6450-01-P

DEPARTMENT OF ENERGY

Supplemental Notice Concerning U.S. Department of Energy Interpretation of High-Level Radioactive Waste

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

ACTION: Notice.

SUMMARY: In this Supplemental Notice, the U.S. Department of Energy (Department or DOE) supplements and updates its 2018 *Request for Public Comment on the U.S. Department of Energy Interpretation of High-Level Radioactive Waste*, published in the *Federal Register* on October 10, 2018 (October 10 Notice), concerning its interpretation of the statutory term "high-level radioactive waste" (HLW) as defined in the Atomic Energy Act of 1954, as amended, and the Nuclear Waste Policy Act of 1982, as amended.

ADDRESSES: This *Federal Register Notice* (Notice) is available on the Department's Web site at: https://www.energy.gov/em/high-level-radioactive-waste-hlw-interpretation.

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SUPPLEMENTARY INFORMATION: As DOE stated in the October 10 Notice and as this Supplemental Notice reiterates, DOE interprets this statutory term to mean that not all wastes from the reprocessing of spent nuclear fuel (reprocessing wastes) are HLW. 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. This Supplemental Notice provides additional explanation of DOE's interpretation as informed by public review and comment and further consideration by DOE following the October 10 Notice. DOE has not made, and does not presently propose, any changes or revisions to current policies, legal requirements or agreements with respect to HLW. Decisions about whether and how this interpretation of HLW will apply to existing wastes and whether such wastes may be managed as non-HLW will be the subject of subsequent actions.

I. Background

The Department sought public comments on its HLW interpretation through its *Request for Public Comment on the U.S. Department of Energy Interpretation of High-Level Radioactive Waste*, 83 FR 50909 (October 10, 2018). The 90-day public comment period, including a 30-day extension to submit comments, invited public input in order to better understand stakeholder perspectives, and sought to increase transparency and enhance public understanding of DOE's views of its legal authority. DOE received a total of 5,555 comments, roughly 360 of which were distinct, unrepeated comments, from a variety of stakeholders: members of the public, Native American tribes, members of Congress, numerous state and local governments, and one federal agency, the Nuclear Regulatory Commission (NRC).

All input is important to the process and all comments were carefully and fully considered by DOE. DOE is issuing this Supplemental Notice to provide the public additional information about its HLW interpretation, informed by public comments. This interpretation does not change or revise any current policies, legal requirements, or agreements with respect to HLW. Decisions about whether and how this interpretation of HLW will apply to existing wastes and whether such wastes may be managed as non-HLW will be the subject of subsequent

actions. The following sections of this Supplemental Notice describe the Department's HLW interpretation, and provide summary responses to significant and recurring comments received through the public comment process.

As a first step in determining whether and how to implement this HLW interpretation specific to a particular waste stream, DOE is initiating a public process under the National Environmental Policy Act (NEPA) to analyze the potential environmental impacts associated with disposing of certain waste from the Savannah River Site at a commercial disposal facility outside South Carolina licensed by either the Nuclear Regulatory Commission (NRC) or an Agreement State under 10 CFR part 61 to receive low-level radioactive waste. This NEPA process is explained further in a separate Notice, *Environmental Assessment for the Commercial Disposal of Defense Waste Processing Facility Recycle Wastewater from the Savannah River Site* (NOI) that was submitted concurrently with this Supplemental Notice for publication in the *Federal Register*. At this time, DOE is not considering whether to implement the HLW interpretation at any other site or for any other waste stream. While DOE will continue in the normal course to evaluate its waste inventories and related management and disposal options, and expects to engage openly with stakeholders regarding potential future opportunities to implement the HLW interpretation more broadly, any decisions about whether and how the interpretation will apply to other wastes at any specific site will be the subject of subsequent actions.

II. Summary Description

In this Supplemental Notice, DOE explains its interpretation of the term HLW, as defined in the Atomic Energy Act of 1954, as amended (AEA, 42 U.S.C. 2011 *et seq*.) and the Nuclear Waste Policy Act of 1982, as amended (NWPA, 42 U.S.C. 10101 *et seq*.). DOE has the long-

standing authority and responsibility under the AEA to ensure that all radioactive waste from the United States' defense program – including reprocessing waste – is managed and disposed of in a safe manner. The AEA and NWPA define HLW as:

> (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
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> (B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.

42 U.S.C. 10101(12); *see* 42 U.S.C. 2014(dd). This definition of HLW makes clear that not all radioactive wastes from nuclear fuel reprocessing are HLW. DOE has the legal authority to interpret the term HLW in these statutes to determine that certain of its reprocessing wastes are not HLW based on their radiological characteristics. Accordingly, DOE interprets those statutes to provide that reprocessing wastes are properly classified as non-HLW where the radiological characteristics of the waste in combination with appropriate disposal facility requirements for safe disposal demonstrate that disposal of such waste is fully protective of human health and the environment.

DOE has revised the interpretation stated in its October 10 Notice after consideration of public comments, in particular those of the NRC and affected state and local stakeholders, in order to clarify its meaning and import. Based on those comments, DOE interprets the statutes to provide that a reprocessing waste may be determined to be non-HLW if the waste meets either of the following two criteria:

> 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, and meets the performance objectives of a disposal facility; or
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> 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 requirements.

Performance objectives are the quantitative radiological standards set by the NRC or DOE to ensure protection of the health and safety of individuals and the environment during operation, and after permanent closure of the disposal facility. The technical means to demonstrate compliance with performance objectives are through a modeling and analytical tool commonly referred to as a performance assessment. Safe disposal also entails compliance with other facility requirements, such as waste acceptance criteria – the technical and administrative requirements associated with waste acceptance, including but not limited to: allowable radionuclide content; waste form and packaging; and required waste generator certifications and approvals. Reprocessing waste meeting either I or II of the above criteria is non-HLW, and – pursuant to appropriate processes – 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.

As noted, additional, subsequent DOE action is required before the interpretation in this Supplemental Notice can be implemented. This Supplemental Notice, therefore, does not alter the Department's current management of reprocessing waste for any specific waste stream. Each reprocessing waste stream has unique radiological characteristics and, accordingly, the interpretation will be implemented in subsequent actions on a site-specific basis, following consideration of: evaluation and characterization of specific reprocessing waste streams in conjunction with the waste acceptance criteria and requirements of a specific waste disposal facility; input from affected stakeholders (*e.g.*, federal, state, local and tribal officials; and members of the public); and compliance with applicable federal and state laws, regulations, and agreements. This interpretation does not, and will not be used to, abrogate DOE's responsibilities under existing laws, regulations, agreements, or permit requirements. Nor does it

change DOE's existing statutory authorities or those of its regulators at the federal, state, or local level. DOE anticipates continued engagement and productive involvement of members of the public and the regulatory community in subsequent activities that may follow this HLW interpretation, including the NEPA process described in the NOI.

III. Response to Comments

DOE received 5,555 comments on its proposed interpretation that break down to roughly 360 distinct comments (that is, excluding duplicative form comments). DOE received both critical and supportive comments, with the majority of comments expressing concerns or questions relating to health and safety and environmental outcomes associated with the interpretation. The following sections of this Supplemental Notice provide additional detail and explanation of DOE's HLW interpretation in response to the significant and recurring comments received. DOE is providing this additional information in response to comments, while recognizing that not all of this information is central to, or necessary for an understanding of DOE's interpretation. To aid in organizing the comments, this section categorizes public comments in broad terms relating to the legal authority, technical basis, implementation, and other comments on the HLW interpretation.

A. Legal Authority for HLW Interpretation

As DOE explained in the October 10 Notice, DOE interprets the term "high-level radioactive waste," as stated in the AEA and the NWPA, 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 whether the waste can be disposed of safely in a facility other than a deep geologic repository. Having fully considered all comments received, DOE continues

to believe that the HLW interpretation is legally sound, technically appropriate, and fully protective of human health and the environment.

DOE's purpose in issuing the interpretation in the form of an interpretative rule within the meaning of section 553(b) of the Administrative Procedure Act (APA, 5 U.S.C. 553(b)) is to provide the public with a clear and transparent explanation of DOE's view of a specific legal question – the meaning of the term HLW, including the authority that Congress conferred on DOE through that term. DOE's interpretation is, however, only one factor in initiating a broader process of identifying potential options for disposing of reprocessing wastes that are determined to not require disposal in a deep geologic repository. 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.

1. DOE Authorities

Consistent with its long-standing authority under the AEA to ensure that radioactive waste from the United States' defense program is managed and disposed of in a safe manner, DOE has the legal authority to interpret the term HLW in the AEA and the NWPA to determine that certain of its reprocessing wastes are not HLW based on their radiological characteristics. This interpretation is consistent with the AEA, the NWPA, and Section 3116 of the 2005 Ronald Reagan National Defense Authorization Act (Section 3116, Public Law 108-375).

The significance of "highly radioactive." Commenters stated that under the NWPA DOE lacks the legal authority to determine that certain reprocessing wastes are non-HLW based on their radiological characteristics because Congress defined HLW based only on its source.

The plain language of the HLW definition contradicts this exclusively "source-based" interpretation.

The AEA and NWPA define HLW as:

> (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.

42 U.S.C. 10101(12); *see also* 42 U.S.C. 2014(dd). In Paragraph A, Congress limited HLW to those materials that are "highly radioactive." This limiting term applies to all reprocessing waste, including the "liquid waste produced directly in reprocessing" and "any solid material derived from such liquid waste." The use of the limiting term "highly radioactive" demonstrates that Congress intended to distinguish between waste that is "highly radioactive" and waste that is not. If Congress had intended to define all reprocessing waste as HLW regardless of its radiological characteristics, it would not have included the "highly radioactive" requirement and instead defined HLW as "*all* waste material resulting from the reprocessing of spent nuclear fuel." Similarly, for "any solid material derived from" the "liquid waste produced directly in reprocessing," Congress also specified that in addition to being "highly radioactive" it must also contain fission products in "sufficient concentrations."

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 material 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, for its reprocessing wastes, to determine when the standards are met. That is what DOE has done through its interpretation.

DOE has evaluated the meaning of those terms based on its historical knowledge, experience, and expertise in managing reprocessing wastes. DOE's interpretation is an articulation of the technical criteria that can be applied to individual waste streams on a case-by-case basis to determine whether the standard for HLW has been met. DOE also notes that in their comments on the interpretation, the NRC staff stated that they "agree with the concept proposed in *Federal Register* October 10 Notice (83 FR 50909) that radioactive waste may be classified and disposed of in accordance with its radiological characteristics." DOE places significant weight on the NRC's views of matters relating to the safe management and disposal of radioactive waste, including this HLW interpretation.

Distinguishing between HLW and non-HLW based on the need for disposal in a deep geologic repository. Commenters stated that DOE's interpretation is circular, and that there is no basis for the interpretation that if waste does not require disposal in a deep geologic repository then it is not HLW. DOE disagrees. DOE's interpretation is consistent with the statutory text, the underlying purposes of the AEA and the NWPA, and the well-established principles of the NRC's regulatory structure for the disposal of low-level radioactive wastes (LLW).

As discussed above, without further defining the terms "highly radioactive" and "sufficient concentrations," Congress left it to DOE to determine when reprocessing waste meets the standards. The statutory context is fundamental to determining the meaning of the terms "highly radioactive" and "sufficient concentrations." Through the AEA Congress conferred on DOE the responsibility to "provide for safe storage, processing, transportation, and disposal of" reprocessing and other radioactive wastes resulting from the United States' defense program. *See* 42 U.S.C. 2121(a)(3), 5814, 7151(a). DOE's primary objective in fulfilling this statutory

responsibility is to manage and dispose of radioactive waste in a manner that fully protects the public and the environment from the hazards posed by the waste. Similarly, a primary purpose of the NWPA is to identify 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. *See* 42 U.S.C. 10131(b); 10101(12), (18). As the NRC has explained,

> Th[e] combination of highly-concentrated, short-lived nuclides together with other very long-lived nuclides has historically been described by the term 'high-level radioactive wastes' (HLW). There has long been a recognition that such waste materials require long-term isolation from man's biological environment…

Advance Notice of Proposed Rulemaking, *Definition of High-Level Radioactive Waste,* 52 FR 5992, 5993 (February 27, 1987). Deep geologic disposal is the internationally recognized and technically viable means to provide such long-term isolation for waste with both highly concentrated short-lived radionuclides and long-lived radionuclides. However, not all radioactive wastes have these properties, and therefore do not require the same disposal methods. Because not all radioactive wastes have the same radiological characteristics, there is a well-established statutory and regulatory regime for the safe and technically sound disposal of radioactive waste commensurate with the radiological hazard posed by the waste. Consequently, determining whether a particular reprocessing waste can be disposed of safely in a facility other than a deep geologic repository is the appropriate basis for differentiating between waste that is "highly radioactive" and waste that is not, and, for solid material, waste that contains fission products in "sufficient concentrations" and waste that does not.

In its regulations, the NRC has identified classes of LLW — Class A, B, or C — for which near-surface disposal is safe for public health and the environment. Waste that exceeds the Class C tables in 10 CFR 61.55 also may be safely disposed in a near-surface disposal facility

under certain conditions. 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. In accordance with NRC regulations, 10 CFR 61.55(a)(2)(iv) and 10 CFR 61.58, 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.

Non-HLW Criterion 1. 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. Waste that is at or below Class C limits does not have "highly radioactive" radionuclide concentrations because it can be, and routinely is, safely disposed in near-surface facilities that are proven to be protective of human health and the environment. In other words, because waste within Class C limits clearly does not require disposal in a deep geologic repository, it is not "highly radioactive" within the meaning of the HLW definition, and therefore, non-HLW.

Non-HLW Criterion 2. As stated above, solid material derived from liquid reprocessing waste is HLW only if it is "highly radioactive" and contains fission products in "sufficient concentrations." Where solid material derived from liquid reprocessing waste exceeds the Class C limits (and could, therefore, be considered "highly radioactive"), it is appropriate to analyze also whether the waste contains "sufficient concentrations" of fission products in combination with long-lived radionuclides such that disposal in a deep geologic repository is necessary. As previously articulated, not all radioactive wastes are the same or require the same disposal methods. Only those wastes that have the characteristics of both high concentrations of short-

lived radionuclides and long-lived radionuclides bear the hallmarks of a radioactive waste that is necessary for deep geologic disposal. Other disposal facilities may be capable of accepting the waste in compliance with the performance objectives of the facility, which means that the public and the environment can be effectively protected from harmful effects by safely disposing the waste in such a facility. Under DOE's interpretation, where solid material exceeds the NRC's Class C limits, such material can still be classified as non-HLW if technical analysis of the radiological characteristics of the waste demonstrates that it can be safely disposed in a facility other than a deep geologic repository. That is, analysis must show that a given waste can be safely disposed, considering the physical characteristics of a specific (non-geologic repository) disposal facility and a method of disposal compliant with the facility's performance objectives.

DOE and NRC authority under Paragraphs A and B of the HLW definition.

Commenters stated that through its interpretation DOE is improperly attempting to assign to itself under Paragraph A of the HLW definition the authority that Congress assigned to the NRC. That is incorrect. The authority granted to the NRC in Paragraph B reflects Congress' intent for the NRC potentially to define other "highly radioactive materials" as HLW. DOE recognizes the NRC's authority on this point. DOE does not, however, agree with the commenters that by granting NRC, and not DOE, the authority to define non-reprocessing wastes as HLW, Congress explicitly or implicitly deprived DOE of its long-standing AEA authority to interpret this statutory term as it pertains to DOE reprocessing wastes. DOE manages a large inventory of legacy reprocessing waste from atomic energy defense activities, e.g., nuclear weapons production. The structure of the HLW definition simply reflects Congress' recognition of the respective roles that each agency has played under the AEA since the responsibilities of the Atomic Energy Commission (AEC) were divided between DOE and the NRC in 1974.

The AEA vested in the AEC the exclusive responsibility to regulate the materials covered by the Act. *See* 42 USC 2201(b). With regard to the United States' defense program, the AEA expressly provided the AEC the authority to "provide for safe storage, processing, transportation, and disposal of hazardous waste (including radioactive waste) resulting from nuclear materials production, weapons production and surveillance programs, and naval nuclear propulsion programs." 42 U.S.C. 2121(a)(3).

In 1974, Congress enacted the Energy Reorganization Act of 1974 (ERA), 88 Stat. 1233, as amended, 42 U.S.C. 5801 *et seq*., which abolished the AEC and divided its functions between DOE's predecessor, the Energy Research and Development Administration (ERDA), and the NRC. *See* ERA, Sections 104, 201(f), Pub. L. No. 93-438, 88 Stat. 1233, 1237-38, 1242-44, 42 U.S.C. 5814, 5841(f). Under the ERA, the NRC was assigned responsibility for commercial licensing of nuclear power plants and related regulatory functions. 42 U.S.C. 5841(f). The NRC also acquired licensing authority over ERDA facilities in limited circumstances, including "[f]acilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under such Act" and "facilities authorized for the express purpose of subsequent long-term storage of high-level waste generated by the Administration, which are not used for, or are part of, research and development activities." 42 U.S.C. 5842.

The ERDA was assigned all other AEC functions, including its weapons production and defense waste management authority. 42 U.S.C. 5814(c). The ERA also authorized the ERDA Administrator to "prescribe such policies, standards, criteria, procedures, rules, and regulations as he may deem to be necessary or appropriate to perform functions now or hereafter vested in him." 42 U.S.C. 5815(a). In 1977, Congress abolished the ERDA and transferred its functions to DOE. *See* Department of Energy Organization Act (DOEOA) Section 301(a), Pub. L. No. 95-

91, 91 Stat. 565, 577-78 (1977), 42 U.S.C. 7151(a). Among other things, the DOEOA specifically assigned responsibility for the military applications of nuclear energy to DOE. Additionally, the DOEOA made clear that DOE retained all of ERDA's radioactive waste management responsibilities and authorities including: (1) control over existing Government facilities for the treatment and storage of nuclear wastes, including all containers, casks, buildings, vehicles, equipment, and other materials associated with such facilities; (2) control over all existing nuclear waste in the possession or control of the Government; (3) the establishment of temporary and permanent facilities for storage, management, and ultimate disposal of nuclear wastes; and (4) the establishment of programs for the treatment, management, storage, and disposal of nuclear wastes. *See* 42 U.S.C. 7133(a)(8)(A), (B), (C), and (E). "This left control over existing government facilities and defense nuclear waste in DOE." *NRDC v. Abraham*, 244 F.3d 742, 745 (9th Cir. 2001).

Accordingly, it is well within DOE's authority and responsibility to interpret Paragraph A of the HLW definition to determine whether reprocessing wastes within the DOE complex meet the technical criteria of "highly radioactive" and "sufficient concentrations." Paragraph B, on the other hand, is a different type of function granted to NRC. The authority to define other "highly radioactive materials" that require permanent isolation is consistent with the NRC's licensing and regulatory role under the AEA and NWPA. In assigning NRC this authority, however, Congress did not change DOE authority under the AEA to interpret this statutory term to ensure it is safely storing, managing, and disposing of its radioactive wastes in accordance with applicable law.

Notwithstanding the clear division of responsibilities, DOE and the NRC have historically worked closely together on various issues relating to the safe management and

disposal of radioactive waste, including HLW. As stated above, DOE places significant weight on the NRC staff's agreement with the concept in DOE's interpretation that HLW, like other radioactive waste, may be disposed of in accordance with its radiological characteristics.

HLW interpretation and Section 3116. Commenters stated that DOE's interpretation is inconsistent with Section 3116. DOE disagrees. The HLW interpretation does not impact DOE's intent and obligation to comply fully with Section 3116. In addition, Section 3116 does not limit DOE's long-standing authority under the AEA to interpret the definition of HLW or to apply that interpretation to reprocessing wastes that are not covered by Section 3116.

Section 3116 sets forth a process for determining that specified DOE reprocessing waste is not HLW. This Section 3116 process is similar to the process in DOE's Order 435.1, *Radioactive Waste Management*, the accompanying DOE Manual 435.1-1, *Radioactive Waste Management Manual*, (Manual), and the accompanying DOE Guide 435.1-1, *Implementation Guide* for use with DOE M 435.1-1 (Implementation Guide) for determining whether certain reprocessing wastes are "wastes incidental to reprocessing," or WIR. *See* Public Law 108-375, 2004, Section 3116(a). Section 3116 applies to two "covered States" – South Carolina and Idaho. *Id*. Section 3116(d). However, Section 3116 does not apply to reprocessing wastes that are transported out of South Carolina or Idaho and disposed of in a different state. *See id*. Section 3116(c). Section 3116 also specifies that "nothing in this section establishes any precedent or is binding" outside of South Carolina and Idaho. *Id*. Section 3116(e). In short, in enacting Section 3116, Congress did not limit DOE's long-standing authority under the AEA to interpret the term HLW or to apply this interpretation to reprocessing wastes that are disposed of in states other than Idaho and South Carolina.

2. DOE's Explanation of Its HLW Interpretation

Commenters stated that the HLW interpretation represents a change in DOE's existing policy for determining whether reprocessing waste is HLW, and that DOE did not adequately explain the basis for that change. Some commenters also stated that DOE should update its existing authorities to be consistent with the HLW interpretation. Other commenters stated that the HLW interpretation is unnecessary in light of DOE's existing mechanisms for determining whether reprocessing waste is HLW.

As noted above, through this Supplemental Notice DOE is only stating its understanding of the proper interpretation of the statutory text in light of the language and purpose of the two Acts, which is also consistent with Congress's direction and the expert community's consensus, while remaining fully protective of the health and welfare of the public and the environment. This interpretation does not, by itself, change existing applicable DOE regulations, orders, or policies regarding the classification of wastes or the treatment of any particular waste stream. Implementation of this interpretation at a particular site or for a particular waste stream, and any changes to existing policies that may be appropriate in light of this interpretation will be the subject of subsequent actions.

DOE acknowledges, as explained below, that the HLW interpretation in this Supplemental Notice differs from the existing WIR evaluation method under DOE Order 435.1 for determining whether reprocessing waste is HLW or WIR that is set forth in the Manual and Implementation Guide. DOE disagrees, however, that the HLW interpretation is unnecessary in light of the existing DOE Order 435.1 WIR evaluation method. DOE believes in light of further consideration that the HLW interpretation is the proper reading of the statutory definitions of that term, informed by DOE's expert understanding of the risks presented to the public and the environment by different types of reprocessing wastes. As explained elsewhere in this

Supplemental Notice, hereafter DOE will consider what actions may be needed and appropriate to update applicable DOE directives in light of this interpretation and will, as part of that process, assess whether any additional elements of its current policies should be amended. Accordingly, any changes in policy, including revisions to DOE Order 435.1, related documents, or the WIR process and its application, will be addressed in future actions.

DOE Order 435.1 and WIR. Covering a broad range of topics, DOE Order 435.1 defines how DOE – through its programs and contractors – implements its AEA authority to manage radioactive waste at DOE-owned or leased facilities. The Order is intended to ensure that waste characterization, treatment, disposal, and environmental monitoring activities are conducted in a manner that protects the public, workers, and the environment from exposures to doses of radiation in excess of specified standards. DOE Order 435.1 (4.b.). The Manual sets forth in more detail the requirements and responsibilities for managing waste under the Order. The Implementation Guide discusses acceptable methods for meeting the requirements of the Order and Manual.

DOE Order 435.1 breaks down DOE's waste management activities by waste type including HLW, transuranic (TRU) waste, and LLW. With regard to HLW, the Manual also formalizes the long-standing concept that "WIR" is not HLW because its radioactive characteristics do not pose the elevated risk to human health and the environment that HLW poses. According to the Manual, "waste resulting from reprocessing spent nuclear fuel that is determined to be incidental to reprocessing is not high-level waste, and shall be managed as [TRU] or [LLW], as appropriate." Manual at II.B.[1]

[1] The Manual sets forth two processes for determining that waste is WIR, not HLW. First, under the "citation method," a limited number of secondary solid waste items that fall on a precompiled list are excluded from HLW, including "laboratory items such as clothing, tools, and equipment." Second, the

The 435.1 WIR Criteria provide that wastes being managed as HLW can be determined to be WIR, e.g., managed as LLW[2], where they meet the following criteria (DOE M 435.1-1, Chapter II-B(2)(a), page II-1,2):

> (1) Have been processed, or will be processed, to remove key radionuclides to the maximum extent that is technically and economically practical;
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> (2) Will be managed to meet safety requirements comparable to the performance objectives set out in 10 CFR part 61, Subpart C, *Performance Objectives;* and
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> (3) Are to be managed, pursuant to DOE's authority under the *Atomic Energy Act of 1954*, as amended, and in accordance with the provisions of Chapter IV of this Manual, provided the waste will be incorporated in a solid physical form at a concentration that does not exceed the applicable concentration limits for Class C low-level waste as set out in 10 CFR 61.55, Waste Classification; or will meet alternative requirements for waste classification and characterization as DOE may authorize.

If DOE determines that waste meets the 435.1 WIR Criteria, the waste is not HLW and DOE manages it as LLW or TRU waste.

The above describes the WIR process in DOE Manual 435.1-1. DOE has applied the 435.1 WIR Criteria in limited circumstances to determine that certain waste is not HLW. The 435.1 WIR Criteria would not apply to reprocessing waste disposed of in South Carolina or Idaho, pursuant to Section 3116. As previously noted, reprocessing wastes that are transported out of South Carolina or Idaho and disposed of in a different state are not covered by Section 3116.

WIR Criteria and the HLW interpretation. While the development of the 435.1 WIR Criteria was an important step forward in DOE's management of HLW because it allows DOE in

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"evaluation method" includes a consideration of the risk-related characteristics of the waste (435.1 WIR Criteria).

[2] Under the WIR process, certain reprocessing wastes may also be managed as TRU waste, in accordance with DOE M 435.1-1, Chapter II-B(2)(b), page II-2.

limited circumstances to determine that certain waste is not "highly radioactive," DOE has re-examined the statutory term HLW. At this time, however, DOE is not making any decisions based upon this re-examination and is not modifying DOE Manual 435.1-1 or the current management of existing wastes. DOE will address such issues as it examines future application to any specific waste, and such examination will occur only with appropriate public engagement and full compliance with other legal obligations such as compliance with the National Environmental Policy Act (NEPA, 42 U.S.C. 4321 *et seq*.).

With respect to the HLW interpretation, however, 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's HLW interpretation is consistent with and informed by analysis of the risk presented to the public and the environment from reprocessing wastes. Reprocessing wastes that already meet existing regulatory requirements for safe disposal as LLW without any radionuclide removal do not present risks to the public and the environment that would necessitate their classification as HLW under the AEA and NWPA. Accordingly, DOE Manual 435.1-1's requirement to remove radionuclides to the maximum extent technically and economically practical is not a component of DOE's HLW interpretation as reflected in this Supplemental Notice. However, DOE continues to operate under DOE Manual 435.1-1 and any change to the terms or applicability of that document will be the subject of appropriate agency action.

Why DOE is issuing the HLW interpretation. Through the AEA, Congress conferred on DOE the responsibility of safely and permanently disposing of the radioactive waste from the United States' defense program, including reprocessing wastes. *See* 42 U.S.C. 2121(a)(3), 5814, 7151(a). While DOE has made important progress in fulfilling this responsibility, there has been

widespread recognition that the current approach to managing and disposing of these wastes has shortcomings, and that alternative strategies should be explored and developed.

Most recently, in enacting the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115-91), Congress specifically tasked DOE with "conduct[ing] an evaluation of the feasibility, costs, and cost savings of classifying covered defense nuclear waste as other than high-level radioactive waste, without decreasing environmental, health, or public safety requirements." Public Law 115-91, Sec. 3139. DOE's report responsive to Congress' directive is currently undergoing interagency review. Even before this Congressional directive, in 2012, for example, the Blue Ribbon Commission on America's Nuclear Future (BRC) – a group of experts, including a former NRC Chairman, tasked by the Secretary of Energy at the request of the President with reviewing the existing policies for managing the back end of the nuclear fuel cycle – reported that "[t]he most important overarching criticism of the U.S. waste classification system is that it is not sufficiently risk-based. Rather, it is (for the most part) directly or indirectly source-based – that is, based on the type of facility or process that produces the waste rather than on factors related to human health and safety risks." (Blue Ribbon Commission on America's Nuclear Energy Future, Report to the Secretary of Energy, January 26, 2012[3]). The BRC found that "the definition of HLW, in particular, has attracted the most criticism" for being insufficiently risk-based, noting that "to the extent that terms such as 'highly radioactive,' 'sufficient concentrations,' and 'requires permanent isolation' are used to define HLW, they have not been quantified." *Id*. The BRC explained that this is "potentially problematic because the liquid waste stream from the front end of a reprocessing plant can have a broad range of characteristics—including characteristics that may be altered by time (decay) or by subsequent

[3] *The BRC report is available at: https://www.energy.gov/sites/prod/files/2013/04/f0/brc_finalreport_jan2012.pdf*.

processing (which DOE has done with many of its defense wastes). The waste that remains after these changes, while still classified as HLW, may have characteristics similar to TRU waste or LLW." *Id*.

Consistent with Congress' directive, the BRC's report, and other similar reports and findings, DOE has re-examined its existing authorities and the statutory requirements for managing and disposing of reprocessing wastes, including the HLW definition and the 435.1 WIR Criteria. Consistent with the statutory text, DOE's HLW interpretation is more fully based on radiological characteristics that determine risk. As such, it is the first step in a process of potentially opening new disposal pathways for reprocessing waste with lower levels of radioactivity, while protecting human health and the environment. This process will proceed on a site-by-site basis and involve, as appropriate, various stakeholders including the NRC, the Environmental Protection Agency (EPA), states, tribes, and others.

DOE's interpretation of HLW could, upon implementation, provide a range of benefits to both DOE and the public, including: enhancing safety at DOE sites by using lower-complexity waste treatment and immobilization approaches to reduce the risks of long-term waste storage and management; reducing time that untreated radioactive waste is stored on-site at DOE facilities; furthering DOE's commitment to state and local communities to move radioactive material out of the generator state; utilizing mature and available commercial facilities and capabilities to shorten mission completion schedules and reduce taxpayer financial liability; aligning with international guidelines for management and disposal of radioactive waste based on radiological risk; and establishing risk-informed disposal practices, consistent with current regulatory requirements for LLW.

3. Interpretative Rule

Commenters stated that DOE's HLW interpretation should be issued as a regulation. Commenters also stated that DOE should provide the public with more information about how the Department intends to implement the interpretation at each site where reprocessing waste is stored, and that DOE should provide additional opportunities for public participation beyond the 90 days of public comment provided on the interpretation.

DOE wishes to make clear that an interpretative rule is a type of rule or regulation within the meaning of those terms in the APA, *See* 5 U.S.C. 551(4). It is well established under the APA that agencies have the authority to issue interpretative rules, and that these rules are a valuable tool for an agency to use to advise the public prospectively, and in a clear and transparent manner, of the agency's construction of a statute it administers. As such, an interpretative rule does not have force and effect on its own. It is not until the agency takes an action in which the interpretation is applied that the interpretation can have an effect and, even then, only through that subsequent action.

When DOE considers this statutory interpretation in the context of taking an action in the future with regard to specific wastes, it will evaluate its internal orders and policies to determine if any require revision to accommodate this interpretation, and if so, DOE will follow applicable procedures to make any necessary changes. However, DOE's internal system of orders are not rules or regulations under the APA, and do not themselves constitute agency action.

Furthermore, DOE disagrees that the public required additional information about how DOE intends to implement the HLW interpretation in order to comment on it. The wealth of substantive comments received, including comments that led to revisions in the HLW interpretation as reflected in this Supplemental Notice, indicate that the public had a meaningful opportunity to comment on DOE's general interpretation. Finally, DOE disagrees that additional

process is necessary before DOE adopts the interpretation. As DOE indicated in the request for comments and is reiterating in this Supplemental Notice, there will be additional processes after the interpretation has been issued but before any specific waste classification or disposal decisions are implemented, as outlined in greater detail below.

State, Tribal, Local and Public Involvement. The Department will work closely with State and local officials, regulators, tribal governments, and stakeholders, on a site-by-site basis, to ensure compliance with applicable programmatic requirements and regulatory agreements before classifying any reprocessing waste as non-HLW under the HLW interpretation or consequent disposal decisions.

Path Forward. DOE expects that, depending on site and waste specific facts, some of its reprocessing waste will be found to qualify for non-HLW classification, while other waste will continue to be managed, and ultimately disposed of, as HLW. The development of the path forward for reprocessing waste classified as non-HLW, and decisions flowing from that path, will be dependent on executing a number of technical and regulatory steps (listed in no particular order, recognizing some steps may occur simultaneously), including, but not limited to:

- Identifying potential disposal facilities.
- Evaluating disposal facility waste acceptance criteria and impacts on performance objectives of the disposal facility (the licensee or permittee for the disposal facility may also be required to obtain appropriate regulatory authorizations to accept waste).
- Coordinating with stakeholders.
- Preparing or revising necessary permits.
- Preparing NEPA or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documentation, if needed, to retrieve, treat, package, characterize, and certify the wastes for disposal.
- Modifying affected contracts, if necessary.

- Including a fiscal year budget request to plan for and/or execute disposal of the waste stream.

- Initiating project planning and execution activities in accordance with DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, as appropriate.

- Developing waste loading, packaging, and transportation cask systems as needed to remove the waste from the site and deliver to the disposal facility.

As explained above and in the NOI, DOE's first step in determining whether and how to implement the HLW interpretation specific to a particular waste stream is initiating a NEPA process to analyze the potential environmental impacts associated with disposing of certain waste from the Savannah River Site at a commercial disposal facility located outside South Carolina licensed by either the Nuclear Regulatory Commission (NRC) or an Agreement State under 10 CFR part 61 to receive low-level radioactive waste. At this time, DOE is not considering whether to implement the HLW interpretation at any other site or for any other waste stream. While DOE will continue in the normal course to evaluate its waste inventories and related management and disposal options, and expects to engage openly with stakeholders regarding potential future opportunities to implement the HLW interpretation more broadly, any decisions about whether and how the interpretation will apply to other wastes at any specific site will be the subject of subsequent actions.

4. West Valley Demonstration Project

Commenters stated that DOE did not address the application of the interpretation to the West Valley Demonstration Project (WVDP) in New York. As commenters pointed out, the WVDP operates under a distinct statutory and regulatory basis pursuant to the West Valley Demonstration Project Act (Public Law 96-368), which provides a definition of HLW separate from the AEA and the NWPA. As such, DOE is now clarifying that: (1) the interpretation does

not apply to the reprocessing wastes from the WVDP governed by Pub. L. 96-368; and (2) the interpretation therefore will not be used in connection with the disposition of any reprocessing wastes from the WVDP.

5. Compliance with the National Environmental Policy Act

Commenters stated that the HLW interpretation is a major federal action affecting the quality of the human environment, and that DOE is required to prepare a NEPA analysis that specifically addresses the potential environmental impacts of the interpretation. DOE disagrees that the HLW interpretation requires the NEPA analysis suggested by the commenters.

As discussed above, through this Supplemental Notice, DOE is only stating its understanding of the proper interpretation of the statutory text in light of the language and purpose of the two Acts. Again, issuance of this Notice does not change how DOE will manage any particular reprocessing wastes, and it does not commit DOE to any specific disposal pathways for any reprocessing wastes. Rather, DOE's interpretation helps initiate a waste-specific decision-making process that will include appropriate engagement with stakeholders before any final decisions could or will be made that potentially would result in any environmental impacts. As explained above, and in the NOI, DOE is separately initiating a NEPA process to study the potential environmental impacts associated with implementing the interpretation to dispose of certain waste from the Savannah River Site at a commercial disposal facility located outside South Carolina licensed by either the Nuclear Regulatory Commission (NRC) or an Agreement State under 10 CFR part 61 to receive low-level radioactive waste. If, in the future, DOE proposes an additional action to which NEPA would apply, such as implementation of this interpretation with respect to other specific wastes, DOE will likewise analyze such a proposal pursuant to NEPA.

B. Technical Basis for HLW Interpretation

DOE is committed to the safe and environmentally sound disposal of all its radioactive waste, and the HLW interpretation enhances rather than lessens DOE's commitment to that outcome. Commenters expressed concern that, in effect, DOE's HLW interpretation would lead to the less rigorous and safe disposal of radioactive wastes without a sufficient technical basis. However, the source of the waste does not dictate its safe disposal – the radiological characteristics of the waste and the requirements of the disposal facility operate together to ensure safe disposal. Reprocessing wastes that meet the criteria for non-HLW can be safely disposed along with other non-reprocessing wastes (with similar waste characteristics) that meet the disposal facility's requirements. The requirements that ensure the health and safety of the public, workers, and the environment are long-standing and embedded in DOE's and the NRC's regulations and implementing procedures and documents (e.g., design, permitting, and operations processes for disposal of LLW). All commercial and DOE disposal facilities must be designed, constructed, operated, and closed to meet relevant safety standards, including performance objectives. Commercial LLW disposal facilities are licensed by either the NRC or Agreement States under 10 CFR part 61. LLW disposal facilities owned by DOE must be authorized by DOE in accordance with DOE Order 435.1 and associated manuals, guides, and other directives. Tank closures in the states of Idaho and South Carolina must comply with Section 3116, while tank closures in Washington must comply with the requirements of DOE Order 435.1.

The HLW interpretation and the two criteria for non-HLW are based on well-established approaches for waste classification and disposal. The first criterion is derived directly from the NRC's waste classification system established in the 1980's under 10 CFR 61.55. The second

criterion is consistent with both the NRC's alternative classification system (10 CFR 61.58, *Alternative Requirements for Waste Classification and Characteristics,* and 10 CFR 61.55(a)(2)(iv), *Waste Classification*) and DOE Manual 435.1-1, which regulates the safety of LLW disposal facilities according to demonstrated compliance with public health and worker safety-based performance objectives. The NRC's performance objectives for commercial LLW disposal facilities (10 CFR part 61, Subpart C) and the DOE performance objectives for DOE LLW disposal facilities (DOE M 435.1-1, Chapter IV, Paragraph P) are comparable in their standards and focus on protecting the environment, workers, and the public.

Both criteria 1 and 2 directly incorporate the requirement that a reprocessing waste must meet the performance objectives of a LLW disposal facility to be determined as non-HLW. As further explained below, performance objectives set forth the overarching radiological standards necessary to protect the health and safety of individuals and the general population from radiological releases, both during operation and following the closure of the disposal facility. Disposal facilities have other requirements that must be met for disposal of the waste, including for example satisfaction of waste acceptance criteria (WAC). The WAC are the technical and administrative requirements a waste must meet to be accepted at a disposal facility (e.g., waste characterization, waste form acceptability, quality assurance), and are established to ensure the disposal facility, in total, meets its safety-based performance objectives[4].

[4] Each disposal facility has its own WAC, which are dictated in part by the physical characteristics of a site. An example of a site-specific WAC for the WCS commercial disposal facility in Texas is available at: *http://www.wcstexas.com/pdfs/forms-and-docs/Waste%20Acceptance%20Criteria-a.pdf*.

Although DOE's plain reading of the statutory definition of HLW stands on its own, the following information is provided to further public understanding of the interpretation from a technical perspective.

1. Criterion 1 – Waste At or Below Class C LLW Limits

Criterion 1, as stated in the October 10 Notice, provided that a reprocessing waste is non-HLW if the waste: "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." This criterion has been revised to clarify that a waste must also meet the performance objectives of a disposal facility. The revised criterion provides that a reprocessing waste is non-HLW if the waste: "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, and meets the performance objectives of a disposal facility." This criterion would be applicable only to DOE waste suitable for off-site disposal at a commercial disposal facility regulated by the NRC or an Agreement State.

Commenters offered a number of observations about criterion 1, as originally stated. Commenters noted that this criterion does not require that the waste comply with the performance objectives of a LLW facility, only that it meet the 10 CFR 61.55 concentration limits. Other commenters believed it to be unreasonable because, for example, it would permit DOE to convert HLW to non-HLW by dilution or concentration averaging (e.g., mixing with grout); DOE reprocessing wastes have different radionuclides than commercial LLW; and DOE would need to employ statistical sampling to accurately characterize waste for the purposes of assessing whether it meets the Class C standard. On the other hand, several commenters believed this criterion was reasonable based on its technical merit, and supported DOE in its technical rationale for this criterion. These comments are addressed below; a comparison of

NRC and DOE safety goals and performance objectives for LLW disposal facilities is provided in Appendix A of this document.

Compliance with performance objectives. In response to comments, DOE has revised this criterion to expressly state that the reprocessing waste must meet the performance objectives of a disposal facility. DOE understands that a waste meeting the concentration limits in the tables in 10 CFR 61.55 alone is not sufficient to effectuate the disposal of non-HLW at a disposal facility. If a certain reprocessing waste stream is determined by waste characterization data and analysis to have concentrations satisfying Class A, B, or C using the 10 CFR 61.55 tables, and meets the performance objectives of a disposal facility, then the waste stream is non-HLW. This process is consistent with how DOE disposes of non-reprocessing waste (e.g., soils and debris from environmental restoration and decontamination and decommissioning [D&D] of nuclear facilities) that the Department determines is appropriate for DOE disposal facilities or off-site commercial disposal. The process is also consistent with how industry routinely disposes of LLW in commercial disposal facilities.

Concentration Averaging. Application of DOE's interpretation would not result in improper dilution of a reprocessing waste stream. Dilution of a waste stream to meet concentration limits is not permitted by DOE (Implementation Guide, Section II-A, page II-4) or the NRC (*Concentration Averaging and Encapsulation Branch Technical Position*, Revision 1 (February 2015)). Some types of stabilization (*e.g.*, grouting), solidification, or other treatment would result in reductions of radionuclide concentrations. However, this is not dilution if stabilization or solidification is required by disposal sites' waste acceptance criteria to immobilize radioactive constituents and meet long-term performance objectives. Grout, for example, is a proven safe and effective technology that continues to be used by DOE and other

national and international parties to stabilize radioactive wastes, including certain tank wastes, for disposal. Use of stabilization agents for this purpose is consistent with the NRC's *Concentration Averaging and Encapsulation Branch Technical Position*, which allows mixing of nonradioactive constituents with radioactive waste (e.g., solidification, encapsulation, or additives used in thermal processing) provided the mixing has a purpose other than reducing the waste classification, such as waste stabilization or process control. Furthermore, the addition of stabilization agents to the waste prior to disposal is often necessary to meet the NRC requirements in 10 CFR 61.56, *Waste characteristics* (e.g., to ensure structural stability of the waste form).

Radionuclides in DOE reprocessing waste. Commenters noted that DOE reprocessing wastes are unique, and it may be improper to consider some DOE reprocessing wastes as comparable to the LLW classification concentration limits in the NRC regulations that are based on generic LLW from the commercial sector. Commenters noted that some DOE reprocessing waste streams, in particular those that are not currently treated, may contain unique radionuclides. This does not mean that the criterion is improper, only that, as DOE has stated in the October 10 Notice and this Supplemental Notice, waste classification and any disposal decision would not be made until DOE completes waste characterization, among other prerequisite actions (*e.g.*, applicable NEPA compliance). The results of this analysis, and the ability to meet performance objectives at the intended disposal facility would dictate the ultimate waste classification for disposal purposes.

Regarding 10 CFR 61.55, table 1 addresses seven specific radionuclides and alpha emitters with half-lives greater than five years, and table 2 includes four additional specific radionuclides with the Class C limits. These nuclides identified by NRC are the most mobile and

problematic of all possible key radionuclides and their concentration determine the classification of the waste. Regardless of classification, compliance with performance objectives is ensured through compliance with the disposal facility waste acceptance criteria for all key radionuclides. For DOE facilities, which do not follow the 10 CFR 61.55 waste classification tables, and the NRC/Agreement State facilities, the full range of radionuclides would be considered as part of the regulatory review of a facility's ability to meet applicable performance objectives.

Sampling. DOE will continue to use the existing framework of guidelines, best practices, regulations, and other mechanisms to ensure that each waste stream – whether from reprocessing or other sources – is properly characterized before it is received by a treatment, storage, or disposal facility. DOE follows established practices to characterize and document radioactive waste in sufficient detail to ensure safe management and compliance with the waste acceptance requirements of any facility receiving the waste. These practices are described in DOE M 435.1-1 (e.g., Chapter II-L, page II-5, and Chapter IV-1, page IV-4); DOE G 435.1-1 (e.g., Chapter II-L, page II-78, and Chapter IV-I, page IV-70); EPA guidance (e.g., Hazardous Waste Test Methods/SW-846, Guidance on Systematic Planning Using the Data Quality Objectives Process, etc.); NRC guidance (e.g., *Concentration Averaging and Encapsulation Branch Technical Position*); DOE or commercial facility waste acceptance criteria; and DOE waste analysis plans and sampling and analysis plans for specific waste streams or activities (e.g., tank waste retrieval); and other documents.

2. Criterion 2 – Waste Above Class C Limits

Criterion 2, as stated in the October 10 Notice, provided that a reprocessing waste is non-HLW if the waste: "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." This criterion has been revised from "applicable regulatory requirements" to "applicable requirements." The revision was made to more precisely reflect that performance assessments are conducted pursuant to DOE and NRC requirements, guidance, and standards.

Commenters raised several concerns about criterion 2, as originally stated. Comments regarding this criterion centered on DOE as a self-regulator, with the ability to unilaterally determine or change performance standards for its own facilities, and DOE's reliance on performance assessments. Commenters also noted more specific concerns, such as DOE's use of performance objectives rather than waste acceptance criteria and the need for DOE to counteract the purported motivation of a commercial disposal facility to accept any waste for a profit. As with criterion 1, these comments are addressed below, and Appendix A of this document contains a comparison of NRC and DOE safety goals and performance objectives for LLW disposal facilities.

DOE regulatory role. Congress conferred on DOE the authority to, in certain circumstances, self-regulate its own radioactive waste management and disposal in accordance with the AEA, as amended, and other statutes. Where DOE disposes of its wastes at NRC or Agreement State licensed facilities, DOE is not the regulator and is subject to the same requirements and oversight as any private customer. While DOE has self-regulatory authority in certain circumstances, that does not mean DOE operates with unfettered discretion and without oversight. DOE is subject to various levels of independent internal and external oversight making it accountable to comply with an integrated framework of laws and technical standards to protect public health, safety, and the environment. Contrary to the concerns of some commenters, DOE's internal governing documents (*e.g.*, DOE Order 435.1, and associated

manual and guide) represent a mature and robust system to address the protection of workers, public health and safety, and the environment for all DOE onsite radioactive waste management, as well as environmental restoration activities resulting in off-site management and disposal of radioactive waste. Many of the current DOE compliance-related actions revolve around waste and material disposition that are governed by, among other external regulatory regimes: CERCLA; Resource Conservation and Recovery Act (RCRA) or industrial waste water regulations; and regulatory agreements.

In addition, there are several organizations involved in oversight of DOE's Office of Environmental Management and that office's waste management and disposal activities, including: State agencies and EPA for activities under RCRA and CERCLA; the Defense Nuclear Facilities Safety Board (DNFSB) for defense nuclear facilities; DOE's Low-Level Waste Disposal Facility Federal Review Group (LFRG)[5] for radioactive waste disposal and closure of liquid waste tanks; DOE's Office of Environmental, Health, Safety & Security for establishing radiation protection standards through DOE orders and regulations; and DOE's Office of Enterprise Assessment for independent oversight and enforcement functions covering all DOE program offices.

Other forms of guidance or external accountability exist such that it would be highly difficult and unlikely for DOE to unilaterally change its requirements to be inconsistent with established norms and regulatory requirements for radioactive waste management. For example,

[5] The LFRG is comprised of federal employees from DOE-Headquarters, the National Nuclear Security Administration, and DOE Field Elements with radioactive waste disposal facility responsibilities. Among its functions, the LFRG is charged with reviewing the underlying technical basis of a waste disposal facility, which may include, for example: disposal facility performance assessments and composite analyses; appropriate CERCLA documentation; and other technical basis documentation (e.g., monitoring plan and closure plan). The reviews are performed to provide management with reasonable assurance that the applicable performance objectives and measures will be met.

the National Council on Radiation Protection and Measurements (NCRP), a Congressionally-chartered corporation (Public Law 88-376, July 14, 1964), plays a key role supporting radiation protection by providing independent scientific analysis, information, and recommendations that represent the consensus of leading scientists. NCRP draws from collaboration with the International Commission on Radiological Protection (ICRP), which has developed and maintained the International System of Radiological Protection used world-wide as the common basis for radiological protection standards, legislation, guidelines, programs, and practice.

Further, the Interagency Steering Committee on Radiation Standards (ISCORS) operates at the federal level to ensure that comparable standards of protection are afforded to workers, the public, and the environment across agencies that develop and enforce regulations for nuclear-related activities and facilities. DOE is a member of the ISCORS, which is comprised of eight Federal agencies, three Federal observer agencies, and two state observer agencies that facilitate consensus on acceptable levels of radiation risk to the public and workers, and promote consistent risk approaches in setting and implementing standards for protection from ionizing radiation. The NRC and EPA play prime roles on ISCORS and, like DOE, set standards for the level of acceptable risk from radiation exposures by considering ICRP and NCRP recommended guidelines. Unilateral proposals to change practices would be met with significant scrutiny and oversight from ISCORS, as the actions of one agency reflect on policies in other agencies.

Performance objectives and performance assessments. Several commenters were skeptical about DOE's reliance on performance assessments and questioned whether such assessments provide the necessary level of technical rigor, particularly when used for LLW disposal versus HLW or spent nuclear fuel (SNF) disposal, which account for longer compliance time periods, to ensure safe disposal of non-HLW. Also, commenters noted the lack of

regulatory standards for a performance assessment and the potential for inconsistent application across disposal sites.

Performance objectives are the regulatory means by which NRC and DOE set forth the overarching radiological standards necessary to protect the health and safety of individuals and the general population from radiological releases, both during operation and following the closure of the disposal facility (e.g., both DOE and NRC set the performance objective to ensure protection of the general population at a dose of no more than 25 millirem annually [DOE M 435.1-1, Chapter IV-P(1)(a), page IV-9, and 10 CFR 61.41]).

Performance assessments (PA) are used by the NRC and other regulatory bodies as a universally utilized approach to radioactive waste disposal to demonstrate how performance objectives will be met. The PA is the process, model, or collection of models used to estimate future releases of radionuclides to the environment and potential doses to human receptors. NRC has specific and detailed requirements, guidance and standards applicable to the conduct of a performance assessment: NUREG 1573, *Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities.* DOE has comparable requirements set forth in DOE M 435.1-1 (Chapter IV-P(2), page IV-11), and DOE *Standard Disposal Authorization Statement and Tank Closure Documentation (*(DOE-STD-5002-2017, Chapter 2).

The disposal facility's wide-ranging requirements – derived from the performance objectives of the facility and coupled with other quantitative and qualitative elements, e.g., waste acceptance criteria, defense-in-depth safeguards, sensitivity and uncertainty analyses, and waste form/disposal facility stability considerations - form an integrated framework to provide confidence that the disposal facility will perform safely to protect the public and the environment.

The HLW interpretation does not change, and will not require any changes to NRC or DOE regulatory requirements or facility performance objectives. The same high standards for safety and technical rigor will be maintained across commercial and DOE disposal sites, recognizing that each site will have its own site-specific requirements. In addition, the disposal facility's compliance period for ensuring protection of public health and safety is established by the regulator (*e.g.*, NRC or Agreement State) and will be applied in accordance with the radiological characteristics of the waste and the site-specific performance objectives of the disposal facility.

Other concerns. Other commenters raised the general concern that, under DOE's interpretation, commercial operators would be motivated by profit to accept wastes that may not be safe for disposal. DOE believes this concern is misplaced, given the integrity and rigor of the regulatory system governing the disposal of LLW at private facilities licensed or permitted by the NRC and Agreement States. LLW has been, and will continue to be, disposed of at commercial facilities in a safe and technically sound manner. DOE has no reason to find that the addition of its non-HLW to this system would cause any different or irresponsible action from commercial entities.

3. Technical Basis for Not Removing Key Radionuclides

Commenters were concerned by DOE's interpretation, which does not include the removal of key radionuclides "to the maximum extent practicable" as a condition for a reprocessing waste stream to be determined non-HLW. This concern related to all forms of disposal, whether in situ (e.g., closure of a waste tank), or at a designated DOE or commercial

LLW disposal facility. Commenters noted that this is an element of both the existing 435.1 WIR Criteria, and Section 3116[6].

As previously explained, there is nothing in the statutory text of the AEA or the NWPA that requires radionuclides to be removed to the maximum extent technically and economically practical prior to determining whether waste is HLW. Rather, the statutory text is focused on examining a waste in terms such as whether it is highly radioactive, contains fission products in sufficient concentrations, or requires permanent isolation. As a consequence, DOE believes that reprocessing wastes that already meet existing regulatory requirements for safe disposal as LLW without any radionuclide removal do not present risks to the public and the environment that would necessitate their classification as HLW under the AEA and NWPA.

4. Tank Closures

Commenters, in particular government officials of states with underground radioactive waste tanks, voiced concern with DOE's approach to the extent it would result in classifying tank reprocessing wastes as non-HLW and disposing of it in place. Commenters believed the interpretation is unreasonable in its application to tank wastes, based on the concern that tank waste from reprocessing is highly radioactive as a matter of fact and, additionally, that this interpretation should not be applied to close tanks without retrieving wastes.

As noted previously and reiterated below, this Supplemental Notice does not propose or finalize any decisions about the classification or disposal of any waste stream, or this interpretation's potential application to the closure of waste tanks. DOE understands the complex history and practice with regard to tank closure activities, and existing arrangements

[6] As noted elsewhere, the requirements of Section 3116 are not applicable to waste shipped out of South Carolina or Idaho and disposed of in another state.

that may affect implementation. In this case as with its other wastes, DOE will pursue any waste classification or disposal decisions in separate actions, in accordance with applicable law, regulations and agreements, and based on appropriate interactions with affected stakeholders and regulators.

C. Implementation and Other Comments on the HLW Interpretation

DOE received a number of comments, from state and local representatives, non-governmental organizations, and individual members of the public suggesting the need for and inquiring about more detailed information, *e.g.*, waste inventory amounts, wastes affected by a different classification, transportation routes, and new disposal locations that would result from the Department's implementation of its interpretation. In particular, commenters wanted to better understand DOE's approach with regard to state, local, and tribal consultation when evaluating and implementing disposal decisions; the NRC's regulatory role; confirmation of compliance with applicable federal and state environmental laws, regulations and agreements; potential environmental justice issues; impact on the Waste Isolation Pilot Plant (WIPP); and availability of space in LLW facilities with the addition of non-HLW.

DOE also received an assortment of comments not directly related to its interpretation. Some commenters wanted DOE to expand the scope of the interpretation to include all radioactive waste, specifically uranium-233 waste, while others questioned the need for the interpretation at all if DOE pursued the development of a deep geologic repository at Yucca Mountain for SNF and HLW disposal.

Information needs. The questions and issues raised by commenters seeking more information and details on implementation actions are important to DOE (and were constructive in assisting DOE with its criteria for non-HLW), and will be the subject of subsequent public

interactions when DOE undertakes implementation. As stated in the October 10 Notice seeking public comment on the HLW interpretation, and equally applicable at this juncture, DOE is not by issuance of this interpretation making and has not made any decisions on the classification or disposal of any particular waste stream at any location. At this time, it is premature to conclude any detailed impact analyses or to provide specific implementation details or plans (*e.g.*, what reprocessing waste will go to what facility); DOE will not be changing how it manages or disposes of its reprocessing waste except pursuant to subsequent actions to implement this interpretation, which would include appropriate NEPA analysis for any particular proposed action, such as the NEPA process described in the NOI.

Notwithstanding that at present DOE has not made any implementation decisions, as mandated by law (Public Law 115-91, Sec. 3139), DOE prepared a Report to Congress providing in part the type of information requested by commenters (and several commenters specifically asked about the status of the report). The report is undergoing interagency review and will not be publicly available until that review is complete and the report is submitted to Congress.

Consultation and compliance. DOE will not undertake any implementation actions without appropriate interactions with applicable federal, state and local agencies, and Native American governments. The scope of implementation will be considered site by site, and conducted in full compliance with existing statutes, regulations, and DOE directives. Specifically, DOE will continue to comply with its responsibilities under existing requirements, agreements, consent orders or permits including: NEPA; CERCLA; RCRA; DOE Order 435.1 and its implementing documents; and Section 3116, applicable in Idaho and South Carolina. DOE will consider input from affected state, local, and tribal stakeholders, along with governing regulatory agencies.

NRC regulatory role. The Department fully supports the NRC in its statutory and regulatory role with respect to regulating commercial nuclear activities (including licensing disposal facilities), as well as its historical and established consultative role to DOE on the disposal of its reprocessing wastes determined to not be HLW under DOE Order 435.1. DOE's interpretation does not change the NRC's existing authorities, e.g., under Section 3116. DOE intends to maintain its strong relationship with the NRC, and will engage with the NRC on the best way to continue that relationship when and as it applies its HLW interpretation in the future.

Environmental Justice. Some commenters were concerned that DOE's interpretation violates the principles of environmental justice, specifically the impact on Native American nations and impacts on tribal lands from DOE's radioactive waste management and disposal decisions. DOE is committed to the principles of a government-to-government relationship with tribal populations as embodied in Executive Order (EO) 13175 and DOE's Order 144.1, as well as the 2010 United States' announcement supporting the United Nations Declaration of the Rights of Indigenous People. DOE also remains committed to build on the legacy of EO 12898 and the principles of environmental justice. In this and other applicable contexts, DOE will continue to work with all stakeholders, including interested tribal organizations and minority and low-income populations to ensure their interests are taken into account, consistent with environmental justice principles and applicable NEPA processes.

WIPP. All transuranic waste generated from atomic energy defense activities to be disposed of at WIPP must comply with the WIPP Land Withdrawal Act, as amended, the WIPP Hazardous Waste Facility Permit, the WIPP waste acceptance criteria, and other applicable requirements. Currently, any reprocessing waste that may be determined to be non-HLW could

not be disposed of at WIPP because the WIPP permit specifically prohibits tank waste from disposal at WIPP.

Disposal capacity. DOE believes that the available commercial LLW disposal capacity will be adequate to accommodate its wastes, as well as those from the commercial sector. The Waste Control Specialists (WCS) Federal Waste Facility accepts DOE Class A, B or C LLW. Energy*Solutions* in Utah (Clive) receives commercial and DOE Class A LLW.[7] These facilities have several million cubic meters of disposal capacity, with the possibility of increased capacity if license amendments are approved, that can be used for DOE's eligible radioactive wastes. DOE will continue to evaluate LLW disposal capabilities and available capacity.

Other waste types. The scope of the HLW interpretation is reprocessing waste; it does not and would not appropriately address other waste types that are not from reprocessing of SNF, such as: the greater-than-Class C (GTCC) LLW inventory included in the *Final Environmental Impact Statement for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste and GTCC-Like Waste*, and also discussed in the recently issued *Environmental Assessment (EA) for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste at Waste Control Specialist in Andrews County, Texas*; and uranium-233 waste.

Yucca Mountain. At least one commenter opined that DOE could obviate the need for the HLW interpretation if, instead, the Department pursued the development of a deep geologic repository at Yucca Mountain for SNF and HLW. Pursuit of a deep geologic repository at Yucca Mountain and DOE's HLW interpretation are not mutually exclusive efforts, and DOE believes it is necessary and appropriate to pursue both. DOE agrees that Yucca Mountain is the only site that can legally be considered for the disposal of HLW, and the Administration has requested

[7] There are two additional licensed LLW disposal facilities for commercial compact waste only (the Barnwell, South Carolina facility and the U.S. Ecology facility near Richland, Washington).

funding from Congress to restart the Yucca Mountain licensing proceeding. The Department's interpretation of what is not HLW does not affect the need for, or the Department's commitment to a deep geologic repository at Yucca Mountain for the disposal of HLW.

IV. Conclusion

The Department bases its interpretation of the statutory term HLW on the statutory text and purpose. DOE's interpretation is consistent with and informed by its comprehensive understanding and experience in the safe and technically sound disposal of many types of radioactive wastes, including those from its legacy reprocessing activities. On this basis, the Department interprets the AEA and NWPA as establishing that not all reprocessing wastes are HLW by law, and that where wastes can be safely disposed based on the radiological characteristics of the waste, such wastes may properly be classified as non-HLW. DOE anticipates continued engagement and productive involvement of members of the public and the regulatory community in subsequent activities that may follow this HLW interpretation, including the NEPA process described in the NOI.

Signed at Washington, DC on May 30, 2019.

Anne Marie White,
Assistant Secretary for Environmental Management.

Appendix A

This Appendix provides additional detail comparing the requirements of DOE and NRC for the disposal of LLW. While there are some differences in the two systems, both are based on technical and administrative requirements that ensure an essentially identical level of public health and safety protection.

Safety Goals and Comparison of NRC and DOE Performance Objectives

Safety Goal	**NRC Performance Objective for Commercial Facilities**	**DOE Performance Objective/Measures for DOE Facilities**
Standard for demonstrating compliance	reasonable assurance exists that exposures to humans are within the limits established in the performance objectives… [10 CFR 61.40]	reasonable expectation that the performance objectives identified in this Chapter are not exceeded as a result of operation and closure of the facility. [DOE Manual 435.1-1 Ch. IV P(1)]
Protection of the General Population	Radioactive material released to the general environment in groundwater, surface water, air, soil, plants, or animals must not result in a dose to the whole body of in excess of 25 mrem annually. [10 CFR 61.41]	Dose to a representative member of the public shall not exceed 25 mrem annually from all exposure pathways excluding the dose from radon and its progeny in air. [DOE Manual 435.1-1 Ch. IV P(1)(a)]
	NRC adds organ-specific objectives: No dose to the thyroid in excess of 75 mrem/year and to any other organ of any member of the public in excess of 25 mrem/year. [10 CFR 61.41]	DOE adds air pathway objective: Dose to representative members of the public shall not exceed 10 mrem/year, excluding radon and its progeny. [DOE Manual 435.1-1 Ch. IV P(1)(b)]
	- This cell intentionally blank -	DOE adds an objective specifically for radon: Radon release shall not exceed an average flux of 20 pCi/m^2/second at the surface of the disposal facility. Alternatively a limit of 0.5 pCi/liter of air may be applied at the facility boundary. [DOE Manual 435.1-1 Ch. IV P(1)(c)]
Protection of Individuals from Inadvertent Intrusion	Design, operation, and closure of the land disposal facility must ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the	For purposes of establishing limits on concentration of radionuclides that may be disposed of near-surface, an analysis of inadvertent human intrusion shall use performance measures for chronic

	disposal site are removed. [10 CFR 61.42] While a quantitative limit is not specified, 10 CFR 61 Final EIS suggests dose limit of 500 mrem/year [NUREG-0945, NUREG-1854]	and acute exposure scenarios of 100 mrem in a year and 500 mrem total effective dose equivalent, excluding radon. [DOE Manual 435.1-1 Ch. IV P(2)(h)]
Protection of individuals during operations	Operations at the land disposal facility must be conducted in compliance with radiation protection standards set out in 10 CFR part 20 except for releases of radioactivity in effluents from the land disposal facility, which shall be governed by 10 CFR 61.41. [10 CFR 61.43] Worker dose shall not exceed 5 rem/year (10 CFR 20.1201) and public dose shall not exceed 100 mrem/year (10 CFR 20.1301)	Facilities, operations, and activities shall meet the requirements of 10 CFR part 835 and DOE Order 5400.5 (superseded by Order 458.1) for establishing acceptable dose rates to workers and the public. [DOE Manual 435.1-1 Ch. I 1.E(13)]. Worker dose shall not exceed 5 rem/year (10 CFR 835.202), public dose in controlled area shall not exceed 100 mrem/year (10 CFR 835.208); and public does shall not exceed 25 mrem/year (DOE Order 458.1, Section 4.h(1))
Stability of Disposal Facility	The disposal facility must be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care are required. [10 CFR 61.44]	Disposal Facility Closure Plans, includes a description of how the disposal facility will be closed to achieve long-term stability and minimize the need for active maintenance following closure and to ensure compliance with the requirements of DOE Order 5400.5, *Radiation Protection of the Public and the Environment*. (superseded by Order 458.1) [DOE Manual 435.1-1 Ch. IV Q(1)(b) and Ch. IV M]
Composite Analysis of Impacts of All Sources of Radioactive Material at a DOE site	- *This cell intentionally blank* -	Dose at point of compliance from all interacting sources does not exceed 30 mrem per year. [DOE Standard 5002-2017, Section 3.2.1.]

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