

August 17, 2026

**Subject: Breakthrough Institute Comment on Integrated Low-Level Radioactive Waste Disposal
[Docket ID NRC—2011—0012].**

The Breakthrough Institute (BTI) appreciates the opportunity to comment on the Nuclear Regulatory Commission's (NRC) proposed rule, *Integrated Low-Level Radioactive Waste Disposal* (Docket ID NRC—2011—0012; RIN 3150—AI92).¹ BTI is an independent 501(c)(3) global research center that advocates for appropriate regulation and oversight of nuclear reactors and radioactive materials to enable the new and continued use of safe and clean nuclear energy. BTI acts in the public interest and does not receive funding from industry.

Changes to Part 61 are needed to enable a more risk-informed approach to handling waste. The proposed rule closes a licensing gap that has persisted since 1989: the absence of a generic pathway for near-surface or specialized land disposal of waste exceeding Class C concentration limits ("Greater-Than-Class-C" or "GTCC" waste).² BTI supports this overall direction, including the shift toward risk-informed, dose-based waste acceptance criteria in proposed § 61.58 and the codification of a safety case and defense-in-depth expectations for land disposal facilities.

The preamble is explicit that the proposed rule "does not alter legal requirements or policies to dispose of high-level radioactive waste or spent fuel in a geological repository" under the Nuclear Waste Policy Act, 42 U.S.C. § 10101 et seq., and "would not redefine what constitutes high-level radioactive waste."³ The recommendations below are intended to strengthen the rule's legal durability, administrability, and coordination with directly related rulemakings.

I. SUMMARY OF RECOMMENDATIONS

- Make a stronger determination of the statutory analysis for maintaining direct NRC licensing of GTCC waste, given historic Commission acknowledgement that Agreement States could regulate such waste.

¹ Nuclear Regulatory Commission, *Integrated Low-Level Radioactive Waste Disposal*, 91 Fed. Reg. 40,290 (proposed July 1, 2026) (Docket No. NRC—2011—0012; RIN 3150—AI92).

² 91 Fed. Reg. at 40,290—91; 10 C.F.R. § 61.55(a)(2)(iv) (2025). 54 Fed. Reg. 22,578 (May 25, 1989).

³ 91 Fed. Reg. at 40,290; see also Staff Requirements—SECY-15-0094 (Dec. 22, 2015).

- Explain, in the final rule or Subpart F, how compact-region consent and host-state participation would be addressed if a compact-region facility sought to host an NRC-licensed GTCC disposal site.
- Broaden the regulatory analysis beyond the single waste stream currently used to quantify net cost savings before relying on it to support the rule's designation as an Executive Order 14192 deregulatory action, and reconcile the inconsistent net-savings figures reported in different sections of the preamble.
- Clarify that the generic screening concentrations in draft NUREG-2175 Appendix H are a presumptively acceptable, non-exclusive method for determining whether a 10,000-year compliance period is required, and separately clarify that the probabilistic dose thresholds in NUREG-2175 Chapter 7 are non-binding defense-in-depth benchmarks rather than compliance criteria.
- Confirm that proposed § 61.58 is intended as a generally available, technology-neutral performance-based waste acceptance pathway, while recognizing that waste exceeding Table 3 concentrations remains subject to Commission approval under proposed § 61.55(b)(2)(iii).
- Retain the safety case as a standalone application component, but clarify that it may incorporate the underlying § 61.13 technical analyses by reference.
- Commit to updating NUREG-2175's GTCC intruder-barrier guidance as ongoing engineered-barrier research matures.
- Explain how the § 61.13(a) performance assessment methodology and existing § 61.12(f) non-radiological substance requirements apply to co-occurring chemical hazards, such as the toxicity of depleted uranium, and describe how the NRC coordinates with the Environmental Protection Agency (EPA) on this category of waste stream.
- Clarify that the § 61.55 statement that Class A waste is "the least hazardous" and GTCC waste is "the most hazardous" describes escalating isolation and containment requirements, not the instantaneous radiological hazard of a given waste stream. This prevents confusion about terminology.
- Address how this framework satisfies the ADVANCE Act § 501 obligation that regulation "not unnecessarily limit" the benefits of civilian nuclear technology to society. A framework that can find that a facility needs another barrier but cannot find that a credited barrier does no work is unable to determine whether a limit it imposes is

necessary, and neither the proposed rule, draft NUREG-2175, nor the draft regulatory analysis addresses the obligation.

- Give the preamble's statement that "each layer of defense must make a definite contribution to the isolation of the waste" operative content by adding a paragraph to § 61.13(a) requiring, for each engineered barrier and design feature credited in the performance assessment, an analysis in which that feature's credited performance is neglected, reported in absolute dose units, with a stated basis in the safety case for retaining any feature whose removal does not significantly change the result.

II. STATUTORY BASIS FOR EXCLUSIVE NRC LICENSING OF GTCC DISPOSAL FACILITIES

Two statutes provide the statutory basis for the NRC to regulate GTCC waste: the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPA) and the Atomic Energy Act of 1954 (AEA). The LLRWPA provides that GTCC waste resulting from NRC-licensed activities "shall be disposed of in a facility licensed by the Nuclear Regulatory Commission that the Commission determines is adequate to protect the public health and safety."⁴ Separately, AEA § 274c(4) authorizes the Commission to retain licensing authority over disposal of material that, "because of the hazards or potential hazards thereof," should not be disposed of without a Commission license.⁵

However, in prior direction, the Commission concluded that some GTCC waste streams could be regulated by Agreement States per SRM-SECY-20-0098.⁶ The proposed rule explains that the NRC staff's 2019 regulatory basis concluded that (based on the DOE's *Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste*) most GTCC waste could be safely regulated by an Agreement State in accordance with AEA § 274c(4).⁷ The Commission then directed staff in 2020 to pursue a rulemaking implementing that

⁴ 42 U.S.C. § 2021c(b)(2).

⁵ 42 U.S.C. § 2021(c)(4).

⁶ Staff Requirements—SECY-20-0098—Path Forward and Recommendations for Certain Low-Level Radioactive Waste Disposal Rulemakings (Apr. 5, 2022), ML22095A227.

⁷ *Approximately 60% of total GTCC volume was found potentially suitable for near-surface disposal by Agreement States.*

conclusion. The rulemaking at hand has now reexamined and reversed that direction based on the same statutory hazard-based standard in AEA § 274c(4).⁸

Because § 274c(4) commits the underlying hazard determination to the Commission's own regulatory judgment rather than a fixed statutory category, the NRC should strengthen the record with an explanation of what changed in the technical basis between 2019 and 2026, beyond the general statement that the Commission has reexamined the question. The 2026 supplement to the Commission's hazard analysis provides much of this technical basis for the near-surface and specialized land disposal provisions; the final rule should cite it directly in explaining the reversal, rather than relying solely on the general statement that the Commission has reexamined its prior direction.⁹

BTI encourages the Commission to consider, as a secondary matter, recommending that Congress clarify by statute whether GTCC disposal facilities may operate under Agreement-State licenses issued pursuant to Commission-approved programs. Doing so would remove the recurring discretionary determination that § 274c(4) otherwise requires each time the question is revisited.

III. RESPONSE TO NRC'S SPECIFIC REQUESTS FOR COMMENT

1. Compliance-Period and Performance-Period Analyses (Specific Request for Comment #1)

Unlike the clearly defined ten-metric-ton depleted uranium threshold codified at proposed § 61.1(b)(1)(ii),¹⁰ the "significant quantities of long-lived radionuclides" determination for other radionuclides are more complex. They depend on the three-tier screening approach and generic concentration table in draft NUREG-2175 Appendix H, which the guidance describes as a tool for determining whether a 1,000- or 10,000-year compliance period is appropriate rather than a

⁸ 91 Fed. Reg. at 40,300–40,301; Nuclear Regulatory Commission, "Disposal of Greater-than-Class C (GTCC) and Transuranic Waste," *Draft Regulatory Basis for Public Comment* (RIN 3150-AK00, Docket NRC-2017-0081, July 22, 2019, 84 Fed. Reg. 35,037); Nuclear Regulatory Commission, Historical and Current Issues Related to Disposal of Greater-Than-Class C Low-Level Radioactive Waste, SECY-15-0094 (July 17, 2015), ML15162A849; Staff Requirements—SECY-20-0098, *supra* note 3.

⁹ Nuclear Regulatory Commission, *Supplement to NRC's Technical Analysis of the Hazards of Disposal of Greater-Than-Class C (GTCC) and Transuranic Waste: Consideration of a Specialized Land Disposal Facility and Additional Waste Streams* (May 2026), ML26174A245.

¹⁰ 91 Fed. Reg. at 40,333 (proposed § 61.1(b)(1)(ii)).

means of demonstrating compliance with the performance objectives themselves.¹¹ The NRC should clarify that Table H-1 is a presumptively acceptable screening method rather than the exclusive one, so that Agreement States and applicants can apply it consistently while retaining the flexibility the guidance appears to intend.

Separately, draft NUREG-2175 Chapter 7 states that licensees should demonstrate that the 95th percentile of probabilistic annual dose estimates remains below 1 mSv (100 mrem) for the public and 20 mSv (2 rem) for an inadvertent intruder, and identifies a 50 mSv (5 rem) peak-realization threshold that should prompt consideration of additional defense-in-depth layers.¹² These would function as uncertainty-management and defense-in-depth benchmarks applied after compliance with the performance objectives has been demonstrated, not as an independent compliance test; and the guidance frames its methods generally as acceptable rather than exclusive. The final rule or NUREG-2175 should confirm that the Chapter 7 percentile and peak-realization values are non-binding indicators supporting a defense-in-depth review, not hidden compliance criteria that operate independently of §§ 61.41 and 61.42.

Clarifying both points would reduce the risk of inconsistent application across Agreement States and would give applicants a clear basis for understanding which values are binding and which are illustrative.

Section IV below addresses a further consequence of these timeframes. As the horizon lengthens, a larger share of the governing uncertainty becomes irreducible by any feasible characterization or testing program, which increases the weight the rule places on defense-in-depth as an uncertainty-mitigation measure and correspondingly increases the need for a criterion capable of returning the conclusion that a credited feature is not needed.

2. State and Compact Participation in GTCC Licensing (Specific Request for Comment #2)

The LLRWPA separately provides that nothing in that assignment “shall be deemed to prohibit a State, subject to the provisions of its compact, or a compact region from accepting for disposal”

¹¹ Nuclear Regulatory Commission, draft NUREG-2175, Rev. 1, Guidance for Conducting Technical Analyses for 10 CFR Part 61, App. H (2026), ML23255A282.

¹² *Id.*, ch. 7.

GTCC-type material.¹³ This voluntary compact-participation option does not obviously compel NRC to create a new consultation mechanism paralleling State and Tribal consultation under Subpart F, but it does create a coordination question that the final rule could usefully resolve. Congress established the compact system by statute, and this rulemaking's GTCC licensing determinations bear directly on where GTCC waste will actually be sited. This is the core subject the LLRWPA compact structure was designed to govern.

On the specific request for comment, the most direct step the NRC can take toward ensuring States' insights are considered is to state plainly whether compact-region consent under § 2021c(a)(2) is intended to be sought through the existing Subpart F process or through some other mechanism specific to GTCC facilities. On whether Subpart F itself appropriately enables that participation, the record does not yet answer the question the agency is asking. The redline to Subpart F in this rulemaking makes only conforming changes from "shall" to "must" with no substantive revision to §§ 61.70 through 61.73 to account for GTCC licensing.¹⁴ Subpart F was written in 1982 for a licensing landscape in which GTCC disposal facilities did not exist as a distinct category; the final rule should state whether the NRC has concluded that framework remains adequate for that purpose or intends to revisit it.

The final rule should explain how compact-region consent and host-state participation would be addressed if a compact-region facility sought to host an NRC-licensed GTCC disposal site. The final rule should be the process the NRC would go through for any new facility or changes to existing facilities within a host state that belongs to a compact, consistent with the voluntary-hosting option in 42 U.S.C. § 2021c(a)(2).

Existing near-surface disposal facilities operating under Agreement State licenses already report experience handling GTCC-type material and have represented publicly that such activities remain within State regulatory authority because the material is legally low-level waste.¹⁵ Under the reversal described in Section II above, that representation would no longer hold for GTCC waste licensed after finalization. Neither the rule text nor NUREG-2175 explains what happens at

¹³ 42 U.S.C. § 2021c(a)(2).

¹⁴ Nuclear Regulatory Commission, *Redline/Strikeout Proposed Rule Language, Integrated Low-Level Radioactive Waste Disposal*, (2026), ML26174A243, at 46–47 (Subpart F).

¹⁵ See, e.g., Waste Control Specialists, *Support WCS*, <https://www.wcstexas.com/support-wcs/> (last visited Aug. 11, 2026) ([WCS] "has been safely working with Greater Than Class C (GTCC) LLRW for over two decades" and "GTCC activities on the WCS site are regulated by the State of Texas").

such a facility going forward: whether GTCC disposal would require a separate, NRC-issued license limited to the GTCC-accepting portion of the site while the Agreement State retains jurisdiction over the facility's Class A, B, and C operations, or whether any acceptance of GTCC waste would bring the entire facility under NRC's exclusive licensing jurisdiction. States and compact regions have long-standing relations with waste facilities and any possible transition should be made clear ahead of time for regulatory certainty.

3. Annual Waste Acceptance Criteria Review (Specific Request for Comment #3)

The NRC should tie the depth of the review to risk. A documented administrative check confirming no change in waste streams, inventory, or site conditions could satisfy the annual requirement in most years, while a substantive reanalysis would be required only when a licensee proposes to accept a new waste stream, experiences a significant inventory change, or identifies a significant change in site conditions. This would preserve the annual cadence NRC has proposed while directing the more resource-intensive review toward the years when it is most likely to matter.

4. Applicability of the Framework to Novel and Emerging Waste Streams (Specific Request for Comment #4)

Neither the LLRWPA nor the Nuclear Waste Policy Act foreclose addressing chemical hazards. The NRC has separately maintained that its own case-by-case licensing judgment can independently ensure adequate protection against comparable hazards without a new generally applicable rule.¹⁶ NEPA reinforces that NRC environmental reviews already require disclosure of nonradiological impacts, even where the Commission has historically deferred to State permitting programs rather than setting independent standards.¹⁷

The proposed significant-quantities provisions for depleted uranium are intended to facilitate disposal of larger volumes of a long-lived radionuclide at existing and future land disposal facilities. Proposed § 61.12(f) already requires applicants to describe methods for handling wastes containing chelating agents or other non-radiological substances that might affect meeting the

¹⁶ 83 Fed. Reg. at 54,543

¹⁷ Consumers Energy Co. (Palisades Nuclear Plant), 65 Fed. Reg. 66,781 (Nov. 7, 2000).

performance objectives of Subpart C: that is, substances whose main regulatory relevance is their effect on radionuclide mobility and containment.¹⁸ Depleted uranium presents a different kind of non-radiological concern: it is a heavy metal with chemical toxicity, principally nephrotoxicity, that is independent of its radiological properties and that matters directly to human health rather than only to radionuclide performance. The EPA's drinking water standards for uranium reflect this chemical hazard pathway directly.¹⁹ The performance assessment methodology in proposed § 61.13(a) and the corresponding technical analyses described in draft NUREG-2175 address radiological dose but do not describe a role for this kind of direct chemical toxicity screening.

Since this rulemaking is expected to increase the volume of depleted uranium disposed of at near-surface facilities with compliance periods extending to 10,000 years, the absence of an explicit mechanism addressing co-occurring chemical hazards in groundwater is a more consequential gap under this rule than under current practice. The final rule should clarify how NRC expects applicants to address co-occurring chemical hazards. This could be through qualitative acknowledgment, a parallel screening analysis, or reliance on EPA and State hazardous-waste programs. It should also describe how the Commission coordinates with EPA on this category of waste stream, consistent with the Commission's general obligation to cooperate with other agencies in formulating compatible standards for protection against radiation and related hazards.²⁰

The NRC should not duplicate or displace the chemical-hazard authority that EPA and the States properly exercise under RCRA, the Safe Drinking Water Act, and comparable statutes for hazards to the general environment and off-site receptors. But the NRC's own precedent confirms that this division of labor does not extend to hazards on the NRC-licensed site itself arising from NRC-licensed material: under the Uranium Mill Tailings Radiation Control Act, NRC's regulations at 10 CFR Part 40, Appendix A, govern both radiological and non-radiological hazards at uranium and thorium mill tailings sites, and NRC has taken the position, in comments to EPA, that this

¹⁸ 91 Fed. Reg. at 40,336 (proposed § 61.12(f)).

¹⁹ See 40 C.F.R. pt. 141, Subpart G.

²⁰ AEA § 274g, 42 U.S.C. § 2021(g).

application of Part 40, Appendix A "meets the AEA standard of 'adequate protection' of public health and safety and the environment."²¹

5. Cost-Benefit Analysis (Specific Request for Comment #5)

The draft regulatory analysis quantifies net cost savings of \$39.4 million (7 percent discount rate) and \$69.9 million (3 percent discount rate) over a 30-year period.²² The preamble's Executive Order 14192 discussion reports different figures for the same 30-year analysis (\$39.2 million and \$69.7 million), an internal inconsistency the final rule should reconcile regardless of the broader scope question addressed below.²³ NRC staff have described the underlying quantification as based on a single waste stream associated with the West Valley Demonstration Project site, extrapolated to the broader GTCC inventory on the reasoning that additional waste streams would only increase the net benefit.²⁴ The draft regulatory analysis itself acknowledges that it does not quantify the benefits of expanded disposal options for other GTCC waste streams, industry-generated GTCC waste, or reprocessing waste.²⁵

Because the rule is tentatively designated a deregulatory action under Executive Order 14192 based on these net-savings figures,²⁶ a designation resting on a single-waste-stream extrapolation, and reported inconsistently within the preamble itself, may not adequately reflect the range of costs and benefits across the regulated population. Before finalizing that designation, the Commission should reconcile the figures, identify the waste streams and assumptions used in the quantified analysis, and either extend that analysis to a representative set of GTCC waste streams, including industry-generated and reprocessing-derived waste, or state

²¹ 42 U.S.C. § 2022(a); 10 C.F.R. pt. 40, Appendix A; Nuclear Regulatory Commission, "NRC Staff's Comments on EPA Proposed Rulemaking for 40 CFR Part 192 Rule, 82 FR 7400" (July 17, 2017), ML17173A638; Environmental Protection Agency, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings; Withdrawal of Proposed Rule, 83 Fed. Reg. 54,543, 54,544 (Oct. 30, 2018)

²² Nuclear Regulatory Commission, draft Regulatory Analysis for Integrated Low-Level Radioactive Waste Disposal (2026), ML26174A244; 91 Fed. Reg. at 40,290, 40,314.

²³ Compare 91 Fed. Reg. at 40,290, 40,314 (reporting net cost savings of \$39.4 million and \$69.9 million) with id. at 40,319 (reporting, in the Executive Order 14192 discussion, net cost savings of \$39.2 million and \$69.7 million for the same 30-year period).

²⁴ Nuclear Regulatory Commission, Executive Order 14300 Rulemaking Public Meeting — Integrated Low-Level Radioactive Waste Disposal — Proposed Rule, July 14, 2026, (Docket No. NRC—2011—0012), ML26182A244.

²⁵ Nuclear Regulatory Commission, draft Regulatory Analysis for Integrated Low-Level Radioactive Waste Disposal (2026), ML26174A244; 91 Fed. Reg. at 40,313.

²⁶ 91 Fed. Reg. at 40,319 (Executive Order 14192 discussion).

clearly in the final rule that the quantified savings reflect a single representative waste stream rather than a comprehensive accounting.

The analysis's benefit categories are also worth examining, apart from their precision. The draft regulatory analysis enumerates nonquantified benefits in terms of "public health (routine), improvements in knowledge, and regulatory efficiency," and separately notes that the rule advances Executive Order 14300 policies on nuclear leadership and on reducing the costs of nuclear operation. However, it does not identify the benefits of the licensed activity to society as a category, or connect its discussion to ADVANCE Act § 501.²⁷ The final regulatory analysis should identify that category and state the NRC's basis for concluding that the requirements adopted do not limit those benefits beyond what the performance objectives require.

6. Site-Specific Waste Acceptance Criteria Exceeding Generic GTCC Concentration Limits (Specific Request for Comment #6)

Proposed § 61.58 permits licensees to develop site-specific waste acceptance criteria, supported by the technical analyses required under § 61.13, in lieu of the generic classification tables in § 61.55 and the generic GTCC concentration limits described in the preamble.²⁸ This structure evaluates safety through dose-based performance criteria rather than technology- or concentration-specific proxies, and is the same type of mechanism relevant to other waste streams whose characteristics do not map cleanly onto generic classification tables developed decades earlier.²⁹ This pathway operates alongside, not in place of, proposed § 61.55(b)(2)(iii), which independently provides that waste exceeding the Table 3 values "is not generally acceptable for land disposal unless proposals for disposal of such waste in a disposal site licensed pursuant to this part are approved by the Commission."³⁰ The Commission's supporting technical analyses indicate that even a waste stream deliberately modeled with radionuclide concentrations at the

²⁷ Draft Regulatory Analysis, ML26174A244, at 23 (§ 4.4, Qualitative Analysis), 32 (§ 4.7.2, Nonquantified Benefits); *Id.* at 23; ADVANCE Act § 501(a)

²⁸ 91 Fed. Reg. at 40,346–47 (proposed § 61.58).

²⁹ *Id.* at 40,304–05 (discussing site-specific waste acceptance criteria as an alternative to generic concentration limits).

³⁰ 91 Fed. Reg. at 40,345 (proposed § 61.55(b)(2)(iii)).

Table 3 ceiling remained substantially below the applicable dose limits for both an offsite individual and an inadvertent intruder within the compliance period.³¹

The final rule should confirm how these two provisions interact: specifically, whether an approved site-specific waste acceptance criteria program under § 61.58 itself satisfies the Commission-approval requirement in § 61.55(b)(2)(iii) for waste above Table 3, or whether a separate approval is required, and should specify what qualitative or quantitative outer bounds, if any, apply to a site-specific showing above those values.

7. Adequacy of Draft NUREG-2175 Guidance (Specific Request for Comment #7)

Safety Case

The NRC should consider whether a standalone safety case document duplicates the technical analyses already required under § 61.13.³² The preamble explains that the safety case is intended, in part, to align with international practice and provide greater transparency of safety decisions with stakeholders. An integrated, plain-language synthesis makes these documents more accessible than navigational indices organized around the § 61.13 analyses for a license application.³³

The Commission should retain the proposed safety case as a standalone, integrated component of the license application, and should clarify in NUREG-2175 that a safety case may incorporate the underlying § 61.13 technical analyses by reference rather than restating their contents. This would address the duplicative-drafting concern industry commenters have raised without eliminating the document's distinct function. The defense-in-depth discussion under § 61.10(c) should use the quantitative barrier-neutralization analysis previously discussed.

GTCC Intruder-Barrier Guidance

Draft NUREG-2175 discusses several candidate engineered barrier designs intended to deter inadvertent intrusion into GTCC disposal units over a 500-year period, and itself acknowledges

³¹ Nuclear Regulatory Commission and Center for Nuclear Waste Regulatory Analyses, *Impact of Greater-than-Class C (GTCC) Radioactive Waste Disposal in a Specialized Land Disposal Facility* (June 25, 2026), ML26083A006, at 37, 49–51.

³² NRC staff and industry remarks at the July 14, 2026 public meeting.

³³ 91 Fed. Reg. at 40,305.

that field experience with such barriers is limited and that testing of barrier performance against drilling is still underway.³⁴ The dose limits and inadvertent-intruder exposure scenarios underlying Part 61's classification tables, and this rulemaking's new Table 3 thresholds, trace back to intrusion modeling developed in the early 1980s and refined through technical position papers issued into the mid-1990s. This rulemaking substantially expands the range of waste streams and disposal configurations subject to that framework, and a separate pending rulemaking is proposing to rely on the same decades-old dose limit as the licensing basis for an entirely new category of byproduct material.³⁵

Because this research is expected to continue evolving, and because guidance rather than codified rule text is the appropriate vehicle for barrier-specific technical detail, the Commission should commit to updating this guidance as the underlying research develops, rather than treating current barrier examples as a fixed technical baseline.

IV. NECESSITY REVIEW FOR BARRIERS AND DESIGN FEATURES

The preamble states a principle not effectuated by the rule: "The NRC continues to hold that each layer of defense must make a definite contribution to the isolation of the waste, so that the NRC can find with reasonable assurance that no single layer of defense will be relied upon exclusively to achieve the overall safety objectives over the compliance period."³⁶ That sentence sets out two distinct requirements. One governs *how many* layers of defense a disposal system must have: no single layer may be relied upon exclusively. The other governs *which* features may be counted as layers of defense in the first place: each must make a definite contribution. The first is codified, at the § 61.2 definition of defense-in-depth, and draft NUREG-2175 describes how to demonstrate it.³⁷

³⁴ Nuclear Regulatory Commission, draft NUREG-2175, Rev. 1, App. G (2026), ML23255A282; G. Wittmeyer, Evaluating the Capacity of Engineered Human Intrusion Barriers to Deter Domestic Water Well Drilling Methods (2026), ML26043A236; Nuclear Regulatory Commission and Center for Nuclear Waste Regulatory Analyses, Impact of Greater-than-Class C (GTCC) Radioactive Waste Disposal in a Specialized Land Disposal Facility (June 25, 2026), ML26083A006, at 21.

³⁵ See, e.g., Nuclear Regulatory Commission, *Regulatory Framework for Fusion Machines*, 91 Fed. Reg. 9,476, 9,487 (proposed Feb. 26, 2026) (Docket No. NRC-2023-0071; RIN 3150-AL00).

³⁶ 91 Fed. Reg. at 40,306. Draft NUREG-2175 states the same proposition in the staff's voice. Nuclear Regulatory Commission, draft NUREG-2175, Rev. 1, *Guidance for Conducting Technical Analyses for 10 CFR Part 61* (2026), ML23255A282, at 7-16.

³⁷ 91 Fed. Reg. at 40,334 (*proposed § 61.2, defining defense-in-depth as "the use of multiple independent and, where possible, redundant layers of defense against release of radioactive material such that no single layer, no matter how robust, is exclusively relied upon"*); Draft NUREG-2175, Rev. 1, ML23255A282, at 7-14.

The second appears nowhere in the rule text, is defined nowhere in the rule or the guidance, and no regulatory consequence attaches to it.

Despite the difference in treatment, the two requirements are closely connected. A single calculation answers both: set aside the credited performance of one barrier, re-run the performance assessment, and compare the result to the base case. If the projected dose still meets the performance objective, then that layer is not being relied on exclusively, and the first requirement is satisfied as to it. If the projected dose does not change significantly, that barrier makes no definite contribution, and the second requirement is not satisfied by it. Running the same comparison for each credited feature in turn answers both questions; only the reading of the output differs.

Draft NUREG-2175 already specifies that calculation in detail as the “one-off” barrier analysis of Section 6.3.2.1, and Chapter 7 states that it is available for the compliance period and not only the performance period.³⁸ The guidance acknowledges what a null result can mean: a one-off analysis showing no change when a component is turned off “could show that the barrier or component truly does not contribute significantly to overall performance.”³⁹ However, the guidance directs that one-off results be reported as relative quantities—a percent change, or a rank ordering of barriers against one another—and a relative quantity can establish that one barrier matters more than another but cannot be compared either to a dose limit or to zero. Every consequence the guidance attaches to a barrier analysis runs toward adding layers of defense; as set out below, nothing follows from the opposite finding.

The framework is asymmetrical: it can determine that a facility needs an additional barrier but it cannot determine that a facility has a barrier that does not work. Closing this gap requires (1) that the result already being computed be reported in units that can be compared against something, and (2) that the rule provide a place where a null result calls for an answer.

The asymmetry is also a statutory problem. Section 501 of the ADVANCE Act directs that licensing and regulation of the civilian use of radioactive materials and nuclear energy “be conducted in a manner that is efficient and does not unnecessarily limit— (1) the civilian use of radioactive materials and deployment of nuclear energy; or (2) the benefits of civilian use of radioactive

³⁸ Draft NUREG-2175, Rev. 1, ML23255A282, at 6-18 (§ 6.3.2.1); *id.* at 7-16.

³⁹ Draft NUREG-2175, Rev. 1, ML23255A282, at 6-18.

materials and nuclear energy technology to society.”⁴⁰ That command is not a direction to conduct cost-benefit analysis, and BTI does not read it as one. It is a necessity test, and two features have bearing on this rule. First, it prohibits a defect rather than prescribing a maximum. It is violated where a regulatory design limits a covered benefit by more than the Commission’s non-compensable obligations require, and where a less-limiting alternative would have delivered the same protection. A stringent requirement that is necessary is lawful under it, however burdensome. Second, it cannot operate to reduce protection: a limit that is necessary to adequate protection is by definition not unnecessary. What the test reaches is the space of regulatory choice above and around the safety threshold, including the means by which a given level of protection is secured..⁴¹

Thus, a credited feature whose neutralization does not significantly change the projected dose is not necessary based on performance objectives. Crediting and entrenching such a feature therefore limits the covered benefits by something other than what those objectives demand. The less-limiting alternative is not a hypothetical but the same facility without that feature, performing the same. The NRC is obligated to explain how a selected design does not unnecessarily limit benefits relative to the protection-adequate alternatives, and a failure to consider the question at all misses an important aspect of the problem.⁴²

Neither the proposed rule, draft NUREG-2175, nor the draft regulatory analysis refer to ADVANCE Act § 501, the mission statement, or the non-limitation obligation. While the draft regulatory analysis identifies nonquantified benefits (public health, improvements in knowledge, and

⁴⁰ Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024 (ADVANCE Act), Pub. L. No. 118-67, § 501(a), codified at 42 U.S.C. § 2201 note. The directive operates on the Commission’s mission statement, and Congress did not amend the Commission’s licensing authority, having judged the existing authority sufficient. The obligation the provision makes explicit is therefore grounded in the policies of the Atomic Energy Act and the Energy Reorganization Act with which § 501 requires the updated mission to remain consistent, rather than created by § 501 itself. See A. Stein, *Considering Nuclear Energy’s Benefits to Society: Update to the Mission Statement of the Nuclear Regulatory Commission as Required by the ADVANCE Act* (Breakthrough Institute, Nov. 25, 2024).

⁴¹ ADVANCE Act § 501(a) conditions the updated mission on remaining consistent with those statutory policies, “including to provide reasonable assurance of adequate protection of the public health and safety, to promote the common defense and security, and to protect the environment.”

⁴² See *Motor Vehicle Mfrs. Ass’n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (agency action is arbitrary and capricious where the agency has “entirely failed to consider an important aspect of the problem”).

regulatory efficiency) it does not treat the benefits of the licensed activity to society as a category subject to a non-limitation obligation.⁴³

1. Component Descriptions and Thresholds

Where the rule names a component or design feature, it requires description. Proposed § 61.10(c) requires the safety case to “describe the defense-in-depth protections that enhance the resiliency of the facility in complying with the performance objectives specified at §§ 61.41 and 61.43.”⁴⁴

Proposed § 61.13(a)(8) requires the performance assessment to “[i]dentify and differentiate between the roles performed by the natural characteristics and the design features of the disposal site in limiting radiological releases to the general population.”⁴⁵ Proposed § 61.13(e) requires the performance period analyses to “identify and describe disposal site design features and natural characteristics relied on to demonstrate compliance with the applicable performance objectives.”⁴⁶ Each of these is a duty to identify, describe, or differentiate. None establishes a level that a description can fail.

Where the rule sets a threshold, the threshold applies to the total system. The performance objectives at proposed §§ 61.41 and 61.42 govern dose to a member of the public and to an inadvertent intruder from the disposal site as a whole.⁴⁷ No provision in the proposed rule is both feature-specific and threshold-bearing. A question of the form “does this feature earn its place” therefore has no home in the rule by construction rather than by oversight. The § 61.2 definition of defense-in-depth reinforces the asymmetry by requiring that “no single layer, no matter how robust, is exclusively relied upon” is a floor against under-reliance. Every additional layer satisfies it more completely, and there is no corresponding ceiling.

2. Part 63 as a Comparison

The NRC’s historic decisions creating 10 CFR Part 63 in 2001 have relevance to this rulemaking. Part 63 requires an applicant to identify the design and natural features “considered barriers

⁴³ Nuclear Regulatory Commission, draft Regulatory Analysis for Integrated Low-Level Radioactive Waste Disposal (2026), ML26174A244, at 23, 32, (enumerating nonquantified benefits as public health (routine), improvements in knowledge, and regulatory efficiency). The searchable text of the proposed rule, draft NUREG-2175, and the draft regulatory analysis contains no reference to the ADVANCE Act, to § 501, or to the non-limitation obligation.

⁴⁴ 91 Fed. Reg. at 40,336 (proposed § 61.10(c)).

⁴⁵ 91 Fed. Reg. at 40,337 (proposed § 61.13(a)(8)).

⁴⁶ 91 Fed. Reg. at 40,338 (proposed § 61.13(e)).

⁴⁷ 91 Fed. Reg. at 40,340–40,341 (proposed §§ 61.41, 61.42).

important to waste isolation,” to “[d]escribe the capability of barriers, identified as important to waste isolation, to isolate waste,” and to provide the technical basis for that description.⁴⁸ It sets no level that any of those descriptions must reach. The quantitative standard operates on the system: the engineered barrier system must be designed so that, “working in combination with natural barriers,” radiological exposures to the reasonably maximally exposed individual fall within the limits specified at § 63.311.⁴⁹ As in proposed Part 61, no provision is both barrier-specific and threshold-bearing. Commenters asked for quantitative per-barrier limits, and the NRC declined: “the final rule does not place quantitative limits on individual barriers,” and “[t]he Commission continues to believe a qualitative approach, as proposed, is appropriate.”⁵⁰

The generic rule for geologic repositories, 10 CFR part 60 (repositories other than Yucca Mountain), contains bounded and satisfiable per-barrier requirements: containment of high-level waste within the waste packages “substantially complete for a period ... not less than 300 years nor more than 1,000 years after permanent closure”; a release rate from the engineered barrier system that “shall not exceed one part in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure”; and pre-waste-emplacement groundwater travel time of “at least 1,000 years.”⁵¹

The NRC gave three grounds for not carrying that approach into Part 63: design flexibility, common-mode uncertainty, and that better methods obviated the need for per-barrier consideration.⁵² BTI shares the NRC’s goal of not over-constraining designers, but the same bounded per-barrier requirements it removed to achieve that were also the only provisions capable of confirming a barrier had done enough. The Part 63 record does not establish that any particular engineered feature was unnecessary.

3. Draft NUREG-2175 Feature Analysis and Concerns

As noted above, the method that would answer the question is already in the draft guidance, and it is described there in detail. Section 6.3.2.1 sets out one-off, one-on, and factorial barrier

⁴⁸ 10 C.F.R. § 63.115(a)–(c).

⁴⁹ 10 C.F.R. § 63.113(b); *see also id.* § 63.311 (individual protection standard).

⁵⁰ Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada, 66 Fed. Reg. 55,732, 55,759 (Nov. 2, 2001).

⁵¹ 10 C.F.R. § 60.113(a)(1)(ii)(A), (B), (a)(2).

⁵² 66 Fed. Reg. at 55,759.

analyses: “In one-off analyses, the performance of a single barrier or component is neglected to understand the contribution of the barrier to performance when the system is operating under the anticipated range of conditions. Each barrier or component is analyzed in this manner, and the relative performance, such as the change in peak dose, is compared.”⁵³ Barrier analyses are commonly performed as part of a performance assessment, and though the guidance in Section 6.3.2 is focused on the performance period, it applies to barrier analyses for the compliance period as well.”⁵⁴

However, three features of the guidance, each individually reasonable, jointly foreclose the finding that a credited feature contributes nothing: purpose, units, and consequence.

1. **Purpose:** Section 6.3.2.1 states the use to which one-off results are put: they “clearly identify which elements of the system are contributing the most to performance and, therefore, which elements should have the most technical basis and most rigorous review effort applied to them.”⁵⁵ That is not a test of whether a credited feature belongs in the design.
2. **Units:** “The results are best expressed on a relative basis, such as percent change, as the analyses may be unphysical.”⁵⁶ Reporting in fundamental units, like expected doses, is essential for understanding the utility of each individual barrier. If barriers are ranked by percent change that does not provide the essential information of whether even the lowest ranked barrier is critical, or conversely, if a barrier provides no additional benefit.⁵⁷
3. **Consequence:** A null one-off result has two possible explanations: the barrier is redundant, or it was never relevant to what drives the dose. Chapter 7 only addresses redundancy, treating a null result as evidence that “another barrier is available to provide a similar and adequate function.”⁵⁸ It doesn’t address if a credited barrier is contributing no benefit, though the guidance acknowledges that possibility elsewhere. If a barrier turns out to be functionally irrelevant, the framework has no next step for it.

⁵³ Draft NUREG-2175, Rev. 1, ML23255A282, at 6-18 (§ 6.3.2.1).

⁵⁴ Draft NUREG-2175, Rev. 1, ML23255A282, at 7-16.

⁵⁵ Draft NUREG-2175, Rev. 1, ML23255A282, at 6-18.

⁵⁶ *Id.*

⁵⁷ Draft NUREG-2175, Rev. 1, ML23255A282, at 6-18 (methods); *id.* at 6-20 (Example 6.2).

⁵⁸ Draft NUREG-2175, Rev. 1, ML23255A282, at 7-14.

The result is a framework that can conclude a facility needs an additional layer of defense and has no path to concluding that a facility has credited one it does not need. Engineered features credited in a license application carry construction, materials, occupational safety, and long-term operational consequences and can be revised across the license term. Each such revisit can add to the credited set. None can subtract from it on the strength of an analysis.

4. Asymmetric Time Scales and Solutions

This matters more under the proposed rule than under current Part 61 because of the time horizons the rule establishes. A disposal site containing significant quantities of long-lived radionuclides faces a 10,000-year compliance period, and the performance period extends beyond it with no stated end.⁵⁹ The preamble is explicit about the function defense-in-depth serves across those horizons: diversity among components “compensates, in part, for uncertainties in the long-term estimation of performance of the disposal site,” and defense-in-depth “is used to mitigate the effects of large uncertainties identified during the development of the technical analyses.”⁶⁰

That is the correct response when the uncertainty in question can be reduced. For a substantial part of what governs performance at 10,000 years and beyond, it cannot be. For a disruptive process that recurs at some average rate, the probability that an observation or test program of finite duration ever exercises the mechanism is approximately the product of that rate and the duration. A process recurring on average once in 10,000 years has roughly a one-in-a-hundred chance of occurring during a century of monitoring. Even a century of non-observation revises the estimated rate correspondingly little. No site characterization program, no engineered-feature testing program, and no institutional control period resolves that uncertainty. So, at multiple stages (license application and subsequent revisions), there will always be pressure to continue to add further defenses against this unconstrainable uncertainty. This is a ratchet rather than a safety margin.

A barrier-neutralization analysis has the opposite property. It compares two runs of the same model rather than asking what will happen in the future, so it needs no new observation, no prototype, and no reduction in the underlying uncertainty. Because both runs share the same

⁵⁹ 91 Fed. Reg. at 40,334–40,335 (proposed § 61.2, defining “compliance period” and “performance period”).

⁶⁰ 91 Fed. Reg. at 40,306.

models, parameters, and conservatisms, any error built into the model applies equally to both runs and largely cancels out when they are compared. It is answerable today, from the performance assessment the applicant has already built.

5. § 61.13(a)

BTI recommends that the NRC add the following paragraph to proposed § 61.13(a):

(9) For each engineered barrier and design feature credited in the performance assessment, an analysis in which the credited performance of that barrier or feature is neglected, reporting the resulting change in the projected peak annual dose in absolute units. Where that change is not significant, the safety case required by § 61.10(c) must state the basis for crediting and retaining the barrier or feature.

This text is scoped to features the applicant itself credits and it creates no obligation to identify barriers beyond those the applicant has already identified under proposed § 61.13(a)(1) and (a)(8). It also requires a statement of basis, not removal. BTI recommends codifying this in rule text rather than addressing it in NUREG-2175 alone. The guidance already contains the method; what it lacks is a requirement and a consequence. Section 6.3.2.1 should direct that one-off results be reported in absolute dose units alongside relative measures, and Chapter 7 should state how a reviewer should treat a null one-off result for which the redundancy explanation does not hold. Conforming changes should be made to NUREG-2175.

This recommendation sets no independent floor for any barrier and so avoids the shared-uncertainty objection that led the NRC to reject subsystem performance standards in Part 63, requires no more than one additional run of a model the applicant has already built, and supplies exactly the record the necessity test requires without any new proceeding.

V. ADDITIONAL TECHNICAL RECOMMENDATIONS

1. Waste Classification Language

The final rule should clarify the statement in proposed § 61.55 that Class A waste is “the least hazardous” and GTCC waste is “the most hazardous” to specify that this description refers to the escalating isolation and containment requirements associated with each waste class, not the

instantaneous radiological hazard of a specific waste stream.⁶¹ As currently written, this framing could be read to imply a general hazard ranking, when a Class A waste stream can present a substantially greater near-term radiological hazard than a GTCC waste stream with a smaller total activity, depending on the specific radionuclides and quantities involved.

A related terminology problem exists between the NRC's and DOE's classification systems. The DOE defines transuranic waste, for its own facilities, as material containing more than 100 nCi/g of alpha-emitting transuranic isotopes with half-lives greater than 20 years.⁶² Table 1 in § 61.55 draws the same 100 nCi/g concentration line for the Class C/GTCC boundary, but applies it to alpha-emitting transuranic radionuclides with half-lives greater than 5 years.⁶³ A radionuclide with, for example, an 8-year half-life above 100 nCi/g is GTCC under NRC's classification but does not meet DOE's own definition of transuranic waste.

A second gap involves "GTCC-like waste," a term DOE uses in its own environmental review documents to describe DOE-owned or DOE-generated waste with characteristics similar to GTCC waste but with no identified disposal path.⁶⁴ This term has no independent definition in NRC's regulations. The preamble explains that "GTCC-like waste would need to meet NRC requirements when an NRC licensee assumes responsibility for management of the material under its NRC license," and that, accordingly, "the NRC does not distinguish between GTCC and GTCC-like waste."⁶⁵ That approach is reasonable for licensing purposes, but it leaves the two agencies describing overlapping material with non-identical vocabularies up until the point of custody transfer, which complicates cross-agency planning for waste streams.

Finally, DOE's transuranic waste definition excludes "waste that the [NRC] has approved for disposal on a case-by-case basis" Because this rulemaking restructures that mechanism into the new Table 3 and § 61.55(b)(2)(iii) framework, DOE's own definition will, absent a corresponding update to DOE Order 435.1, continue to cross-reference a provision that no longer exists in its current form. The final rule should note this dependency and recommend that DOE update its

⁶¹ 91 Fed. Reg. at 40,306–07 (proposed § 61.55).

⁶² U.S. Department of Energy, DOE Manual 435.1-1, Radioactive Waste Management Manual, Change 1 (2001)

⁶³ 10 C.F.R. § 61.55, Table 1.

⁶⁴ U.S. Department of Energy, Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375, Jan. 2016).

⁶⁵ 91 Fed. Reg. at 40,294–40,295.

Order 435.1 definitions to track the restructured provision, consistent with the Commission's general obligation to coordinate with other agencies on compatible radiation protection standards.

2. Branch Technical Position on Concentration Averaging

The NRC should specify a timeline for updating the Branch Technical Position on Concentration Averaging and Encapsulation to address GTCC waste streams.⁶⁶ The existing Branch Technical Position's general principles remain applicable to GTCC waste, but the document has not yet been updated to address GTCC-specific concentration averaging considerations, which bear directly on whether a given waste stream is classified as GTCC in the first instance.

VI. CROSS-RULE COORDINATION AND EXECUTIVE ORDER 14300

This rulemaking is not self-contained, and its own preamble says so directly: the Commission grounds this proposal in Executive Order 14300's directive to undertake "a review and wholesale revision" of NRC's regulations and guidance, not in a standalone Part 61 initiative.⁶⁷ Before finalizing this rule, the NRC should verify that its amendments to Parts 20, 61, 73, and 150 are consistent with the operative and proposed text of the other rulemakings proceeding under that same directive, and should not finalize cross-references or shared definitions as though the provisions they touch are static.

1. The Proposed Removal of § 61.7 Conflicts With the Pending Fusion Machine Rulemaking

The proposed rule removes and reserves § 61.7, "Concepts."⁶⁸ The proposed *Regulatory Framework for Fusion Machines* (Docket ID NRC-2023-0071)⁶⁹ depends on that exact section for its core waste-disposal compliance mechanism. Proposed § 20.2008(a) in the fusion rulemaking would allow a fusion licensee to dispose of novel waste as low-level waste if the waste is "manifested and labeled for disposal consistent with the description of the applicable waste class in § 61.7,

⁶⁶ NRC staff remarks at the July 14, 2026 public meeting confirming the Branch Technical Position on Concentration Averaging and Encapsulation has not yet been updated to address GTCC waste.

⁶⁷ 91 Fed. Reg. at 40,292 (citing Executive Order 14300, § 5, 90 Fed. Reg. 22,587 (May 29, 2025)).

⁶⁸ 91 Fed. Reg. at 40,336; see also *id.* at 40,298–40,299.

⁶⁹ *Regulatory Framework for Fusion Machines*, *supra* note 35.

‘Concepts,’” without a site-specific intrusion assessment.⁷⁰ If this rule finalizes as proposed, that cross-reference will point to a reserved, empty section.

The fusion rulemaking’s preamble states that “[t]he draft proposed part 61 rule, if approved by the Commission, would not conflict with the fusion machine rule’s proposed changes to § 20.2008,” citing SECY-24-0045, the May 2024 draft version of this proposal.⁷¹ That assurance predates, by over two years, the version of this rule now published for comment, which does remove § 61.7. The Commission should not allow a two-year-old no-conflict finding to stand uncorrected against current text that contradicts it.

The final rule should not eliminate § 61.7 without first resolving this dependency. The NRC should either (1) retain § 61.7, or a reduced pointer provision in its place, until the fusion machine rulemaking is finalized and its cross-reference can be corrected in parallel, or (2) coordinate the two rulemakings’ finalization so that proposed § 20.2008(a) is amended concurrently to reference wherever the relevant waste-classification concepts are relocated in the restructured Part 61. NUREG-2175 should include a table or index cross-referencing the concepts previously addressed in § 61.7 to their current locations in revised § 61.55 and elsewhere in guidance; that same cross-reference would let both Part 61 applicants and reviewers of the fusion machine rulemaking trace where the classification concepts § 20.2008(a) depends on have relocated. At minimum, before finalizing either rule, the NRC should reconcile whether the fusion rulemaking’s no-conflict finding remains accurate in light of this rule’s current text.

2. ALARA Cross-References in §§ 61.41 and 61.43

The final rule should also include explicit coordination language addressing its relationship to the pending *Reforming and Modernizing the NRC’s Radiation Protection Framework* rulemaking (Docket No. NRC–2025–1140; RIN 3150–AL47).⁷²

Both rulemakings propose to amend §§ 61.41 and 61.43. This proposed rule restructures those sections into subsections (a) through (c), introduces a 0.25 mSv (25 mrem) total effective dose limit

⁷⁰ Id. at 9,487 (proposed § 20.2008(a)).

⁷¹ Id. at 9,484 n.20 (citing Nuclear Regulatory Commission, SECY-24-0045, “Proposed Rule: Integrated Low-Level Radioactive Waste Disposal” (May 29, 2024), ML23242A249).

⁷² Nuclear Regulatory Commission, *Reforming and Modernizing the NRC’s Radiation Protection Framework*, 91 Fed. Reg. 43,456, 43,502–43,503 (proposed July 15, 2026) (Docket No. NRC–2025–1140; RIN 3150–AL47)

tied to the new compliance-period framework, and replaces the current ALARA sentence with a cross-reference to revised § 20.1101(b). The *Radiation Protection Framework* rulemaking, evaluated on its own proposed text, instead deletes the same ALARA sentence from the current, single-paragraph version of §§ 61.41 and 61.43, without incorporating this rulemaking's restructuring and without inserting replacement text.⁷³ This proposed rule preserves the current organ-dose limits only for licensees meeting the § 61.1(b) accommodation.⁷⁴

This is not merely two rules editing the same sections; it is one rule's text depending on content the other rule is simultaneously rewriting. The *Radiation Protection Framework* rulemaking replaces ALARA requirements with a new "graded approach to dose management" that becomes § 20.1101(b)'s operative content.⁷⁵ This rulemaking's proposed cross-reference to "revised § 20.1101(b)" is therefore written to presume that rewrite is already in place. But the *Radiation Protection Framework* rulemaking's own amendment to §§ 61.41 and 61.43 does not insert the cross-reference this rulemaking depends on. Each rule assumes a coordination step the other does not perform.

If the *Radiation Protection Framework* rulemaking is finalized on its current schedule without accounting for the restructuring proposed here, its amendatory instruction would apply to text that this rulemaking will already have superseded. Depending on the order of finalization, §§ 61.41 and 61.43 could be left, at least temporarily, without any provision addressing dose optimization pending reconciliation between the two rules.

3. Convergent Amendments to Shared Part 20 Definitions

At least three Executive Order 14300 rulemakings are amending Part 20 concurrently, without cross-referencing one another. This rule revises the definition of "Waste" in § 20.1003 to remove the existing exclusion of transuranic waste.⁷⁶ The fusion machine rulemaking separately amends § 20.1003 in the same proceeding to add a definition of "fusion machine" and revise the definitions of "particle accelerator" and "byproduct material."⁷⁷ *Modernizing Materials Licensing*

⁷³ Compare 91 Fed. Reg. at 40,340–40,341 (proposed §§ 61.41, 61.43) *Reforming and Modernizing the NRC's Radiation Protection Framework*, 91 Fed. Reg. 43,456, 43,502–43,503..

⁷⁴ 91 Fed. Reg. at 40,340 (proposed § 61.41(c)).

⁷⁵ *Reforming and Modernizing the NRC's Radiation Protection Framework*, supra note 72, at 43,480–43,481 (proposed § 20.1101(b)).

⁷⁶ 91 Fed. Reg. at 40,332 (proposed § 20.1003).

⁷⁷ *Regulatory Framework for Fusion Machines*, supra note 35, at 9,482 (proposed § 20.1003)

(Docket No. NRC—2025—1370; RIN 3150—AL56) further relies on Part 20 for radiation-protection requirements applicable to the facilities it covers. None of these three rulemakings' Federal Register notices acknowledges the others' pending amendments to the same part. Because amendatory instructions operate on whatever CFR text is in effect when each rule is finalized, the sequence in which the Commission finalizes these proceedings will determine whether Part 20's definitions are correctly layered, silently overwritten, or left internally inconsistent.

4. Cumulative Effects of Regulation

Section IX, "Cumulative Effects of Regulation," proposes an effective date 30 days after publication of the final rule and asks whether there are "unintended consequences related to this rulemaking and how should they be addressed."⁷⁸ A cross-reference broken by this rule's removal of § 61.7, or a dose-optimization provision left incomplete by uncoordinated amendments to §§ 61.41, 61.43, and § 20.1101(b), are exactly such consequences, and the 30-day effective date proposed leaves little room to resolve them after the fact. The NRC should treat coordination with the fusion machine rulemaking, and with the other Executive Order 14300 proceedings identified above, as part of its answer to that question rather than as a matter external to this docket.

5. Recommended Coordination Mechanisms

The NRC should coordinate effective dates so that no licensee or applicant is subject, even temporarily, to a cross-reference pointing to a reserved or nonexistent provision, or to a provision whose substantive content has not yet been finalized. Supplemental notice should be provided if either this rulemaking or the fusion machine rulemaking materially changes the operative waste-classification text between now and finalization.

VII. CONCLUSION

The proposed rule advances a workable, risk-informed framework for GTCC disposal after an extended period in which no generic licensing pathway existed. The recommendations above are intended to help the Commission finalize a rule that is administrable across Agreement States and compact regions, coordinated with the NRC's concurrent Executive Order 14300 rulemakings, including the pending fusion machine and radiation protection framework proceedings, and

⁷⁸ 91 Fed. Reg. at 40,314—40,315 (Cumulative Effects of Regulation).

supported by a regulatory analysis and technical record adequate to its designation as a deregulatory action.

BTI appreciates the opportunity to comment and welcomes further engagement with NRC staff on the issues raised in this letter.

Sincerely,

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