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Kate Brown, Governor

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Theresa Kliczewski
U.S. Department of Energy
Office of Waste and Materials Management (EM 4.2)
1000 Independence Avenue SW
Washington DC 20585

Dear Ms. Kliczewski:

I am writing in response to the U.S. Department of Energy's (DOE) Federal Register notice seeking public comments on DOE's interpretation of the definition of high-level radioactive waste (HLW). For the past 30 years, Oregon has been actively engaged in the cleanup of the Hanford Nuclear Site in Washington State. Oregon retains a long-term interest in the health and safety of the Columbia River, which stands to be directly affected by the final end state of the HLW currently stored in underground storage tanks at Hanford and other Hanford wastes that could potentially be disposed onsite.

DOE's new interpretation signifies a potentially momentous change in how waste classification determinations are made throughout the nuclear weapons complex. It proposes new, less rigorous criteria by which a waste may be determined to be "non-HLW," thereby allowing such waste to be disposed in a facility other than a deep geologic repository.

Gone would be key defining criteria established by the U.S. Nuclear Regulatory Commission (NRC) and codified by Congress. Gone would be independent regulatory oversight provided by the NRC and by state regulators. Gone also would be the bias toward precaution that has underpinned the original Congressional definition of HLW and the many formal deliberations and processes that have accompanied its implementation. In its place, DOE would have unilateral discretion to determine the classification and disposition of waste that for decades has been managed as HLW.

The new "non-HLW" administrative pathway could become the *de facto* structure under which wastes are reclassified in the United States, potentially leading to significant changes to the cleanup mission at Hanford and other sites within the DOE complex.

Under the current system, wastes managed as HLW may be classified as "Waste Incidental to Reprocessing" (WIR) via one of two administrative pathways: the WIR process in DOE Order 435.1; or the process defined in the National Defense Authorization Act of 2005. Oregon and others recently provided comments to DOE on a draft WIR evaluation specific to Hanford's Waste Management Area C. DOE's proposed new interpretation is far less protective than the existing WIR process.

Legal uncertainty exists regarding whether DOE has the authority to make a WIR determination under Order 435.1, following a successful legal challenge by a consortium of interested parties in 2003, including Oregon, which was subsequently voided in a 2004 ruling that the issue was "not yet ripe for judicial review."

Because of that ambiguity, Congress acted by passing Section 3116 of the National Defense Authorization Act[1]. In doing so, Congress not only kept the substantive elements of the three Order 435.1 WIR criteria (first developed by the NRC in the 1990s), but it institutionalized and expanded the oversight authority of the NRC and the States – establishing checks and balances via a second opinion from an independent expert agency (the NRC), and the consent of the hosting state as represented by an approved closure plan.

DOE's new interpretation of HLW appears to undermine this Congressional action. Section 3116 specifies that the Secretary of Energy can only make a determination in consultation with the NRC. This implies that Congress intended for DOE to not have sufficient authority to independently or unilaterally interpret the definition of HLW. The 3116 process currently only applies in the states of Idaho and South Carolina.

There appears to be a growing interest in the concept of changing how HLW is defined – to focus less on its origin and more on the risk it poses to future generations. Oregon, in fact, joined with Washington State to propose such a concept nearly 30 years ago. In 1990, the two states petitioned the NRC to revise the source-based definition of HLW and establish a procedural framework to determine on a case-by-case basis whether certain Hanford wastes are HLW or incidental wastes. In denying the Oregon/Washington petition in 1993, the NRC established the three general WIR criteria in use today. Oregon is not necessarily opposed to a risk-informed process for exempting certain HLW from deep geologic disposal, provided that

[1] Public Law 108-375, October 28, 2004 (the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005).

this process is effective and credible[2].

The process of waste classification determination is as important as the criteria by which a determination is made. When the National Academies of Sciences evaluated the topic of HLW classification in 2005[3], it found that, "The burden of proof would be weak indeed if it was simply a matter of DOE convincing itself that it is right," and therefore, "a separate federal entity is needed as the regulatory decision maker for exemption purposes." The National Academies further stressed, "The committee does not recommend that DOE attempt to adopt these changes unilaterally, either through the classification system or by other means. Unilateral action seems likely to exacerbate the sense of mistrust that has developed between DOE and at least some of the parties that are its partners in seeking site cleanup."

DOE in various venues has so far been unwilling to discuss how this proposed interpretation would be implemented at specific sites. As a result, Oregon and other entities potentially impacted by this action are forced to speculate as to what the effects might be for Hanford.

Among Oregon's specific concerns:

1. The interpretation paves the way for DOE to classify wastes as "non-HLW" without removing key radionuclides to the maximum extent practical. This is counter to criteria developed by DOE and the NRC in the 1990s and supported by Congressional action from 2005. This could result in greater risk if Hanford single-shell tanks are permanently closed without first removing key radionuclides, especially those which are long-lived and mobile. In 2017, DOE evaluated a hypothetical scenario wherein they closed 49 Hanford single-shell tanks without first performing waste retrieval. The proposed HLW interpretation would clear one of the key regulatory obstacles for pursuing that path – potentially on an even wider scale.

2. Hanford's Waste Treatment Plant Pretreatment Facility as well as pretreatment systems planned to support the Direct-Feed Low-Activity Waste mission, could conceivably achieve a lesser standard of decontamination when separating "high-level" from "low-activity" waste. This could result in higher quantities of long-lived, mobile, or highly radioactive wastes being disposed at Hanford in low-activity glass or grout.

[2] In 2005, the National Academies of Sciences found: "An effective and credible risk-informed-decision-making process has several characteristics. It is (1) participatory; (2) logical; (3) consistent with current scientific knowledge and practice; (4) transparent and traceable; (5) structured with reasonable independence of the decision authority from the petitioner; (6) subjected to thorough, independent peer review; (7) technically credible, with believable results; and (8) framed to address the needs of the decision process.

[3] National Research Council. 2005. *Risk and Decisions About Disposition of Transuranic and High-Level Radioactive Waste*. Washington, DC: The National Academies Press. https://www.nap.edu/catalog/11223/risk-and-decisions-about-disposition-of-transuranic-and-high-level-radioactive-waste.

3. If the soils contaminated by tank leaks and discharges to cribs are considered to be HLW until classified otherwise (as Oregon has contended should be the case with the draft Waste Management Area C WIR determination), DOE's new interpretation would make it easier to leave these wastes in place.

4. Sources such as the highly radioactive cesium/strontium capsules, or the cesium ion exchange resins planned for the tank waste pretreatment system, could potentially be disposed onsite if a performance model suggests unspecified standards will be met.

In easing the criteria for non-HLW classification relative to the existing system, DOE is putting forth an overly optimistic view of the manageability of HLW. DOE projects confidence that it understands one of the most complicated radiochemical mixtures created by our civilization, and that this waste can be managed for many thousands of years in shallow environments, proximate to critical natural resources. DOE's proposed interpretation could lead to long-term risk decisions with insufficient precaution and technical rigor.

DOE's institutional structure places it in the center of a conflict between its responsibility to ensure long-term safety from radiation and its interest in reducing the sizeable financial liability of the nation's nuclear weapons complex cleanup. Oregon's view is that the former must always prevail over the latter.

Perhaps the time is right to begin the conversation about strengthening the legal basis and process for non-HLW classification. However, the potential impacts are so far-reaching and substantial that such a change must occur through a deliberate, inclusive process that in addition to DOE, involves the NRC, Congress, affected states such as Oregon and Washington, affected Native American tribes, and many others. A Federal Register notice and soliciting written comments is not an appropriate method to initiate such a consequential change. At the moment, there is no basis to understand how entities outside of DOE can meaningfully participate in and influence this process.

As a potential alternative, the Oregon Department of Energy suggests that DOE renew its efforts to include the states of Washington and New York in the NDAA Section 3116 WIR framework, once it has addressed the remaining concerns of these states and other affected stakeholders.

For any conversation from this point forward to be meaningful, DOE must be transparent about what it needs from this proposed exemption process that it cannot achieve with the current WIR framework. For more than 25 years, DOE has been working with Washington State and the NRC to establish a technical basis for the eventual reclassification of some 90 percent of Hanford's tank waste to allow its disposal on site, but only after removal of the highly

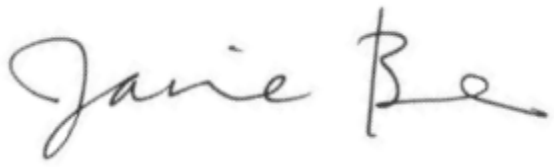
radioactive and highly mobile radionuclides. The highly radioactive/highly mobile fraction would go to eventual geologic disposal. This existing process would seem to meet DOE's stated goal of allowing disposal of waste based on the radiological characteristics of the waste.

To enable interested parties to fully understand the implications of this new policy, DOE should provide a description of how its proposed interpretation would change current disposal options for wastes at Hanford and across the complex, coupled with an analysis that demonstrates which regulatory requirements would apply along the path between each waste source's current situation and its final disposal. It is unlikely that DOE would embark on this interpretation without having performed such an analysis, even informally, and this deeper level of thought should be brought into the conversation.

The Oregon Department of Energy urges DOE to not proceed with its proposed interpretation of HLW as currently written. However, if DOE is convinced that changes are needed in the present waste classification system, DOE should work with others to initiate a truly collaborative effort to affect a change that would strengthen and validate the exemption criteria for non-HLW; maintain a responsible precaution in the face of long-term uncertainty; and preserve the checks and balances crucial to the validation of risk-informed decision-making and good governance. Oregon would welcome the opportunity to participate in such an effort.

Our detailed comments follow.

Sincerely,



Janine Benner
Director

Cc: Governor Kate Brown
Oregon Congressional Delegation
Maia Bellon, Washington Department of Ecology
Anne White, U.S. Department of Energy
Chris Hladick, U.S. Environmental Protection Agency
Gary Burke, Confederated Tribes of the Umatilla Indian Reservation
JoDe Goudy, Yakama Nation
Shannon Wheeler, Nez Perce Tribe
Oregon Hanford Cleanup Board

Oregon Specific Comments on DOE Proposed Interpretation of the Nuclear Waste Policy Act Definition of High-Level Radioactive Waste

In addition to our general comments, Oregon submits the following technical comments on DOE's proposed interpretation of the definition of HLW. These comments cover four general themes:

1) DOE's interpretation provides insufficient detail to ensure adequate long-term protection;
2) Removal of key radionuclides is a worthwhile and reasonable precaution;
3) DOE's interpretation of the Nuclear Waste Policy Act (NWPA) is not a reasonable construction of the statute; and
4) DOE's interpretation is not consistent with the precautionary principle, which we argue is embedded in the spirit of the NWPA;

The provided interpretation gives no indication of the safety standards that would apply to a Performance Assessment for a disposal facility, giving DOE unilateral flexibility in the definition of HLW.

A marked difference between DOE's proposed interpretation and the existing WIR framework is the removal of references to the performance objectives for a disposal facility in 10 CFR Part 61 Subpart C. The Part 61 performance objectives provide a dose-based standard of performance and a compliance period over which performance must be reasonably assured. This interpretation provides no specific information regarding the safety standards a waste must meet in order to be classified as "non-HLW."

Because the interpretation allows "either/or" attainment of the two criteria, the end result is that this interpretation provides no technical or safety basis for the definition of "non-HLW."

If the waste can't meet Class C concentrations, this interpretation would allow DOE to use a Performance Assessment to demonstrate that "applicable regulatory requirements" are met. Because DOE sets its own standards for low-level waste (LLW) disposal facilities, this means that whatever performance requirements DOE puts forth in its own regulations will be the standard, and these standards would be mutable at DOE discretion. This also further serves to exclude NRC from the waste classification process, because they would not be in a position to weigh in on whether their standards are being met.

Allowing classification of waste as non-HLW based on satisfaction of Class C LLW concentrations alone is an improper simplification that discounts risk from contaminated groundwater and permits an inadequate standard of technical review.

The NRC low-level waste classification regime (e.g., Class A, B, C, or Greater-than-Class-C) is based on protection of an inadvertent intruder who builds a house with a basement over the waste in question. The concentration limits are designed to protect against direct exposure and do not account for the potential of radionuclide migration to groundwater sources above drinking water standards. Groundwater protection is addressed via compliance with the performance objectives of 10 CFR 61 Subpart C.

By allowing an "either/or" satisfaction of the two criteria in DOE's proposed interpretation of the HLW definition, DOE would be able use the NRC's NUREG-1854 Guidance to find that any wastes deeper than 15 feet below ground surface (e.g., waste in an underground HLW tank) are not HLW, assuming that a circular diameter drilling excavation (RPP-ENV-58782) would not exhume waste in concentrations exceeding Class C limits when brought to the surface by the drill rig. This Category 3 classification method was recently used in the WIR Evaluation for Waste Management Area-C at Hanford. Under this methodology, DOE would not have to conduct a Performance Assessment to evaluate the long-term impacts of deeper wastes on groundwater sources and the subsequent risk to future users.

As the NRC stated in its guidance on waste classification (NUREG-1854): "Waste concentration is, in some cases, only one of many factors that can influence risk. Waste that is greater than Class C may be determined to be incidental waste and may be safely managed with near-surface disposal if it can be demonstrated that the performance objectives of 10 CFR Part 61, Subpart C, are satisfied. Conversely, waste may be determined to be less than Class C, however, the waste may be inappropriate for near-surface disposal because the performance objective of 10 CFR 61.41 cannot be satisfied."

DOE may argue that the groundwater protection requirements, supported by long-term modeling, are folded into the requirements for a LLW disposal authorization under DOE Order 435.1, which would occur after waste classification. What this argument fails to consider is that a waste should not be classified as LLW unless it is known that such a waste can be disposed in a LLW disposal facility (i.e., a final disposal context for the waste needs to be pre-established). This is especially true in the case of HLW tank farms, which would not be authorized as LLW disposal facilities until after the waste in the tanks has already been classified.

A reasonable construction of the term "sufficient concentrations" in the NWPA considers the risk to future groundwater receptors. It is unreasonable to ignore this aspect of risk by allowing either/or satisfaction of the two proposed interpretive criteria. To do otherwise would be incomplete and technically indefensible.

Removal of key radionuclides to the maximum extent practical is a worthwhile and reasonable precaution that should be retained in any processes that seek to differentiate high-level waste from non-high-level waste.

The NRC established for the first time the specific WIR criteria in 1993. These criteria included removal of key radionuclides to the maximum extent technically and economically practical[4].

The origin of the WIR requirement to remove key radionuclides derives from the Atomic Energy Commission's explanatory statement when it promulgated Appendix F of 10 CFR Part 50, namely, ". . . that the public interest requires that a high degree of decontamination capability be included in such facilities and that any residual radioactive contamination after decommissioning be sufficiently low as not to represent a hazard to the public and safety." The NRC interpreted this statement in 1993 as the basis for the first WIR criterion regarding the removal of key radionuclides to the maximum extent technically and economically practical as exemplified in the following excerpts[5]:

> *"These principles – high decontamination capability and protection of health and safety – are essential benchmarks that have influenced the development of NRC's position vis-à-vis DOE on the question of the proper classification of the tanks wastes and grout at Hanford."*
>
> *"Thus, if it can be shown that DOE has processed the waste with the intent to dispose of the HLW in a repository or other appropriate licensed facility, leaving behind only a small fraction of only moderately radioactive material, then the goals stated…would have been satisfied; and the disposal of the residual would accordingly not be subject to NRC licensing."*

According to NRC Guidance in NUREG-1854, "Essentially, the common goal of the various radionuclide removal criteria is to ensure that DOE minimizes inventory of highly radioactive radionuclides in wastes that are classified as incidental." This statement appears to support a precautionary approach to non-HLW waste classification.

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[4] 58 FR at 12345; The criteria were approved by the Commission in an SRM dated February 16, 1993, in response to SECY-92-391, "Denial of PRM 60-4 - Petition for Rulemaking from the States of Washington and Oregon Regarding Classification of Radioactive Waste at Hanford," and described in a letter from R. Bernero/NRC, to J. Lytle/DOE, dated March 2, 1993.

[5] NRC 10 CFR part 60, Docket No. PRM-60-4. States of Washington and Oregon: Denial of Petition for Rulemaking.

The removal of key radionuclides has tremendous positive effects on the risk management certainty of HLW. Tank waste at the Hanford Site contains a highly complex and heterogeneous mixture of short-lived and long-lived radionuclides, emitting a full spectrum of alpha, beta, and gamma radiation, with varying mobilities and a range of higher and lower energy emitters. Because the waste is layered and heterogeneous, and because direct sampling is spatially limited, it is not possible to have certainty in the mixture of the waste. Therefore the total long-term risk associated with in-situ disposal of these wastes will contain fundamental uncertainty.

This uncertainty will propagate in any long-term risk modeling, which DOE would then use to support an assertion of safety. DOE relies on grout to provide sufficient protection, but the research on new formulations cannot have anticipated the abundance of variabilities in the waste that could cause a grout to not set properly. The uncertainty in grout and cap longevity would be coupled with expectations about future moisture regimes in near-surface disposal environments which may not prove true over time. Transuranic elements in tank waste such as plutonium and americium have long half-lives and, while generally slow-migrating, are more mobile in an acidic environment or when combined with chelating agents and colloid materials. Technetium-99 has a long half-life, migrates readily in water, and is a key risk driver for groundwater.

The process of waste retrieval from tanks preferentially removes soluble and mobile radionuclides, as well as flushes most of the chemicals that facilitate radioactive waste mobilization. This process reduces the variability in the remaining waste and is consistent with a precautionary approach.

DOE's proposed interpretation of HLW deemphasizes the importance of key radionuclides as a discriminator between waste types, which would have the net effect of leaving higher activity and longer-lived radionuclides in geologic environments that are inherently more accessible to humans, contrary to international safety standards.

It is unreasonable to assert that removal of key radionuclides results in greater risk. DOE argues in the Federal Register notice that prolonged temporary storage of waste is a, "potentially greater risk." This statement is untrue if DOE follows its own Order 435.1 regulations for the safe management and storage of wastes. In reality, wastes left in a shallow environment without removal of key radionuclides have objectively greater risk than wastes with key radionuclides removed. Uncertainty in long-term performance models supports a precautionary approach favoring objective risk reduction via source term removal to the maximum extent practicable.

DOE's interpretation of the NWPA is not a reasonable construction of the statute.

DOE interprets that Congress, "distinguished HLW with regard to its form," as both, "liquids originating from reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations." This is an exclusive construction of the statute, when in fact, the plain language of the statute is inclusive.

The 2003 Judicial Ruling (NRDC vs. Abraham) supported an inclusive interpretation by stating: "In this case, Congress defined HLW in NWPA as 'highly radioactive material resulting from the reprocessing of spent nuclear fuel.' Congress then used the word 'including' to signal that what followed were examples designed to illustrate the definition just given."

DOE's interpretation fails to address the part of the NWPA definition that HLW is "highly radioactive." DOE's interpretation changes the meaning of the term "highly radioactive" and "sufficient concentrations" to be based on the results of a Performance Assessment measured against unspecified "applicable regulatory requirements" or Class C LLW concentration limits. Performance Assessment is not identified in the NWPA as a basis for determining qualification of waste as "highly radioactive," especially when the performance objectives of such an assessment are not defined.

A waste source can meet performance objectives but still be "highly radioactive" in plain language. Therefore, in order to not be HLW, a waste must meet both the requirement of not being "highly radioactive" and the requirement that solid materials not contain fission products in "sufficient concentrations." This is consistent with the 2003 judicial ruling in favor of an inclusive interpretation that liquid and solid wastes listed in Paragraph A of the NWPA are merely examples of HLW.

The State of Oregon offers an alternative interpretation that the NWPA is precautionary in nature. Any exemption process for HLW must embody precaution as a philosophy.

The preamble to the Nuclear Waste Policy Act contains a finding that:

> *High-level radioactive waste and spent nuclear fuel have become major subjects of public concern, and appropriate precautions must be taken to ensure that such waste and spent fuel do not adversely affect the public health and safety and the environment for this or future generations.*

This finding by Congress explicitly favors a precautionary approach to risk management. The concept of precaution has emerged as an important alternative decision criterion for action

with deep uncertainty, such as the disposal of long-lived and highly radioactive nuclear waste[6]. The precautionary principle has been integrated into international law and policy as a dominant paradigm of responsible governance that represents the most morally and scientifically defensible way to manage risks in the face of complex systems and uncertain outcomes.

In 1971, the German phrase "Vorsorgeprinzip" (literally "precautionary principle") emerged in the German Program of Environmental Protection. Its introduction arrived after environmental catastrophes of the 1970s and 1980s proved that society could not rely on science to foresee the environmental risks associated with human activities, and to protect future generations a preventative policy was needed to "go beyond the scientific knowledge of a given moment[7]." Declarations in 1987 and 1990 dedicated to protection of the North Sea also contained precursors such as, "Apply the precautionary principle, i.e. to take effective action to avoid potentially damaging impacts of substances that are persistent, toxic and liable to bio accumulate even where there is a lack of full scientific certainty to prove a causal link between emissions and effects." This construction of precaution supported the idea that uncertainty about the likelihood of a risk stemming from a particular action can itself be sufficient justification to trigger a management response or prohibition of that action.

A commonly cited early reference to the precautionary principle in the United States is the Wingspread Statement from the conference convened by the Science and Environmental Health Network in Racine, Wisconsin in 1998[8]. The statement reads:

> *Therefore it is necessary to implement the precautionary principle: Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public bears the burden of proof.*

DOE's proposal to reinterpret HLW in the manner stated in the Federal Register notice conflicts with the precautionary principle and may lead to greatly increased and unanticipated future risks.

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[6] Lempert, Robert J., and Myles T. Collins. 2007. "Managing the Risk of Uncertain Threshold Responses: Comparison of Robust, Optimum, and Precautionary Approaches." *Risk Analysis* 27 (4): 1009–26. doi:10.1111/j.1539-6924.2007.00940.x.

[7] Matthee, Mariëlle, and Dominique Vermersch. 2000. "Are the precautionary principle and the International Trade of Genetically Modified Organisms Reconcilable?" *Journal of Agricultural and Environmental Ethics* 12 (1): 59–70. doi:10.1023/A:1009504212205.

[8] Wilson, Kumanan, Blair Leonard, Robert Wright, Ian Graham, John Moffet, Michael Pluscauskas, and Michael Wilson. 2006. "Application of the precautionary principle by Senior Policy Officials: Results of a Canadian Survey." *Risk Analysis* 26 (4): 981–88. doi:10.1111/j.1539-6924.2006.00793.x.