Section 11e.(2) Byproduct Material in Tailings Impoundments". 57 Fed. Reg. 20,526 (May 13, 1992). In that document the Staff has proposed to allow the "direct disposal" of certain materials other than uranium mill tailings in tailings impoundments, pursuant to licenses or license amendments authorized under 10 CFR Part 40.

The Staff's revised guidance notes that the NRC had received in the past various requests for such disposal in tailings impoundments covering such materials as mine wastes, secondary process wastes, Formerly Utilized Sites Remedial Action Program (FUSRAP) wastes, and naturally-occurring and accelerator-produced (NARM) wastes. The Staff's guidance states that:

> Because of the relatively large volumes of these wastes, low-level waste disposal options are limited. These wastes are similar to tailings in volume, radioactivity and toxicity. Therefore, some waste producers see the mill tailings disposal sites as providing an economical option for such disposal.

57 Fed. Reg. at 20,527. Thus, the Staff now proposes to permit disposal of a wider range of materials, on a case-by-case basis, if certain conditions are met. While those conditions limit the utility of this option for many licensees, the Staff's proposal nevertheless may be quite useful for some licensees.

In particular, under the revised guidance, NARM, special nuclear material and 11e.(1) byproduct material may not be disposed of in this manner. Licensees possessing source material wastes could be authorized to dispose of such wastes in mill tailings impoundments if, among other things:

- the radiological characteristics of the material are similar to 11e.(2) byproduct material;
- the wastes contain no hazardous or toxic wastes regulated by the EPA;
- no significant environmental impact is expected from such disposal;
- compliance with the reclamation and closure criteria of 10 CFR Part 40, Appendix A can be demonstrated; and
- appropriate regional compact approval is obtained.

To obtain the requisite authorization, the mill operator would, most likely, need to apply for an appropriate license amendment.

The fundamental concerns of the NRC in connection with any proposal for direct disposal are that: (1) the proposal not result in dual NRC/EPA regulatory jurisdiction over the tailings impoundments; and (2) it not jeopardize the ultimate transfer of the impoundments to the U.S. government for perpetual care and maintenance. For ordinary mill tailings, NRC possesses exclusive regulatory jurisdiction over the radioactive and hazardous components of such waste under the AEA. By incorporating certain EPA hazardous waste standards into the AEA, Congress has eliminated EPA permitting authority over the tailings impoundments. NRC's concern is that placement of alternative, non-11e.(2) byproduct materials in the impoundments could create new EPA regulatory jurisdiction over the impoundments. To avoid this, the NRC proposes to exclude hazardous wastes subject to RCRA from the direct disposal option.

Second, under the AEA, the U.S. government (through the Department of Energy (DOE)) ultimately is required to accept the impoundments for perpetual care and maintenance. Again, the NRC's concern is that the addition of non-11e.(2) byproduct material may jeopardize DOE's authority to accept ultimate control of the impoundments. Accordingly, among other things, NRC proposes to provide DOE with an opportunity to comment before authorizing such disposal through appropriate license amendments.

Through prior NRC/DOE interactions on this subject, it appears that DOE may be willing to accept title to tailings impoundments containing non-11e.(2) byproduct material if there is no additional cost to DOE. This presumably would be the case if the disposal of the alternative materials created no adverse environmental impacts and no outstanding RCRA or CERCLA compliance issues. According to the Staff, direct disposal in mill tailings impoundments will be approved through appropriate amendments to the mill operator's licenses and through exemptions to 10 CFR Part 61.

Processing of Alternative Feed Materials at Uranium Mills

At the same time that the Staff issued its revised policy on *direct disposal*, it also issued a separate policy for comment entitled "Position and Guidance on the Use of Uranium Mill Feed Materials Other Than Natural Ores", 57 Fed. Reg. 20,530 (May 13, 1992). In that policy, the NRC has recognized that some materials other than native or unrefined ore may be suitable for processing in uranium milling operations to extract their source material content, and that the tailings or wastes from processing such ores could be considered 11e.(2) byproduct material suitable for disposal in tailings impoundments. The Staff referred to several prior instances in which it authorized the processing of such alternative feed materials (including wastes from a uranium hexafluoride conversion facility and from treatment of mine water), concluding that the materials were, in fact, refined or processed "ore" whose further processing at a uranium mill would produce 11e.(2) byproduct material tailings or wastes.

The NRC proposes several criteria to authorize such processing of alternative feed materials. First, the material must qualify as "ore" so that the tailings or wastes from the processing will qualify as 11e.(2) byproduct material. The NRC proposes to clarify that "ore" may include non-native or previously processed ores, so long as source material was extracted in a licensed uranium or thorium mill.

Second, the feed material cannot be a hazardous or mixed waste, so that the resulting tailings do not create dual EPA/NRC jurisdictional issues of the type described earlier. Third, the NRC must determine that the processing of the alternative feed material is "primarily for its source material content, rather than for the disposal of waste." The NRC has expressed concern that licensees not use mills as a method of "sham disposal" by improperly converting materials that otherwise would be viewed as LLW into 11e.(2) byproduct material.

Therefore, in order for the NRC to permit such processing, a generator must demonstrate that the proposed processing is "primarily for the source material content" rather than for the disposal of waste. The Staff has proposed two alternative tests to make such a showing. First, if the feed material could be directly disposed of under the tests discussed above in the context of the "direct disposal" option, then the NRC concludes that processing of such material by the mill operator is primarily for its source material content. Alternatively, a licensee may certify under oath that the feed material is being reclaimed or recycled under RCRA or contains no RCRA hazardous wastes, and is to be processed primarily for uranium recovery. These conditions are intended to avoid "sham" disposal of LLW and to assure that the primary purpose of the processing is for the extraction or concentration of feed materials.

Long Term LLW Storage

LLW generators may also wish to consider longer term interim storage of waste in the event permanent disposal capacity is unavailable. Although NRC discourages the use of storage as a substitute for permanent disposal and considers it an "option of last resort," NRC nonetheless believes LLW can be stored in a manner which adequately protects the public health and safety and the environment. Such storage can be undertaken pursuant to current NRC regulations and regulatory guidance.

Licensees who choose to store LLW at existing facilities or at newly constructed facilities must first determine whether the contemplated storage may be conducted under the authority of its existing license or whether a new 10 CFR Part 30 license or a license amendment is required. Licensees planning LLW storage should also consider additional criteria contained in other NRC regulatory guidance documents, including Generic Letter 81-38 "Storage of Low-Level Radioactive Wastes at Power Reactor Sites" (November 10, 1981) and its accompanying "Radiological Safety Guidance", and Information Notice 90-09 "Extended Interim Storage of Low-Level Radioactive Waste By Fuel Cycle and Materials Licensees" (February 5, 1990).

In addition to existing regulations and regulatory guidance, the NRC has published a proposed rule addressing onsite LLW storage beyond January 1, 1996. The proposed rule would establish, as a generic license condition, a requirement that before storing LLW beyond January 1, 1996, licensees "exhaust all other reasonable waste management options". If adopted, the proposed rule would require licensees to annually request access to existing disposal facilities. The proposed rule would supplement, but not supersede, existing regulations and guidance applicable to LLW storage.

In the supplementary information accompanying the rule, the NRC Staff suggests that "long term" storage (of an undefined duration) might require controls similar to those established in 10 CFR Part 61 for permanent near surface disposal facilities. This suggestion, if ever implemented, would likely have an enormous impact on the design and cost of any "long term" storage facility, and consequently, on any licensee's plan to store LLW for an indefinite period of time.

Impacts of the Residual Contamination Criteria Rulemaking on Current Disposal Activities

In December 1992, the NRC issued a notice announcing the initiation of an enhanced participatory rulemaking on the establishment of radiological criteria for the decommissioning of NRC-licensed facilities. Before developing a draft proposed rule, the NRC is conducting a series of workshops to solicit public comment on the fundamental approaches and issues regarding the development of radiological criteria for the termination of licenses and release of land and structures for unrestricted use. This process is likely to extend over a period of several years.

The new residual contamination criteria would apply to the decommissioning of power reactors, non-power reactors, fuel reprocessing plants, fuel fabrication plants, uranium hexafluoride production plants, independent spent fuel storage installations, and materials licenses. The criteria would apply to nuclear facilities that operate through their normal lifetime, as well as to those that may be shutdown prematurely. The criteria would not apply to the disposition of uranium

mines and mill tailings, high-level waste repositories, or low-level waste disposal facilities.

Currently, the NRC has established a Site Decommissioning Management Plan (SDMP) for achieving the timely decommissioning of approximately 40 sites which either have not been decommissioned properly or have been engaged in the decommissioning process for an extended time. Because SDMP site decommissioning is to proceed in parallel with the proposed rulemaking, licensees have been concerned with the issue of future backfits, viewing the absence of definitive decontamination criteria as a potential incentive to defer decommissioning pending issuance of final NRC requirements. However, the NRC has repeatedly stated that, as a matter of current policy, it will not require additional cleanup of sites in response to criteria established in this rulemaking, provided that the licensee or responsible party decontaminated the site, or was in the process of decontamination in full accordance with an NRC-approved decommissioning plan at the time of promulgation. The NRC has also provided that, until the new criteria have been established, decommissioning of nuclear facilities will proceed on a site-specific basis as the need arises considering existing criteria, and that case and activity-specific risk decisions will continue to be made as necessary during the pendency of the rulemaking process.

Availability of Alternatives

With an increasing number of licensed facilities requiring decommissioning, escalating LLW disposal fees and surcharges, and considerable limitations on access to state and regional disposal capacity, it is important that the NRC and Agreement States recognize the need for maximum flexibility in considering alternatives to state and regional LLW disposal facilities. While the NRC disfavors onsite storage and encourages generators to utilize available disposal options, it should not overreact to safe and environmentally sound temporary storage activities. Encouraging development of new disposal facilities should not be achieved at the expense of the LLW generators. In addition, the NRC and Agreement States should be flexible and consider alternative disposal options on their technical merits, unencumbered by political factors. Generators, for their part, who find traditional LLW disposal methods infeasible should consider carefully the available alternatives.