

# USEPA'S PROPOSED ENVIRONMENTAL STANDARDS FOR THE MANAGEMENT AND LAND DISPOSAL OF LLW AND NARM WASTE

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## ABSTRACT

The Environmental Protection Agency is proposing generally applicable environmental standards for land disposal of low-level radioactive waste and certain naturally occurring and accelerator-produced radioactive wastes. The elements of the proposed standards include: (1) exposure limits for pre-disposal management and storage operations; (2) criteria for other regulatory agencies to follow in specifying wastes that are Below Regulatory Concern; (3) post-disposal exposure limits; (4) ground water protection requirements; and (5) qualitative implementation requirements. In addition to covering those radioactive wastes subject to the Atomic Energy Act, the Agency is also proposing a standard to require the disposal of high concentration, Naturally occurring and Accelerator-produced Radioactive Materials (NARM) wastes exceeding 2 nCi/g, excluding a few consumer items, in regulated LLW disposal facilities.

## INTRODUCTION

In August 1983, the Environmental Protection Agency (EPA) published an Advanced Notice of Proposed Rulemaking (ANPRM) [1], stating the Agency's intention to develop generally applicable environmental standards for the land disposal of low-level radioactive waste (LLW).

These standards are being developed under the authority of the Atomic Energy Act of 1954, as amended [2], and Reorganization Plan No. 3 of 1970 [3]. The intent is that they must be met by facilities that dispose of LLW, whether the facilities are licensed and regulated by the Nuclear Regulatory Commission (NRC) or their Agreement States, or are owned and operated by the Department of Energy (DOE).

Comments from State representatives, strongly recommended that an EPA Standard should also cover certain wastes from Naturally occurring and Accelerator-produced Radioactive Materials (NARM). As EPA is the only Federal Agency with authority to regulate NARM waste disposal, it was decided to include a proposed NARM waste disposal standard.

### LLW DISPOSAL STANDARD (40 CFR PART 193)

The EPA LLW Standard is intended to cover disposal of all AEA materials not covered by other EPA standards; i.e., all radioactive waste that is not high-level and transuranic radioactive waste or spent nuclear fuel, as defined in 40 CFR

Part 191, or, uranium or thorium mill tailings subject to 40 CFR Part 192, or NARM as defined in 40 CFR 764. The standard will have the following elements:

- a. Low-level waste pre-disposal management and storage. This would include limits on radiation exposure to individuals during processing, management, and storage of LLW.
- b. Definition of radiation exposures related to low-level radioactive waste disposal that are sufficiently small

that they do not need to be regulated regarding their radiation hazard (i.e., a level "below regulatory concern").

- c. Limits on radiation exposure to individuals after the disposal site is closed.
- d. Ground water protection requirements for both pre- and post-disposal phases.
- e. Qualitative implementation requirements.

### Individual Radiation Exposure Limits During Management and Storage (Pre-Disposal)

This element would limit annual effective whole body exposure from all environmental pathways to any member of the public from facilities which process, manage, or store LLW. This would include the operational phase of regulated LLW disposal facilities, i.e., while they are receiving and emplacing waste; and "away from generator" LLW management, processing and storage facilities.

A greatly increased need for processing and packaging LLW is being met in a number of ways: (a) commercial companies applying to establish centralized LLW processing facilities located away from LLW generators; (b) small generators being serviced on site by mobile processing units (i.e., compactors, solidifiers); and (c) DOE and Uranium Fuel Cycle licensees building their own processing facilities.

We are, therefore, confronted with growing trends to create a large number of diverse facilities for treating and processing LLW, plus the potential for facilities that would be dedicated to the storage of LLW for periods beyond our previous perception.

These circumstances then create a possible gap in the coverage of EPA's waste related standards. Processing and storage of LLW at any NRC licensed Uranium Fuel Cycle Facility would be covered by 40 CFR Part 190 [4]. Exposure from atmospheric releases at all other LLW processing and storage facilities would be covered by the Clean Air Act radionuclide emission regulations (40 CFR Part 61) [5]. However, exposure through other pathways from

processing operations and long-term storage at LLW disposal facilities and at "away from generator" LLW processing facilities would not be covered.

Most of the exposures from these facilities would be expected to result from airborne releases, but there is also the potential for exposures from direct gamma radiation, water pathways and from releases caused by spillage or other operational activities. Our analyses indicate that control of these exposures should require no more increment of effort than maintaining processing and storage vessels away from public access and the good housekeeping practices necessary to eliminate or cleanup spillage.

The Agency, therefore, deems it prudent to include limits on these potential exposures in our Standard. This would also make the EPA LLW Standard more parallel and consistent in structure with other Agency radiation protection standards. The Office of Radiation Program's analyses indicates a standard around 25 mrem per year from all pathways would be consistent with the technology and other similar standards.

#### **"Below Regulatory Concern" Criteria**

Criteria are being proposed for identifying LLW with sufficiently low levels of radioactivity to qualify as "Below Regulatory Concern" (BRC). Any waste meeting these criteria could be disposed of as a non-radioactive waste. However, if it had Resource Conservation and Recovery Act (RCRA) hazardous characteristics, it would have to be disposed of in compliance with RCRA regulations. The EPA would not be involved in identifying or selecting specific LLW types which qualify as BRC wastes; the NRC, States and DOE would implement the use of our criteria for determining which wastes would qualify for disposal by less restrictive means.

In arriving at a proposed BRC level, EPA carefully weighed and considered many factors. Foremost, was protection of the public and the development of an exposure level with assurance of no undue risk. Also, considered were other daily risks encountered, ability to demonstrate compliance, guidance for similar exemptions by other governmental and scientific groups, consistency with other regulated risk levels, general population health risks, and the maximum annual exposures to critical population groups.

Our economic analyses show that the use of a BRC criteria to eliminate certain low-activity radioactive wastes from the full LLW regulation and disposal process is very cost effective. EPA estimates that approximately 35 percent by volume of all commercial and DOE LLW could be re-classified as BRC with a resulting maximum annual dose to an individual of less than 4 mrem/yr and potential savings of more than 600 million dollars over 20 years.

#### **Individual Radiation Exposure Limits for Post-Disposal**

Our standard will establish limits on exposure through all pathways to members of the public from the land disposal of LLW. EPA's post-disposal limit would apply to any DOE or NRC/State-licensed LLW land disposal method or facility constructed after the effective date of the rule and

apply to existing disposal facilities within a certain time frame.

A persuasive reason would be needed to significantly depart from a 25 mrem/yr level. EPA's technical analysis has not revealed any such reason so far.

#### **Ground Water Protection**

The protection of the Nation's ground waters is of major importance in EPA and such a consideration is particularly appropriate in land-based waste disposal standards. The Agency's Groundwater Protection Strategy [6] calls for the protection of ground water commensurate with its value and use, along with the development of a ground water classification system.

Two sets of ground water protection requirements will be proposed and public comments solicited. In both proposals Class I ground waters require the highest levels of protection and represents those that are highly vulnerable to contamination and serve as irreplaceable sources of drinking water for large populations. It is appropriate to give these ground waters the highest level of protection, i.e., non-degradation. The two proposals differ only with respect to the protection levels for Class II ground waters which represent all non-Class I present or potential sources of drinking water. The first proposal would protect Class II ground waters from high yield aquifers (which are or could be a community water supply) to an annual effective whole body dose equivalent of 4 mrem, while Class II ground waters from low yield aquifers (which generally could not provide a community water supply) would be protected as a part of the 25 mrem/yr all pathways pre- and post disposal performance standards. The second proposal would protect all Class II ground waters, which is by far the largest category of ground waters, to an annual effective whole body dose equivalent of 4 mrem. This level is comparable to the 4 mrem/yr Maximum Contaminant Level (MCL) for manmade beta particle and photon radioactivity established for public water supplies by EPA's drinking water standards under the Safe Drinking Water Act [7].

Finally, both proposals recommend the same levels of protection for Class III ground waters. Class III A ground waters are protected to the level applicable to the highest class of ground water to which it is interconnected. Class III B ground waters have a low degree of interconnection with other classes of ground water and would be protected as a part of the 25 mrem/yr all pathways pre- and post-disposal performance standards.

This is an area where we are particularly interested in receiving public comment as to the impact of these two alternatives. The evaluation of these comments will have a major influence on the final standard.

#### **Qualitative Requirements**

Qualitative requirements are being proposed which would make clear the context and assumptions within which we expect the Standard to be implemented.

These requirements would address areas not appropriate for quantitative requirements and compensate for the uncertainties that necessarily accompany plans to isolate radioactive wastes from the environment for a long time. They would include: (a) limiting the dependence on active institutional controls (such as guarding, maintenance or clean-up of releases) after disposal to no more than 100 years; (b) providing passive institutional measures (such as permanent markers, records or archives or government ownership) which should reduce the chance of inadvertent human intrusion beyond the active institutional control period; (c) requiring monitoring during disposal and post-disposal phases which should be done with techniques that would not jeopardize the isolation of the wastes; and (d) suggesting site location away from areas containing materials not widely available from other sources (such as minerals, fuels and ground waters).

#### NARM WASTE DISPOSAL STANDARD (40 CFR Part 764)

The regulation of certain NARM waste is proposed under the Toxic Substance Control Act (TSCA) [8] since the AEA does not apply to NARM. Section 6 of TSCA provides that if the Administrator determines that an unreasonable risk exists, he may promulgate regulations on the disposal of a chemical mixture or substance to mitigate such risks. Since the proposed NARM regulation would require the disposal of regulated NARM in an authorized and regulated LLW disposal facility, such NARM wastes would become subject to the post-disposal requirements of that regulated facility.

The considerations for the regulation of NARM are to:

- a. Assure the same disposal of discrete high activity NARM wastes as for similar AEA wastes;
- b. Provide for a manifest system that will track the NARM waste from generator to disposal.

An important point on the NARM coverage of an EPA standard is specifically which NARM wastes are to be covered. We have used the nomenclature of discrete, non-diffuse, low volume, high concentration NARM waste to describe our intention. We presently are excluding those high volume diffuse wastes such as mine over-burden and beneficiation residuals. That is not to say that these latter wastes are not deserving of some type of regulation. We are merely saying they are not appropriate for coverage under these LLW Standards, which are focused on regulated disposal sites operated by State compacts or the Federal government.

NARM waste proposed for regulation includes any NARM waste whose radioactivity concentration exceeds 2 nanocuries per gram, but exempts certain consumer items. Individually, such items (e.g., watches) contain small amounts of radioactivity and are typically widely dispersed in society. The primary criterion of the proposed NARM regulation requires the disposal of regulated NARM in an authorized LLW disposal facility. Such facilities are either NRC or Agreement State licensed or authorized under

DOE regulations. This subjects regulated NARM waste to the post-disposal requirements described earlier.

#### CONCLUSION

We are now in the final stage of proposing the LLW and NARM waste standards. We have prepared regulatory support documents which will be available when the proposed standard is published in the Federal Register. They include a draft environmental impact statement which will consist of: (a) a Draft Background Information Document (BID) -- providing a technical treatise on the risk assessment including sources of radiation exposures, routes of exposures, methodology of assessments, individual and population risk estimates, and an evaluation of model sensitivity and uncertainties; and (b) a Draft Economic Impact Assessment (EIA) -- providing a complete presentation of the costs of the controls and cost-effectiveness of the regulatory options. In addition, the Federal Register notice will include the proposed standard listing the requirements discussed earlier; and a preamble to the rule which discusses the Agency's decision-making procedure and the rationale for its regulatory judgements. The final rulemaking (probably a year or two after the proposed rule is issued) will include an additional volume which summarizes the Agency's response to public comments.

The EPA Low-Level Radioactive Waste Management program staff believes the Standards covering the above described areas would provide adequate protection to members of the general public with a reasonable balance of risks and costs. The public process that we will be going through, which includes a formal notice of proposed rulemaking, public comment, and public hearings will provide a mechanism for receiving comments on the areas of coverage we are considering for both the EPA Low-Level Radioactive Waste Standard and the NARM Waste Disposal Standard.

#### REFERENCES

1. U.S. Environmental Protection Agency, 40 CFR Part 193, "Environmental Radiation Protection Standards for Low-Level Radioactive Waste Disposal, Advanced Notice of Proposed Rulemaking" Federal Register, 48(170):39563, August 31, 1983.
2. Atomic Energy Act of 1954, as Amended; 42 U.S.C. 2011.
3. The White House, President R. Nixon, "Reorganization Plan No. 3 of 1970," Federal Register, 35(194):15623-15626, October 6, 1972.
4. U.S. Environmental Protection Agency, 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations, Final Rule," Federal Register, 42(9): 2858-2861, January 13, 1977.
5. U.S. Environmental Protection Agency, 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants, Standards for Radionuclides, Final Rules," Federal Register, 50(25):5190-5200, February 6, 1985.
6. U.S. Environmental Protection Agency, Groundwater Protection Strategy, Office of Groundwater Protection, Washington, DC, August 1984.

**7.U.S. Environmental Protection Agency, 40 CFR Part 141, "Interim Primary Drinking Water Regulations - Promulgation of Regulations on Radionuclides," Federal Register, 41(133):28402-28405, July 9, 1976.**

**8.U.S. Congress, Toxic Substances Control Act, Public Law 99-469, October 11, 1976.**