



[6450-01-P]

DEPARTMENT OF ENERGY

Request for Public Comment on the U.S. Department of Energy Interpretation of High-Level Radioactive Waste

AGENCY: Office of Environmental Management, U.S. Department of Energy.

ACTION: Notice of public comment period.

SUMMARY: The U.S. Department of Energy (DOE or the Department) provides this Notice and request for public comment on its interpretation of the definition of the statutory term “high-level radioactive waste” (HLW) as set forth in the Atomic Energy Act of 1954 and the Nuclear Waste Policy Act of 1982. This statutory term indicates that not all wastes from the reprocessing of spent nuclear fuel (“reprocessing wastes”) are HLW, and DOE interprets the statutory term such that some reprocessing wastes may be classified as not HLW (non-HLW) and may be disposed of in accordance with their radiological characteristics.

DATES: DOE invites stakeholders to submit written comments on its interpretation. The 60-day public comment period begins on **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]** and ends on **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Only comments received through one of the methods described below will be accepted. DOE will consider all comments received or

postmarked by **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Please direct comments to:

- a) *Email:* Send comments to *HLWnotice@em.doe.gov*. Please submit comments in Microsoft™ Word, or PDF file format, and avoid the use of encryption.
- b) *Mail:* Send to the following address: Theresa Kliczewski, U.S. Department of Energy, Office of Environmental Management, Office of Waste and Materials Management (EM-4.2), 1000 Independence Avenue, S.W., Washington, DC 20585.

FOR FURTHER INFORMATION CONTACT: Theresa Kliczewski at

HLWnotice@em.doe.gov or at U.S. Department of Energy, Office of Environmental Management, Office of Waste and Materials Management (EM-4.2), 1000 Independence Avenue, S.W., Washington, DC 20585. Telephone: (202) 586-3301.

SUPPLEMENTARY INFORMATION

A. Background

DOE manages large inventories of legacy waste resulting from spent nuclear fuel (SNF) reprocessing activities from atomic energy defense programs, *e.g.*, nuclear weapons production. DOE also manages a small quantity of vitrified waste from a demonstration of commercial SNF reprocessing. Reprocessing generally refers to the dissolution of irradiated SNF in acid, generating liquid or viscous wastes, and the chemical processing to separate the fission products or transuranic elements of the SNF from the desired elements of plutonium and uranium, which are recovered for reuse. Liquid reprocessing wastes have been or are currently stored in large

underground tanks at three DOE sites: Savannah River Site (SRS) (South Carolina), Idaho National Laboratory (INL) (Idaho), and the Office of River Protection at the Hanford Site (Washington). Solid reprocessing wastes are liquid wastes that have been immobilized in solid form and are currently stored at SRS, INL, and the West Valley Demonstration Project (New York).

DOE's interpretation of HLW is that reprocessing waste is non-HLW if the waste:

- I. Does not exceed concentration limits for Class C low-level radioactive waste as set out in section 61.55 of title 10, Code of Federal Regulations; or
- II. Does not require disposal in a deep geologic repository and meets the performance objectives of a disposal facility as demonstrated through a performance assessment conducted in accordance with applicable regulatory requirements.

Under DOE's interpretation, waste meeting either of these criteria is non-HLW and may be classified and disposed of in accordance with its radiological characteristics.

At this time, DOE is not making - and has not made - any decisions on the disposal of any particular waste stream. Disposal decisions, when made, will be based on the consideration of public comments in response to this Notice and prior input and consultation with appropriate state and local regulators and stakeholders. DOE will continue its current practice of managing all its reprocessing wastes as if they were HLW unless and until a specific waste is determined to be another category of waste based on detailed technical assessments of its characteristics and an evaluation of potential disposal pathways.

B. High-Level Waste Interpretation

DOE interprets the term “high-level radioactive waste”, as stated in the Atomic Energy Act of 1954 as amended (AEA),¹ and the Nuclear Waste Policy Act of 1982 as amended (NWPA)² in a manner that defines DOE reprocessing wastes to be classified as either HLW or non-HLW based on the radiological characteristics of the waste and their ability to meet appropriate disposal facility requirements. The basis for DOE’s interpretation comes from the AEA and NWPA definition of HLW:

- (A) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and
- (B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.³

In paragraph A, Congress limited HLW to those materials that are both “highly radioactive” and “resulting from the reprocessing of spent nuclear fuel.” Reprocessing generates liquid wastes, with the first cycle of reprocessing operations containing the majority of the fission products and transuranic elements removed from the SNF. Thus, in paragraph A, Congress distinguished HLW with regard to its form as both “liquid waste produced directly in reprocessing” and “any solid material derived from such liquid waste that contains fission products in sufficient concentrations.”

In paragraph B, Congress defined HLW also to include “other highly radioactive material” that the Nuclear Regulatory Commission (NRC) determines by rule “requires permanent isolation.” HLW under paragraph B includes highly radioactive material regardless

¹ 42 U.S.C. 2011 *et seq.* This definition of HLW was first enacted in the Nuclear Waste Policy Act of 1982, as amended, and incorporated into the AEA in 1988.

² 42 U.S.C. 10101 *et seq.*

³ 42 U.S.C. 10101(12)(A), (B).

of whether the waste is from reprocessing or some other activity. Further, under paragraph B, classification of material as HLW is based on its radiological characteristics and whether the material requires permanent isolation.

The common element of these statutory paragraphs defining HLW is the requirement and recognition that the waste be “highly radioactive.” Additionally, both paragraphs reflect a primary purpose of the NWPA, which is to define those materials for which disposal in a deep geologic repository is the only method that would provide reasonable assurance that the public and the environment will be adequately protected from the radiological hazards the materials pose.

The terms “highly radioactive,” and “sufficient concentrations” are not defined in the AEA or the NWPA. By providing in paragraph A that liquid reprocessing waste is HLW only if it is “highly radioactive,” and that solid waste derived from liquid reprocessing waste is HLW only if it is “highly radioactive” and contains fission products in “sufficient concentrations” without further defining these standards, Congress left it to DOE to determine when these standards are met. Given Congress’ intent that not all reprocessing waste is HLW, it is appropriate for DOE to use its expertise to interpret the definition of HLW, consistent with proper statutory construction, to distinguish waste that is non-HLW from waste that is HLW.

The DOE interpretation is informed by the radiological characteristics of reprocessing waste and whether the waste can be disposed of safely in a facility other than a deep geologic repository. This interpretation is based upon the principles of the NRC’s regulatory structure for the disposal of low-level radioactive wastes⁴.

⁴ NRC licensing requirements for the land disposal of LLW, originally promulgated in 1962, are codified in Part 61 of the Code of Federal Regulations, 10 CFR part 61.

In its regulations, NRC has identified four classes of low-level radioactive waste (LLW) – Class A, B or C – for which near-surface disposal is safe for public health and the environment, and greater-than-Class C LLW for which near-surface disposal may be safe for public health and the environment. This waste classification regime is based on the concentration levels of a combination of specified short-lived and long-lived radionuclides in a waste stream, with Class C LLW having the highest concentration levels. Waste that exceeds the Class C levels is evaluated on a case-specific basis to determine whether it requires disposal in a deep geologic repository, or whether an alternative disposal facility can be demonstrated to provide safe disposal. The need for disposal in a deep geologic repository results from a combination of two radiological characteristics of the waste: high activity radionuclides, including fission products, which generate high levels of radiation; and long-lived radionuclides which, if not properly disposed of, would present a risk to human health and the environment for hundreds of thousands of years.

Because the NRC has long-standing regulations that set concentration limits for radionuclides in waste that is acceptable for near-surface disposal, it is reasonable to interpret “highly radioactive” to mean, at a minimum, radionuclide concentrations greater than the Class C limits. Reprocessing waste that does not exceed the Class C limits is non-HLW.

DOE interprets “sufficient concentrations” in the statutory context in which the definition was enacted, which, as discussed above, is focused on protecting the public and the environment from the hazards posed by nuclear waste. In addition to the characteristics of the waste itself, the risk that reprocessing waste poses to human health and the environment depends on the physical characteristics of the disposal facility and that facility’s ability to safely isolate the waste from the human environment. Relevant characteristics of a disposal facility may include the depth of disposal, use of engineered barriers, and geologic, hydrologic, and geochemical features of the

site. Taking these considerations into account, it is reasonable to interpret “sufficient concentrations” to mean concentrations of fission products in combination with long-lived radionuclides that would require disposal in a deep geologic repository.

Accordingly, under DOE’s interpretation, solid waste that exceeds the NRC’s Class C limits would be subject to detailed characterization and technical analysis of the radiological characteristics of the waste. This, combined with the physical characteristics of a specific disposal facility and the method of disposal, would determine whether the facility could meet its performance objectives, and if the waste can be disposed of safely. This approach would be governed by the waste characterization and analysis process and performance objectives for the disposal facility established by the applicable regulator, and thereby protective of human health and the environment.

The DOE interpretation does not require the removal of key radionuclides to the maximum extent that is technically and economically practical before DOE can define waste as non-HLW. Nothing in the statutory text of the AEA or the NWPA requires that radionuclides be removed to the maximum extent technically and economically practical prior to determining whether waste is HLW. DOE has determined that the removal of radionuclides from waste that already meets existing legal and technical requirements for safe transportation and disposal is unnecessary and inefficient, and does not benefit human health or the environment. To the contrary, it potentially presents a greater risk to human health and the environment because it prolongs the temporary storage of waste.

Therefore, under DOE’s interpretation, waste resulting from the reprocessing of SNF is non-HLW if the waste:

- I. Does not exceed concentration limits for Class C low-level radioactive waste as set out in section 61.55 of title 10, Code of Federal Regulations; or

- II. Does not require disposal in a deep geologic repository and meets the performance objectives of a disposal facility as demonstrated through a performance assessment conducted in accordance with applicable regulatory requirements.

Reprocessing waste meeting either I or II of the above is non-HLW, and may be classified and disposed in accordance with its radiological characteristics in an appropriate facility provided all applicable requirements of the disposal facility are met.

C. Request for Comments

The Department specifically requests comments on its interpretation that reprocessing waste meeting either of the two criterion stated above is non-HLW. This Notice is intended to solicit public feedback on the DOE interpretation to better understand stakeholder perspectives prior to appropriate input and consultation with affected state and local regulators and any waste disposal classification decisions.

The Department will consider all comments received during the public comment period, and modify its proposed approach, as appropriate, based on public comment.

Signed at Washington, DC on October 4, 2018.

Anne Marie White, Assistant Secretary
for Environmental Management.

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