

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 20, 61, 73, and 150

[NRC-2011-0012, NRC-2017-0081, and NRC-2015-0003]

RIN 3150-AI92

Integrated Low-Level Radioactive Waste Disposal

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend its regulations that govern the land disposal of low-level radioactive waste to require new and revised site-specific technical analyses and permit the development of site-specific criteria for low-level radioactive waste acceptance based on the results of these analyses. The NRC also proposes to authorize the near-surface disposal of certain Greater-Than-Class C waste streams and provide for Agreement State licensing of these waste streams. The rulemaking would not change requirements for licensees of currently operating low-level radioactive waste facilities that do not plan to accept Greater-Than-Class C waste or significant quantities of long-lived radionuclides after the effective date of this rulemaking. In addition, the NRC is issuing for public comment draft implementing guidance.

DATES: Submit comments on the proposed rule and draft guidance by **[INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments

received after this date will be considered if it is practical to do so, but the NRC is able to ensure consideration only for comments received before this date.

ADDRESSES: You may submit comments by any of the following methods; however, the NRC encourages electronic comment submission through the **Federal rulemaking website**:

- **Federal Rulemaking website:** Go to <https://www.regulations.gov> and search for Docket ID NRC-2011-0012. Address questions about NRC dockets to Helen Chang; telephone: 301-415-3228; email: helen.chang@nrc.gov. For technical questions contact the individuals listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **Email comments to:** Rulemaking.Comments@nrc.gov. If you do not receive an automatic email reply confirming receipt, then contact us at 301-415-1677.

- **Fax comments to:** Secretary, U.S. Nuclear Regulatory Commission at 301-415-1101.

- **Mail comments to:** Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.

- **Hand deliver comments to:** 11555 Rockville Pike, Rockville, Maryland 20852, between 7:30 a.m. and 4:15 p.m. eastern time, Federal workdays; telephone: 301-415-1677.

You can read a plain language description of this proposed rule at <https://www.regulations.gov/docket/NRC-2011-0012>. For additional direction on obtaining information and submitting comments, see "Obtaining Information and

Submitting Comments” in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: George Tartal, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-0016, email: George.Tartal@nrc.gov; Cardelia Maupin, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-4127, email: Cardelia.Maupin@nrc.gov; and Priya Yadav, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-6667, email: Priya.Yadav@nrc.gov. They are all staff of the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

EXECUTIVE SUMMARY:

A. Need for the Regulatory Action

The NRC is proposing to amend its regulations in part 61 of title 10 of the *Code of Federal Regulations* (10 CFR), “Licensing Requirements for Land Disposal of Radioactive Waste,” to require new and revised site-specific technical analyses and to permit the development of site-specific waste acceptance criteria (WAC) based on the results of these analyses. These amendments would help to ensure that low-level radioactive waste (LLW) streams that are significantly different from those considered during the development of the current regulations (e.g., significant quantities of depleted uranium) can be disposed of safely in the near surface and meet the performance objectives for land disposal of LLW. These amendments would also increase the use of site-specific information to ensure performance objectives that are designed to protect public health and safety and the environment are met. The NRC is proposing to

consolidate and integrate criteria for licensing the disposal of Greater-Than-Class C (GTCC) waste streams and to allow for Agreement State licensing of those GTCC waste streams that meet the regulatory requirements for near-surface disposal and do not present a hazard such that the NRC should retain disposal authority under Section 274c of the Atomic Energy Act of 1954, as amended (AEA). The NRC is also proposing editorial changes within 10 CFR part 61 and conforming changes to regulations in 10 CFR parts 20, 73, and 150. The proposed revisions improve alignment of NRC requirements with current health and safety standards.

This proposed rule would affect all existing licensees and future applicants to varying degrees. All future license applicants that are regulated by the NRC or by an Agreement State would be required to meet the revised regulations. Any currently licensed LLW site that plans to accept GTCC waste or significant quantities of long-lived radionuclides after the effective date of this rulemaking, or after the effective date of an equivalent Agreement State regulation, would be required to meet the revised regulations. Currently operating LLW facilities that do not plan to accept GTCC waste or significant quantities of long-lived radionuclides after the effective date of this rulemaking would not be required to adopt requirements for new proposed analyses nor other select requirements, such as an intruder assessment. Rather, these licensees would continue to comply with current requirements at 10 CFR part 61 for selected sections of the new regulations (e.g., §§ 61.13(f) and 61.42(c)). In addition, an existing licensee who meets the exemption criteria in 10 CFR 61.1(b) may voluntarily choose to be regulated under the new requirements. Finally, the NRC has developed a draft guidance document for comment, NUREG-2175, Revision 1, "Guidance for Conducting Technical Analyses for 10 CFR Part 61." This document provides guidance on the development of information

and analyses submitted by licensees or license applicants to demonstrate that that they meet the new regulatory requirements.

B. Major Provisions

Major provisions of the proposed rule include the following:

- Assessment for the protection of inadvertent intruders;
- Specification of a 1,000-year compliance period for sites that do not contain significant quantities of long-lived radionuclides or a 10,000-year compliance period for sites that are planning to accept significant quantities of long-lived radionuclides;
- Performance period analyses for the postclosure time period after 10,000 years if significant quantities of long-lived radionuclides are disposed;
- Development of a safety case, which would provide a summary of the safety basis that the disposal site will be capable of isolating waste and limiting releases to the environment; describes the strength and reliability of the technical analyses described in § 61.13; and includes consideration of defense-in-depth protections and safety relevant aspects of the site, the facility design, and the managerial, engineering, regulatory, and institutional controls;
- Revisions to technical analyses necessary to support site closure;
- Development of site-specific WAC that specify the allowable activities and concentrations for each specific radionuclide based on the results of the technical analyses or the use of generic WAC based on the existing LLW classification requirements;

- Clarification of the applicable physical protection requirements for LLW containing special nuclear material (SNM) of low strategic significance or a Category III quantity of SNM;
- Technical analyses for GTCC waste including operational safety assessment and analyses for demonstration of additional waste characteristic requirements;
- An option for existing licensees that do not plan to accept GTCC waste or significant quantities of long-lived radionuclides that would allow them to meet certain existing requirements in 10 CFR part 61 instead of several of the proposed revised requirements;
- Specification of an annual dose limit of 0.25 milliSievert (mSv) (25 millirems (mrem)) for any member of the public within the compliance period;
- Specification of an annual dose not to exceed 5 mSv (500 mrem) to an inadvertent intruder within the compliance period and that exposures to an inadvertent intruder are reduced to the extent reasonably achievable during the performance period;
- Specification that GTCC waste streams containing concentrations greater than 10,000 nanocuries per gram of alpha-emitting transuranic radionuclides with half-lives greater than 5 years are generally not acceptable for near-surface disposal;
- Requirements for avoiding accidental criticality during storage of SNM prior to disposal and waste emplacement for disposal do not apply for radioactive waste that meets the exemption requirements under 10 CFR 71.15(c) as non-fissile material;
- Requirement that the near-surface disposal of GTCC waste streams containing SNM in quantities subject to 10 CFR 70.24 include design features to limit the reconcentration of fissile material following disposal; and

- Allow for Agreement State regulation of GTCC waste streams that meet the regulatory requirements for near-surface disposal and do not present a hazard such that the NRC should retain disposal authority under Section 274c of the AEA.

C. Costs and Benefits

The NRC prepared a draft regulatory analysis to determine the expected quantitative costs and benefits of the proposed rule, as well as qualitative factors to be considered in the NRC's rulemaking decision. The draft analysis concluded that the proposed rule would result in net averted costs to the industry, and net costs to the Agreement State regulators and the NRC. The key findings of the analysis are as follows:

- Averted Costs to the Industry of approximately \$136 million at a 7 percent discount rate
- Costs to the Agreement States of approximately (\$1,270,000) at a 7 percent discount rate
- Costs to the NRC of approximately (\$160,000) at a 7 percent discount rate

The draft regulatory analysis also includes a qualitative analysis of the direct and indirect benefits from risks that could be avoided if the NRC adopted the rule. The principal qualitative benefits of the proposed rule include: 1) ensuring that LLW streams that are significantly different from those considered during the development of the current regulations can be disposed of safely and meet the performance objectives for land disposal of LLW; 2) facilitating the use of site-specific information and up-to-date dosimetry methodology in site-specific technical analyses to ensure public health and safety is protected; and 3) promoting a risk-informed regulatory framework that specifies

what requirements need to be met and provides licensees or applicants flexibility regarding what information or approach they use to satisfy those requirements.

The draft regulatory analysis concludes that the proposed rule should be adopted because the revised regulations would enhance public health and safety by ensuring the safe disposal of LLW that was not analyzed during the development of the current regulations (e.g., significant quantities of depleted uranium, GTCC waste streams). For more information, please refer to the draft regulatory analysis cited in the Availability of Documents section of this notice.

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I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID NRC-2011-0012 when contacting the NRC about the availability of information for this action. You may obtain publicly available information related to this action by any of the following methods:

- **Federal Rulemaking website:** Go to <https://www.regulations.gov> and search for Docket ID NRC-2011-0012.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly available documents online in the ADAMS Public Documents collection at <https://www.nrc.gov/reading-rm/adams.html>. To begin the

search, select “Begin Web-based ADAMS Search.” For problems with ADAMS, please contact the NRC’s Public Document Room (PDR) reference staff at 1-800-397-4209, at 301-415-4737, or by email to PDR.Resource@nrc.gov. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in the “Availability of Documents” section.

- **NRC’s PDR:** The PDR, where you may examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time, Monday through Friday, except Federal holidays.

B. Submitting Comments

The NRC encourages electronic comment submission through the **Federal Rulemaking website** (<https://www.regulations.gov>). Please include Docket ID **NRC-2011-0012** in your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at <https://www.regulations.gov> as well as enter the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

II. Background

A. Existing Regulatory Framework

i. NRC Regulation of LLW

The NRC's licensing requirements for the land disposal of LLW can be found in 10 CFR part 61. The NRC originally promulgated 10 CFR part 61 on December 27, 1982 (47 FR 57446).

The purpose of LLW disposal is to isolate and contain the waste while it remains hazardous. The LLW disposal requirements emphasize a diversity of systems to achieve safety from the disposal of commercial LLW, including site selection, land disposal facility design and operation, LLW characteristics, and site closure. To limit reliance on institutional controls, 10 CFR part 61 emphasizes passive features (e.g., site stability, favorable site characteristics, low-population density) rather than active systems to limit contact with and releases of LLW to the environment. This approach is similar to the defense-in-depth concept used for the NRC's nuclear reactor safety design and licensing regulations. While defense-in-depth was not explicitly discussed in the original 10 CFR part 61 regulations, the regulations do provide for defense-in-depth. Some examples include requiring that the disposal site design complement and improve upon the ability of the site's natural characteristics to ensure the performance objectives will be met; imposing concentration limits on waste that presents a higher hazard through the waste classification requirements; requiring the segregation of unstable waste from waste that should be stable for proper disposal; imposing requirements on wasteform and packaging characteristics; and requiring the use of intrusion barriers for wastes that will

not decay to levels that represent an acceptable impact should an inadvertent intruder contact the waste within 100 years.

Subparts of 10 CFR part 61 cover general provisions and procedural licensing matters; performance objectives; technical requirements for near-surface disposal; financial assurance; State and Tribal participation; and records, tests, and inspections. The regulations cover all phases of near-surface commercial LLW disposal from site selection through facility design, licensing, operations, site closure, postclosure stabilization, and the end of active institutional controls. The overall philosophy that underlies the regulatory requirements of 10 CFR part 61 is provided in § 61.7, “Concepts.”

Some of the existing provisions proposed to be updated in 10 CFR part 61 include:

- Standards for: 1) general requirements for land disposal facilities in § 61.40, “General requirement;” 2) protection of the general population in § 61.41, “Protection of the general population from the releases of radioactivity;” 3) protection of an inadvertent intruder in § 61.42, “Protection of individuals from inadvertent intrusion;” 4) protection of individuals during land disposal facility operations in § 61.43, “Protection of individuals during operations;” and 5) site stability in § 61.44, “Stability of disposal site after closure.”

These standards are collectively known as the “Performance Objectives” in subpart C of 10 CFR part 61.

- Specification of the minimum geologic, hydrologic, and geomorphic characteristics for an acceptable near-surface LLW disposal site in § 61.50, “Disposal site suitability requirements for land disposal.”

- An LLW classification system (LLW being categorized as Class A, Class B, Class C, and GTCC) for commercial LLW in § 61.55, “Waste classification,” based on the concentrations of certain radionuclides prescribed for each class.
- Specification of the LLW characteristics, in § 61.56, “Waste characteristics,” that commercial LLW must meet to be acceptable for disposal.
- Requirements for disposal site landowner or custodial agents oversight in the form of institutional controls of LLW disposal facilities, in § 61.59, “Institutional requirements,” for a period following site closure.

To grant a license, the NRC must conclude that there is reasonable assurance that the performance objectives in subpart C of part 61 will be met. To demonstrate that a licensee¹ will meet these performance objectives, 10 CFR part 61 licensees need to prepare the analyses required by § 61.13, “Technical analyses.”

To demonstrate that the general population is protected from releases of radioactivity, licensees are currently required to prepare an analysis of exposure pathways leading to potential radiological doses to the general population. The original 10 CFR part 61 did not impose a specific performance timeframe for use in the analysis to protect the general population, and there are analysis timeframe differences among the Agreement States that currently regulate the existing land disposal facilities. For

¹ Some radioactive material added to the AEA definition of byproduct material by Section 651(e) of the Energy Policy Act of 2005 has special status relating to its disposal at NRC or Agreement State licensed LLW disposal facilities. These “11e.(3) and (4) byproduct materials” include certain discrete sources of radium-226 (11e.(3)(A)), radioactive material resulting from operation of an [accelerator](#) (11e.(3)(B)), and certain other “discrete source[s] of naturally occurring radioactive material, other than source material” (11.e(4)). Per AEA Sections 81b. and c., 11e.(3) and (4) byproduct materials intended for disposal are not considered LLW under the Low Level Waste Policy Act but may nevertheless be disposed of at near surface [LLW](#) disposal facilities. In addition, AEA Section 81c. ensures that 11e.(3) and (4) byproduct material may also be disposed of at hazardous waste facilities.

example, one Agreement State has required licensees to analyze the land disposal facility for 500 years,² while another has required analyses to the peak dose (in practice this was 1,000,000 years).

The existing framework also requires that licensees demonstrate that potential inadvertent intruders into the LLW disposal site will be protected. Inadvertent intruders might occupy the disposal site after closure of the land disposal facility and may not be aware of the radiation hazard from the buried LLW. Disposal site landowners or custodial agents are required to carry out an institutional control program that ensures that no such occupation or improper use of the site occurs. However, the NRC recognizes that institutional controls may not be effective for long periods of time and only permits licensees to take credit for institutional controls in their technical analyses for up to 100 years following closure and transfer of control of the disposal site to the owner, even if a longer institutional control program is required by the regulator. Under the existing regulations, protection of inadvertent intruders is demonstrated by compliance with the LLW classification (§ 61.55) and segregation requirements (§ 61.52, “Land disposal facility operation and disposal site closure”), and by providing adequate barriers to inadvertent intrusion.

The NRC developed the LLW classification requirements as part of the original 10 CFR part 61 rulemaking. Explicit dose limits for an inadvertent intruder were not provided in the original 10 CFR part 61 because an inadvertent intruder dose assessment was not required, but the LLW classification concentration limits for radionuclides, in tables 1 and 2 of § 61.55, were based on an annual dose of 5

² The Agreement State required 500 years because the waste was limited to Class A and the groundwater was not potable.

milliSievert (mSv) (500 millirems (mrem)) to a hypothetical inadvertent intruder.³ The LLW classification tables were developed assuming that only a fraction of the LLW being disposed would approach the LLW classification limits. The 10 CFR part 61 LLW classification system remains protective of inadvertent intruders for the LLW streams that were analyzed in the development of the regulations because the analysis used to develop that system is conservative in nature. In a theoretical scenario under the current regulations, if an inadvertent intruder is exposed to a large volume of disposed LLW near or at the classification limits, protection of an inadvertent intruder may not be assured. To address this issue, the new inadvertent intruder assessment would require licensees to analyze the LLW disposed at each site in accordance with the site-specific WAC to demonstrate that the annual dose limit of 5 mSv (500 mrem) to the inadvertent intruder is not exceeded.

ii. Low-Level Radioactive Waste Classification System

The NRC developed 10 CFR part 61 based on assumptions regarding the types of LLW likely to go into a commercial land disposal facility at the time the original rule was promulgated in 1982. These assumptions were based on a survey of LLW generators, and the results were published in NUREG-0945, Volumes 1 through 3, "Final Environmental Impact Statement on 10 CFR Part 61, 'Licensing Requirements for Land Disposal of Radioactive Waste.'" The results of this survey ultimately formed the regulatory basis for the source terms used in the analysis to define the allowable isotopic concentration limits in tables 1 and 2 of § 61.55 that established three classes of LLW (Class A, Class B, Class C) and criteria for GTCC. Table 1 of § 61.55 provides limiting

³ The original analyses used organ dose limits with different values prescribed for different organs. The whole-body dose was 5 mSv (500 mrem).

concentrations for long-lived radionuclides, and table 2 of § 61.55 provides limiting concentrations for short-lived radionuclides. Class A LLW is the least hazardous to the inadvertent intruder and requires the fewest controls, while Class C LLW is more hazardous and requires additional controls. As the LLW class increases in hazard, greater controls (e.g., protection for a longer period of time or greater burial depth) are required to reduce the risk from disposal of the LLW. For example, Class C LLW may require either greater burial depth (e.g., 5 meters (m) (16 feet (ft))) or an engineered barrier that will deter inadvertent intrusion for 500 years while GTCC LLW disposal requires both a greater burial depth and an intruder barrier to deter inadvertent intrusion for 500 years because it poses a greater hazard than Class C waste.

As part of the original 10 CFR part 61 rulemaking, the NRC considered inadvertent intrusion receptor scenarios and the physical stability and isotopic concentration of the LLW. These isotopic concentration limits were based on the NRC's understanding of the characteristics and volumes of commercial LLW reasonably expected for commercial disposal through the year 2000, as well as the disposal methods likely to be used.

In the statement of considerations (47 FR 57446; December 27, 1982) for the final rule for the original 10 CFR part 61, the Commission noted:

[W]aste that is stable for a long period helps to ensure the long-term stability of the site, eliminating the need for active maintenance after the site is closed. This stability [requirement] helps to assure against water infiltration caused by failure of the disposal covers and, with the improved leaching properties implicit in a stable waste form, minimizes the potential for radionuclide migration in groundwater. Stability also plays an important role in protecting an inadvertent intruder, since the stable waste form is recognizable for a long period of time and minimizes any effects from dispersion of the waste upon intrusion.

The Commission also noted that to the extent practicable, wasteforms or containers should be designed to maintain gross physical properties and identity over 300 years, approximately the time required for Class B waste to decay to acceptable levels.

Finally, appendix G, “Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests” (60 FR 15664; March 27, 1995), to 10 CFR part 20, “Standards for Protection Against Radiation,” imposes manifest requirements on shipments of LLW consigned for disposal. Manifests for LLW shipments must identify the LLW classification and provide a certification that the LLW is properly classified, described, packaged, marked, and labeled.

iii. The Role of Agreement States in the Regulation of LLW Disposal

Section 274 of the AEA, “Cooperation with States” provides an option for States to regulate certain radioactive materials. Section 274b authorizes the NRC to enter into an agreement with the Governor of a State whereby the NRC discontinues its regulatory authority over certain material, and the State assumes that authority (thus becoming an “Agreement State”). Agreement States can assume authority from the NRC for one or more of the following categories of materials within the State: 1) byproduct materials; 2) source materials; and 3) special nuclear material (SNM) in quantities not sufficient to form a critical mass.

Currently, there are four operating LLW disposal facilities, and all are located in and licensed by Agreement States: EnergySolutions in Clive, Utah; U.S. Ecology, Inc. in Richland, Washington; Waste Control Specialists LLC in Andrews, Texas; and Energy Solutions in Barnwell, South Carolina. In accordance with the continued adequacy and

compatibility provisions of Section 274j of the AEA, these Agreement States adopt 10 CFR part 61 into their LLW regulatory programs. In addition, all Agreement States adopt those 10 CFR part 61 regulations that have basic radiation protection and transboundary implications because LLW is generated in all States.

iv. The Role of the Department of Energy in the Regulation of GTCC and GTCC-like Waste

As previously discussed, the NRC established three classes of LLW (Class A, Class B, Class C) and criteria for GTCC. The regulation at 10 CFR 61.55(a)(2)(iv) prescribes that disposal in a deep geologic repository is the default disposal path for GTCC waste, although it allows for alternate disposal procedures that are approved by the Commission. As presented within the draft regulatory basis, the NRC has determined that most GTCC waste streams are potentially suitable for near-surface disposal and have been determined to be not so hazardous (AEA Section 274c.(4)) that their disposal requires exclusive federal jurisdiction from a safety or security perspective. Therefore, near-surface disposal of most GTCC waste streams may be eligible for regulation by an Agreement State. Further, disposal of GTCC waste that requires deep geological disposal would remain within the NRC's exclusive jurisdiction to license a deep geologic repository for high-level waste.

Section 3(b)(1) of the Low-Level Radioactive Waste Policy Amendments Acts of 1985 (LLRWPA) designates the disposal of certain federally owned or generated LLW and all GTCC waste (as defined by the version of 10 CFR 61.55 in effect on January 26, 1983) as a Federal responsibility.⁴ Section 3(b)(3) of the LLRWPA requires the DOE to

⁴ 42 U.S.C. § 2021c(b)(1).

submit to Congress a comprehensive report with recommendations ensuring the safe disposal of all GTCC waste no later than 1 year after its enactment.⁵ In February 1987, the DOE completed this action by issuing a report to Congress entitled, “Recommendations for Management Greater-Than-Class C Low-Level Radioactive Waste, DOE/NE-0077.” In the 1987 report, DOE acknowledged its responsibility for the disposal of commercially generated GTCC waste, as described in Section 3(b)(1)(D) of the LLRWPA.⁶

Section 631 of the Energy Policy Act of 2005 prescribed further requirements for the DOE regarding the development of a GTCC waste disposal program, including the designation of an entity within the DOE that would be responsible for completing activities to provide a facility for safely disposing of all GTCC waste; to prepare a report containing a cost estimate and schedule for the preparation of an environmental impact statement and record of decision for a permanent disposal facility for GTCC waste; to submit to Congress a report describing all alternatives under consideration for the safe disposal of GTCC waste; and to await action by Congress before making a final decision on the GTCC waste disposal alternative or alternatives to be implemented.⁷ In response to the directions in the Energy Policy Act, the DOE published in 2011 its “Draft Environmental Impact Statement [EIS] for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste and GTCC-Like Waste,” which considered the potential

⁵ 42 U.S.C. § 2021c(b)(3).

⁶ DOE/NE-0077, “Recommendations for Management of Greater-Than-Class-C Low-Level Radioactive Waste,” Report to Congress in Response to Public Law 99-240, February 1987, <https://www.energy.gov/sites/prod/files/2018/09/f55/GTCC-1987-Report-to-Congress-DOE-NE-0077.pdf>.

⁷ Pub. L. No. 109-58, § 631, 119 Stat. 594, 788.

environmental impacts associated with using an existing facility or constructing and operating a new facility or facilities for the disposal of GTCC waste.⁸

On February 25, 2016, the DOE issued its “Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste” (FEIS).⁹ The DOE’s FEIS used the term “GTCC-like,” and provided the following explanation:

Consistent with NRC’s and DOE’s authorities under the Atomic Energy Act of 1954, amended (P.L. 83-703), the NRC LLW classification system does not apply to radioactive wastes generated or owned by DOE and disposed of in DOE facilities. However, DOE owns or generates both LLW and non-defense-generated transuranic (TRU) radioactive waste,¹⁰ which have characteristics similar to those of GTCC LLW and for which there may be no path for disposal at the present time. DOE has included these wastes, otherwise known as “GTCC-like waste,” for evaluation in this EIS because their disposal requirements may be similar to those for GTCC LLW, such that a common approach and/or facility could be used for these wastes. The use of the term “GTCC-like” is not intended to and does not create a new DOE classification of radioactive waste.¹¹

In the FEIS, the DOE stated that its preferred alternative for the disposal of GTCC waste is disposal in the DOE’s Waste Isolation Pilot Plant (WIPP) geologic repository near Carlsbad, New Mexico, and/or land disposal at generic commercial

⁸ “Draft Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste” (DOE/EIS-0375-D) (February 2011). A copy of the document is available online at

https://www.energy.gov/sites/prod/files/2015/10/f27/GTCC_EIS_February2011_Summary.pdf.

⁹ “Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste” (DOE/EIS-0375) (January 2016). A copy of the document is available online at <https://www.energy.gov/nepa/downloads/eis-0375-final-environmental-impact-statement>.

¹⁰ Defense-generated TRU waste is radioactive waste generated by atomic energy defense activities. Atomic energy defense activity, as defined by the Nuclear Waste Policy Act of 1982, as amended, means any activity of the Secretary of Energy performed in whole or in part in carrying out any of the following functions: naval reactors development; weapons activities including defense inertial confinement fusion; verification and control technology; defense nuclear materials production; defense nuclear waste and materials byproducts management; defense nuclear materials security and safeguards and security investigations; and defense research and development. TRU waste that is not generated by atomic energy defense activities is considered non-defense-generated TRU.

¹¹ DOE/EIS-0375, pages 1-1 and 1-2.

facilities.¹² Currently, WIPP is only authorized to accept defense generated TRU waste pursuant to the Waste Isolation Pilot Plant Land Withdrawal Act.¹³ Unless there is a legislative change, GTCC waste disposal at WIPP is not an option. Currently the NRC has no regulatory role over LLW disposal at WIPP. The NRC draft regulatory basis, issued in 2019, addressed GTCC waste disposal in a commercially licensed near-surface disposal facility.

In its November 2017 report to Congress, the DOE stated that GTCC-like waste has no identified path to disposal.¹⁴ In its previous *Federal Register* notice that announced the availability of the FEIS, the DOE made a similar statement, namely, there may be no path to disposal for GTCC-like waste and further noted that the NRC LLW waste classification system in 10 CFR 61.55 does not apply to radioactive waste generated or owned by the DOE and disposed of in DOE facilities.¹⁵

The NRC understands the DOE statements that there may be no path, or no identified path, to disposal for GTCC-like waste as meaning that there is no disposal facility, either federal or commercial, that currently possesses the requisite WAC to allow it to accept GTCC-like waste. From a statutory perspective, the DOE has the requisite authority under the AEA¹⁶ to dispose of GTCC-like waste in either a federal or commercial land disposal facility, provided that the facility has the requisite WAC. In the case of an Agreement State licensed facility, promulgation of an NRC rulemaking or other express approval by the Commission authorizing the near-surface disposal of GTCC waste, as well as satisfaction of the requirements of Section 274 of the AEA,

¹² DOE/EIS-0375, page 2-69.

¹³ Pub. L. No. 102-579, 106 Stat. 4777, as amended by the Waste Isolation Pilot Plant Land Withdrawal Amendment Act, Pub. L. No. 104-201, §§ 3181 *et seq.*, 110 Stat. 2851.

¹⁴ DOE Report to Congress, § II, p. 2.

¹⁵ 81 FR 11550; March 4, 2016.

¹⁶ 42 U.S.C. §§ 2201.

would be a necessary prerequisite for an Agreement State licensed facility to accept GTCC and GTCC-like waste for disposal.

Accordingly, this proposed rule would address near-surface disposal requirements for GTCC waste. As GTCC-like waste is similar in characteristics to those of GTCC LLW, as mentioned in its FEIS, the DOE stated it also intends to determine a path to disposal that is similarly protective of public health and safety for GTCC-like waste that it owns or generates.¹⁷ The NRC further notes that any disposal by the DOE of GTCC-like waste in a commercial facility licensed by an Agreement State would be subject to the requirements in subparagraph 4(b)(1)(B) of the LLRWPA, which state that the low-level radioactive waste owned or generated by the Federal Government that is disposed of at a regional disposal facility or non-federal disposal facility within a State that is not a member of a compact shall be subject to the same conditions, regulations, requirements, fees, taxes, and surcharges imposed by the compact commission, and by the State in which such facility is located, in the same manner and to the same extent as any low-level radioactive waste not generated by the Federal Government.¹⁸

The material would need to meet NRC or Agreement State requirements when an NRC or Agreement State licensee assumes responsibility for management of the material under their NRC or Agreement State license, that typically would occur when the licensee accepts the shipment of material for disposal. At that point in time, NRC or Agreement State regulations would apply and, if the material meets the criteria for GTCC waste, it would be subject to the requirements for GTCC waste disposal. Therefore, in this rulemaking, the NRC does not distinguish between GTCC and GTCC-like waste.

¹⁷ DOE/EIS-0375, page 1-2.

¹⁸ 42 U.S.C. § 2021d(b)(1)(B).

B. Previous Rulemaking Activities

This proposed rule was predated by two Commission-directed activities related to 10 CFR part 61: low-level radioactive waste disposal and disposal of GTCC and transuranic waste.

i. Low-Level Radioactive Waste Disposal

On July 18, 2013, the NRC staff submitted SECY-13-0075, "Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN-3150-AI92)," to the Commission with a proposed rule to amend 10 CFR part 61. The NRC staff explained that the potential for LLW streams to differ significantly in quantity and concentration from that initially considered by the 10 CFR part 61 regulations warranted an update to the overall regulatory framework to ensure the protection of the public health and safety. These waste streams include depleted uranium and blended LLW streams (mixed LLW with different concentrations of radionuclides) in quantities greater than previously expected. In addition, new technologies, such as advanced reactors, might result in the generation of different LLW streams that have not previously been considered.

In SRM-SECY-13-0075, dated February 12, 2014, the Commission approved publication of that proposed rule. The NRC published the proposed rule in the *Federal Register* on March 26, 2015 (80 FR 16081), with a public comment period of 120 days. At the request of stakeholders, the public comment period was reopened from August 27, 2015, to September 21, 2015 (80 FR 51964; August 27, 2015).

During the comment period, the NRC held six public meetings and a webinar to facilitate understanding of the proposed rule and to collect stakeholder comments. The NRC received 2,400 commenter letters (including approximately 2,300 form letters) representing individuals, public interest groups, Tribal Governments, industry groups,

licensees, and State and Federal agencies. The comments represented a wide variety of viewpoints. As a result of the comments, the NRC staff made significant changes in the draft final rule. The NRC staff also had numerous interactions with the Advisory Committee on Reactor Safeguards (ACRS), Radiation Protection and Nuclear Materials Subcommittee and full committee, before and after publication of the proposed rule. Summaries and transcripts of these meetings can be found at the ACRS website, <https://www.nrc.gov/reading-rm/doc-collections/acrs/agenda/index.html>.

In SECY-16-0106, “Final Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN 3150-AI92),” dated September 15, 2016, the NRC staff submitted a draft final 10 CFR part 61 rule to the Commission. Enclosure 1 to SECY-16-0106 contains NRC responses to the public comments received on that proposed rule. In SRM-SECY-16-0106, dated September 8, 2017, the Commission directed the staff to revise the draft final rule and to publish it as a supplemental proposed rule for a 90-day public comment period.

ii. Disposal of Greater-Than-Class C and Transuranic Waste Regulatory Basis

In September 2014, the Commission directed the staff to provide a historical perspective on GTCC waste disposal in SRM-M140918, “Staff Requirements—Briefing on Management of Low-Level Waste, High-Level Waste, and Spent Nuclear Fuel, 9:00 A.M., Thursday, September 18, 2014, Commissioners’ Conference Room, One White Flint North, Rockville, Maryland (Open to Public Attendance).” Following the September 2014 Commission direction, on January 30, 2015, the Texas Commission on Environmental Quality (TCEQ) submitted a letter to the NRC staff regarding whether the State of Texas had authority to regulate the disposal of GTCC waste. In response to the Commission’s direction and TCEQ’s letter, the staff submitted SECY-15-0094, dated

July 17, 2015, to provide the Commission with a historical perspective on the disposal of GTCC waste and to seek Commission approval of the staff's recommendation to allow the State of Texas to license the disposal of GTCC waste.

In SRM-SECY-15-0094, dated December 22, 2015, the Commission directed the NRC staff to prepare a regulatory basis for the disposal of GTCC waste through means other than deep geologic disposal, including near-surface disposal, and to provide the regulatory basis to the Commission for information within 6 months of completing the 10 CFR part 61 rule. The Commission further directed that the regulatory basis should analyze whether, in accordance with Section 274c.(4) of the AEA, the disposal of GTCC waste presents a hazard such that the NRC should retain authority over its disposal. The Commission directed that, if the staff concluded that some or all GTCC waste is potentially suitable for near-surface disposal, the staff should then proceed to develop a proposed rule to include disposal criteria for licensing the disposal of such waste under 10 CFR part 61. In addition, the Commission approved the staff's recommendation to address transuranic waste disposal in the definition of "waste" in 10 CFR 61.2.

On October 23, 2018, in SRM-M181011, the Commission directed staff to decouple, to the extent practicable, the issuance of the draft GTCC waste regulatory basis directed in SRM-SECY-15-0094 from Commission action on the 10 CFR part 61 rulemaking to allow for earlier public engagement on staff's analysis of potential regulatory barriers to the disposal of GTCC waste.

A draft regulatory basis, "Disposal of Greater-Than-Class C (GTCC) and Transuranic Waste," was issued for public comment on July 22, 2019 (84 FR 35037). On August 22, 2019, the staff held a public webinar, followed by a public workshop on August 27, 2019, in Austin, Texas, to facilitate stakeholder engagement. The comment period, originally scheduled to end on September 20, 2019, was extended to November

19, 2019 (84 FR 48309; September 13, 2019), because of stakeholder requests. The NRC staff concluded in its regulatory basis that most of the GTCC waste streams are potentially suitable for near-surface disposal (i.e., approximately 80 percent of the total volume of all GTCC waste), provided appropriate controls are implemented and a sufficient site-specific analysis is conducted to ensure protection to inadvertent intruders and offsite individuals. Site-specific analyses and refinement in the waste stream inventories could also result in a differing quantity of GTCC waste potentially acceptable for near-surface disposal than was determined in NRC's generic analysis. Additionally, the staff determined that most GTCC waste could be safely regulated by an Agreement State (i.e., approximately 75 percent of the total volume of all GTCC waste).

The public comment documents on the regulatory basis are available for review in <https://www.regulations.gov> under Docket ID NRC-2017-0081. As stated in the *Federal Register* notice that issued the regulatory basis, the NRC did not provide formal written responses to each of the comments received on the draft regulatory basis. However, the NRC reviewed the comments in each submission, grouped the comments by category, and developed a summary of and responses to the comments. A brief overview of the categorization of the comments on the GTCC regulatory basis and how they informed the proposed rule follows.

The NRC received over 70 individual comment submissions from members of the public, environmental groups, industry stakeholders, a Tribal nation, various State agencies, and the DOE, and approximately 7,000 form letters from environmental groups. Specific concerns included: the role of generic versus site-specific analyses in determining the safety of near-surface disposal of GTCC waste; the compliance period for long-lived radioactive waste; the role of Agreement States in the licensing of disposal of GTCC waste; protection of the inadvertent intruder; and characteristics of GTCC

waste that could impact operational safety (e.g., criticality controls). This proposed rule and the document summarizing the responses to comments provides further discussion of these concerns and describes the proposed regulatory requirements that address these concerns, and in certain cases identifies where additional guidance has been developed by the NRC.

C. Integration of the Rulemakings

On October 21, 2020, the NRC staff submitted SECY-20-0098, “Path Forward and Recommendations for Certain Low-Level Radioactive Waste Disposal Rulemakings,” to the Commission. In the paper, the staff recommended that the two Commission-directed rulemaking activities that could result in amendments to 10 CFR part 61 (Low-Level Radioactive Waste Disposal draft final rule and the GTCC waste draft regulatory basis) be consolidated and integrated into one proposed rule based on overlapping technical requirements, expected cost savings, consideration of stakeholder input, and efficiencies. In SRM-SECY-20-0098, “Staff Requirements—SECY-20-0098—Path Forward and Recommendations for Certain Low-Level Radioactive Waste Disposal Rulemakings,” dated April 5, 2022, the Commission approved the staff’s recommendation to issue a new proposed rule that consolidates and integrates criteria for licensing and disposal of GTCC waste and 10 CFR part 61 rulemaking activities.

D. Public Interactions During Proposed Rule Development

The NRC conducted several outreach activities with stakeholders during the development of the proposed rule. These activities included holding a public meeting to share preliminary proposed rule concepts and to receive public feedback. These interactions also included discussions on the draft proposed rule guidance. The following

table provides a list of the stakeholder interactions conducted during the proposed rule development.

Meeting	Date(s)	Location
National Conference of Radiation Control Program Directors (CRCPD)	May 16 -19, 2022	Tucson, AZ
LLW Forum Fall Meeting	October 12, 2022	Baltimore, MD
Agreement State LLW Workshop	October 19, 2022	Salt Lake City, UT
Fuel Facilities Stakeholder Fall Meeting	October 19, 2022	Rockville, MD
Waste Management Symposium Meeting	February 26- March 2, 2023	Phoenix, AZ
NRC Regulatory Information Conference	March 14-16, 2023	Rockville, MD
Organization of Agreement States (OAS) /CRCPD Monthly Call	monthly	virtual
LLW Forum Spring Meeting	March 22-23 2023	Charleston, SC
Fuel Facilities Stakeholder Spring Meeting	May 3, 2023	Rockville, MD
CRCPD National Conference on Radiation Control	May 11, 2023	Houston, TX
Integrated LLW Rulemaking Public Meeting	May 17, 2023	virtual
State Liaison Officers Annual Conference	June 8, 2023	Rockville, MD
Performance and Risk Assessment Community of Practice Webinar	July 13, 2023	virtual
Oregon Health Authority Radiation Protection Services meeting with Oregon Dept. of Energy	July 17, 2023	virtual
EPRI International Low- and Intermediate-Level Waste Conference	July 26-28, 2023	Nashville, TN
OAS Annual Meeting	August 7-10, 2023	Seattle, WA
LLW Forum Fall Meeting	October 3-4, 2023	Salt Lake City, UT
International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability	November 6-10, 2023	Vienna, Austria
Advisory Committee on Reactor Safeguards Subcommittee Meeting	December 6, 2023	Rockville, MD and virtual
Integrated LLW Rulemaking Public Meeting	January 23, 2024	virtual
Advisory Committee on Reactor Safeguards Full Committee Meeting	February 7, 2024	Rockville, MD and virtual

Waste Management Symposium Meeting	March 10-14, 2024	Phoenix, AZ
LLW Forum Spring Meeting	April 3-4, 2024	Orlando, FL

III. Discussion

A. Objectives of this Proposed Rule

This proposed rule would amend 10 CFR part 61 to require new and revised site-specific technical analyses and other requirements that will permit the development of site-specific waste acceptance criteria (WAC) based on the results of these analyses. These amendments would also better align the requirements with current health and safety standards (i.e., 10 CFR part 20). Additionally, this proposed rule would amend 10 CFR part 61 to allow for the near-surface disposal of Greater-Than-Class C (GTCC) waste streams and provide specific regulatory requirements for disposal, including radiological protection requirements to protect individuals during the facility’s operational period and after the closure of the disposal facility, to protect the inadvertent intruder and offsite individuals. This proposed rule would also amend 10 CFR parts 20 and 61 to revise the definition of “waste” such that low-level radioactive waste (LLW) that is acceptable for disposal under 10 CFR part 61 no longer excludes “transuranic waste.” Lastly, this proposed rule would 1) amend 10 CFR part 150 to allow appropriate flexibility for Agreement State licensing and the control of special nuclear material (SNM) during operations, and 2) amend 10 CFR part 73 to exempt certain waste material at a near-surface disposal facility from the requirements for physical protection of SNM of low strategic significance.

B. Applicability

This proposed rule would apply to existing and future LLW disposal facilities that are regulated by the NRC or an Agreement State. Currently licensed LLW sites that do not plan to accept GTCC waste or significant quantities of long-lived radionuclides after the effective date of this rulemaking would not be required to comply with certain new regulations under a new provision in subpart A to 10 CFR part 61.

C. Technical Areas with Proposed Revisions to Requirements

This proposed rule would amend requirements in the following technical areas.

i. Inclusion of Transuranic Waste in the Definition of LLW

The NRC proposes to revise the definition of LLW to address transuranic waste, as directed in SRM-SECY-15-0094, and in accordance with revisions in the definition resulting from the Low-Level Radioactive Waste Policy Amendments Act of 1985. Specifically, the NRC proposes to delete the term “transuranic waste” from the second sentence of the “waste” definition paragraph in 10 CFR 20.1003 and 10 CFR 61.2, which currently excludes transuranic waste from what constitutes LLW. In the current regulation, transuranic waste is excluded from the definition of LLW while transuranic radionuclides are not. It is typical for LLW to contain transuranic radionuclides in limited concentrations and up to 100 nanocuries per gram (nCi/g) of transuranic radionuclides is permitted for disposal within the 10 CFR 61.55 limits. The proposed revision to the definition of LLW will allow the safety and suitability of the disposal of waste containing high concentrations of transuranic radionuclides to be assessed with site-specific technical analyses.

ii. Case-by-Case Application of New Requirements for Existing Licensees

As directed in SRM-SECY-16-0106, the NRC proposes to revise the existing language in 10 CFR 61.1 to add a new section 61.1(b) to allow currently licensed LLW facilities that do not plan to accept GTCC waste or significant quantities of long-lived radionuclides after the effective date of this rulemaking to continue to meet the existing 10 CFR part 61 requirements for several revised sections (§§ 61.13, 61.41, 61.42, and 61.58). Significant quantities of long-lived radionuclides are defined in the proposed rule to mean an amount (volume or mass) and concentration that could, if released, result in the performance objectives of the proposed rule not being met. The proposed changes would allow those LLW disposal facilities licensed prior to the effective date of this rulemaking and that do not plan to accept GTCC waste or significant quantities of long-lived radionuclides (e.g., depleted uranium greater than or equal to 10 metric tons) after the effective date of this rulemaking to not have to conform to the new requirements in this rulemaking for the sections previously identified. This proposed rule would add new paragraphs to §§ 61.13, 61.41, and 61.42 that duplicate the current 10 CFR part 61 regulations, with which licensees who meet the criteria in 10 CFR 61.1(b) must comply. Section 61.58 would be replaced with the new requirements. The remaining sections of the revised 10 CFR part 61 regulations would apply to licensees who meet the criteria in 10 CFR 61.1(b) (e.g., safety case upon application for license renewal or closure (10 CFR 61.27, 10 CFR 61.28) including describing defense-in-depth protections, periodic evaluations of the technical analyses (10 CFR 61.24)) because they are consistent with industry practice and provide transparency to the safety basis for all disposal sites.

All LLW disposal facilities initially licensed after the effective date of this rulemaking would be required to meet the new requirements, regardless of the quantities of long-lived radionuclides that they plan to accept for disposal. Those LLW land disposal facilities already licensed prior to the effective date of this rulemaking that plan

to accept GTCC waste or significant quantities of long-lived radionuclides after the effective date of this rulemaking would continue meeting the current 10 CFR part 61 requirements 1) until their license is revised to allow the disposal of GTCC waste or significant quantities of long-lived radionuclides, or 2) upon application for license renewal (§ 61.27), site closure (§ 61.28), or updates required under (§ 61.24).

However, because the NRC has applied an Agreement State Compatibility Category of “D” for 10 CFR 61.1, an Agreement State regulator can decide if it wants a compatible regulation and may require an existing licensee to adopt the new requirements regardless of the quantity of long-lived radionuclides being disposed of after the effective date of this rulemaking. In addition, an existing licensee who meets the criteria in § 61.1(b) may voluntarily choose to be regulated under the new requirements upon approval from the Agreement State regulator.

iii. Site-Specific, Graded Approach to Compliance Period

Consistent with SRM-SECY-20-0098, in this proposed rule the NRC considered establishing a site-specific, graded approach based on when the peak dose is projected to occur or establishing a longer compliance period for disposal sites containing significant quantities of mobile, long-lived radionuclides.

Currently, § 61.7 discusses several timeframes that a licensee should consider when selecting a site, designing stable wastefoms or containers, controlling access to the land disposal facility, and developing intruder barriers. The timeframes discussed were provided within the context of an LLW management system that ensures that LLW decays to safe levels prior to public exposure to radiation. The quantities of LLW containing long-lived radionuclides intended to be disposed at a near-surface land

disposal facility were expected to be restricted by the concentration limits provided in the regulation, thereby limiting potential exposures.

The current regulations in 10 CFR part 61 do not provide a specific time period to demonstrate compliance with the performance objectives. The original regulatory basis for 10 CFR part 61 and the related guidance in NUREG-1573, "A Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities: Recommendations of NRC's Performance Assessment Working Group," recognized the need to use an analysis timeframe commensurate with the persistence of the hazard of the source. In selecting an analysis timeframe, the general practice is to consider the characteristics of the LLW, the analysis framework (e.g., assumed scenarios, receptors, and pathways), societal uncertainties, and uncertainty in predicting the behavior of natural systems over time. Typically, both technical factors (e.g., the characteristics and persistence of the radiological hazard attributed to the LLW) and socioeconomic factors (e.g., transgenerational equity) are considered. The purpose of analyzing a land disposal facility is to provide reasonable assurance that adequate protection of public health and safety will be achieved while the hazard exists. To achieve that purpose, the analyses must ensure acceptable performance of the land disposal facility.

The NRC evaluated approaches used by other countries and international agencies for managing the radiological risks from the disposal of LLW containing long-lived radionuclides. Some organizations impose a requirement to identify impacts from the disposal of LLW containing long-lived radionuclides using technical analyses. Results of the analyses are used to impose appropriate restrictions on LLW disposal, if necessary. Almost every country that the NRC considered places restrictions on how much LLW can be disposed in the near-surface environment or does not allow near-surface disposal of LLW containing long-lived radionuclides. Most countries place

explicit numerical limits on concentrations of LLW containing long-lived alpha-emitting radionuclides. Mostly these concentration limits are set by regulators based on generic technical analyses or policy decisions rather than on the results of site-specific technical analyses. Technical analyses are performed, but only for LLW that satisfies the generic limits. This approach is very similar to what was done for the initial development of the original 10 CFR part 61. The original requirements in 10 CFR part 61 supplemented technical analyses with LLW concentration limits and other disposal requirements, such as minimum disposal depth for certain types of LLW. However, regulating multiple land disposal facilities using generic technical analyses means that the concentration limits must be based on the most limiting conditions across the various sites to ensure protection of public health and safety.

Other countries have used regulatory approaches that vary considerably in the methodology used to achieve protection of future generations from the disposal of LLW. However, countries and international safety organizations consistently apply limiting conditions on the near-surface disposal of LLW (e.g., prohibit disposal, or impose concentration limits, disposal depth requirements, flux limits, or requiring development of long-term analyses). Very limited amounts and concentrations of uranium-bearing wastes have been disposed internationally. Technical analyses are used by licensees, applicants, and regulators domestically and internationally to understand how a land disposal facility, together with the general environment, may perform and include the potential impacts of uncertainties on public health and safety. The many sources of uncertainty associated with projecting the future radiological risks from disposal of LLW include, but are not limited to, natural, engineered, and societal sources. The NRC's selection of analyses timeframes for the evaluation of the disposal of LLW in this

proposed rule considers the different sources of uncertainty and how the uncertainties may impact projected future radiological risk.

Under the proposed regulations, upon application for license renewal (§ 61.27) or site closure (§ 61.28), or upon updates required under (§ 61.24) if an existing licensee can demonstrate to their regulator that they will not be disposing a significant quantity of long-lived radionuclides, then the licensee would only be required to complete a performance assessment and inadvertent intruder assessment to 1,000 years. The 1,000-year compliance period for less than significant quantities of long-lived radionuclides is sufficient because the amount of radioactivity disposed would be insufficient to cause impacts exceeding the performance objectives regardless if these impacts are delayed more than 1,000 years by engineered or natural systems, as the majority of the hazard would decay. Therefore, the 1,000-year analyses will capture the peak risks from the facility.

One of the factors underlying this rulemaking is the unique radiological characteristics of depleted uranium when compared to traditional LLW. Depleted uranium is very long-lived, and there is a substantial quantity of depleted uranium that is being considered for disposal in commercial land disposal facilities. In addition, the hazard of depleted uranium increases over very long periods of time because of the slow decay of uranium and the in-growth of progeny. The time at which the concentration of radionuclides in the LLW is within one order of magnitude of the peak concentration is sensitive to the assumed isotopic mass fractions in the initial LLW. For depleted uranium, this time is approximately 10,000 years or longer. Accordingly, a compliance period of 1,000 years is not likely to sufficiently capture the decay and ingrowth characteristics of significant quantities of depleted uranium. Therefore, land disposal facilities that dispose of significant quantities of depleted uranium (or other long-lived

radionuclides) would be required to use a compliance period of 10,000 years rather than 1,000 years.

Further, the NRC's approach to analyses timeframes is suitable because, in addition to the 10,000-year compliance period, licensees must also complete performance period analyses for depleted uranium and other long-lived radionuclides to understand and reduce to the extent reasonably achievable future doses resulting from the disposal of the long-lived radionuclides after 10,000 years. This approach is comparable to optimization discussed by different international organizations. This proposed rule balances differing views associated with how impacts over very long time periods should be evaluated by having a maximum 10,000-year compliance period, followed by performance period analyses beyond 10,000 years, when significant quantities of long-lived radionuclides would be disposed.

This proposed rule would implement a site-specific, graded approach for the compliance period:

1) For currently licensed land disposal facilities that do not plan to accept significant quantities of long-lived radionuclides after the effective date of this rulemaking, licensees would be required to complete a performance assessment using a compliance period of 1,000 years and use a 0.25 mSv (25 mrem) annual dose limit for the protection of the general population. Similarly, licensees would be required to complete an inadvertent intruder assessment with a 5 mSv (500 mrem) annual dose limit and a 1,000-year compliance period. These licensees would not be required to complete any performance period analyses. As such, the revisions to the regulations would be expected to have minimal impact on these sites.

2) For land disposal sites, either currently licensed or future applicants that plan to dispose of LLW with significant quantities of long-lived radionuclides after the effective

date of this rulemaking, licensees or applicants would be required to complete a performance assessment using a compliance period of 10,000 years and an annual dose limit of 0.25 mSv (25 mrem) for the protection of the general population. Similarly, licensees or applicants would be required to complete an inadvertent intruder assessment with an annual dose limit of 5 mSv (500 mrem) for the 10,000-year compliance period. These licensees or applicants would also have to complete performance period analyses to understand and reduce, to the extent reasonably achievable, future doses resulting from the disposal of the long-lived radionuclides beyond 10,000 years.

This approach would ensure that public health and safety are protected and only imposes a regulatory burden upon licensees or applicants when it is necessary due to the risks associated with the LLW that is accepted for disposal. The licensee or applicant wishing to use a 1,000-year compliance period should voluntarily provide a technical rationale to its regulator (likely an Agreement State regulator) confirming that the disposal of LLW will not contain significant quantities of long-lived radionuclides such that the disposal would require a 10,000-year compliance period. A simple evaluation of the inventory can be used to demonstrate that the performance objectives would not be exceeded. Licensees or applicants may use the draft guidance in NUREG-2175, Revision 1, to determine significant quantities of long-lived radionuclides for their specific land disposal facilities. The development of the technical rationale would not be expected to be burdensome and if it becomes overly complex, the licensee should consider using the longer compliance period.

iv. New and Revised Technical Analyses

This proposed rule would require licensees or applicants to prepare technical analyses consistent with 10 CFR 61.13 to demonstrate that its land disposal facility and design meet the performance objectives. The current regulations require technical analyses; however, the NRC is amending 10 CFR 61.13 to provide additional details for analyses requirements (revising certain technical analyses) as well as requiring new analyses.

Under the proposed rule, licensees or applicants would be required to prepare the following as part of their technical analyses: a) a revised analysis, called a performance assessment, to demonstrate the protection of the general population from releases of radioactivity (§ 61.41); b) a new analysis¹⁹, called an inadvertent intruder assessment, to demonstrate the protection of inadvertent intruders (§ 61.42); c) an operational safety assessment to demonstrate the protection of individuals during operations (§ 61.43); d) performance period analyses for licensees or applicants using the 10,000-year compliance period to evaluate how the disposal system may mitigate the long-term risk from disposal of significant quantities of long-lived radionuclides in the LLW inventory (§§ 61.41(b) and 61.42(b)); and e) a site stability assessment to demonstrate the stability of the site after closure (§ 61.44).

Existing licensees would be expected to update their current technical analyses upon the next license renewal, before receiving new waste streams not analyzed in their current technical analyses, or as otherwise required by Agreement State regulations compatible with this proposed rule. Licensees who meet the criteria in 10 CFR 61.1(b) may choose to comply with the original part 61 regulations for technical analyses, which would be retained in 10 CFR 61.13(f). These licensees may also continue to use the

¹⁹ The analysis is new only from the standpoint that it was not required in the original regulations. This analysis has been performed for some U.S.-operating facilities and for many international facilities.

timeframes in their analyses deemed acceptable by the appropriate regulator prior to the revisions to 10 CFR part 61 in the proposed rule.

The proposed rule would require the technical analyses to be updated prior to site closure to provide assurance of compliance with the performance objectives. As set forth in the proposed 10 CFR 61.28, revisions to the technical analyses at site closure must consider the waste disposed during operations and reflect significant changes to the human activities occurring in and around the site. The proposed rule would also require that an application for site closure must include the total volume and mass of waste that was disposed as well as the total radioactivity in curies of each radionuclide that was disposed. The NRC has developed draft guidance in NUREG-2175, Revision 1, that would facilitate the development of information and analyses to support licensees in addressing the regulatory requirements.

Under the proposed rule, the licensee would be required to operate the land disposal facility in a manner consistent with the technical analyses. In addition, as set forth in the proposed 10 CFR 61.24, the licensee would evaluate whether updates to the technical analyses are warranted at a minimum of every 5 years, if significant changes have occurred at the site, or before receiving new waste streams not analyzed in the most recent approved technical analyses.

1) Performance Assessment

The first performance objective of subpart C of 10 CFR part 61, which provides protection of the general population from releases of radioactivity, would continue to be demonstrated with a technical analysis. The NRC proposes to rename this analysis in § 61.13(a) as a “performance assessment.” Under the proposed rule, a licensee would conduct a performance assessment to demonstrate the protection of the general

population from releases of radioactivity, thereby meeting the performance objective set forth in § 61.41. A performance assessment would evaluate the projected behavior of an LLW disposal site and the uncertainties in its projected behavior. The performance assessment would include the specific characteristics of the disposal site (e.g., hydrology, meteorology, geochemistry, biology, geomorphology) and degradation, deterioration, or alteration processes of the engineered barriers (including the waste form and container) and natural system. The performance assessment would also identify interactions between the disposal site characteristics and engineered barriers that might affect the performance of the LLW disposal site. The performance assessment would examine the effects of these processes and interactions on the ability of the LLW disposal site to limit releases and calculates the projected annual dose to a member of the public for comparison with the appropriate performance objective. The results of a performance assessment would assist in demonstrating that the general population is adequately protected from releases of radioactivity. The NRC proposes to revise its regulations to require the performance assessment to demonstrate compliance with the public dose limit of 0.25 mSv (25 mrem) required in 10 CFR 61.41 for the duration of the compliance period.

The dose limit would apply to a compliance period of 1,000 years after closure, or 10,000 years after closure if there are significant quantities of long-lived radionuclides in the LLW that will be disposed after the effective date of this rulemaking. The licensee or applicant would provide a technical rationale to its regulator to support the decision to use a 1,000-year compliance period. Should a 10,000-year compliance period be necessary, the licensee or applicant would also be required to conduct performance period analyses beyond 10,000 years to demonstrate that releases from the disposal site are reduced to the extent reasonably achievable. Draft guidance is provided in

NUREG-2175, Revision 1, that can be used to help determine what is a significant quantity of long-lived radionuclides.

Under the proposed rule, a licensee or applicant must evaluate: the interactions between the disposal site and engineered barriers that might affect performance of the disposal site; radionuclide transport characteristics of the waste; features, events, and processes that might affect demonstrating compliance with § 61.41; contaminant transport pathways and processes in environmental media; and uncertainties and variability in the projected performance of the disposal site and surrounding environment. In the performance assessment, a licensee or applicant would be required to use a dose methodology consistent with the dose methodology specified in the standards for radiation protection set forth in part 20 of this chapter. The weighting factors used in the calculation of the dose would be required to be consistent with the methodology used to perform the calculation.

2) Inadvertent Intruder Assessment

In 10 CFR part 61, the NRC recognizes that it is possible, though unlikely, that an inadvertent intruder might occupy a disposal site in the future and engage in normal activities without knowing that they are receiving radiation exposure from buried LLW. Therefore, the second performance objective in subpart C of 10 CFR part 61 is the protection of inadvertent intruders. The current regulations do not require a site-specific analysis to demonstrate the protection of an inadvertent intruder. Instead, the safety of an inadvertent intruder is demonstrated by compliance with the LLW classification system and the disposal requirements imposed for each class of LLW. The connection between the LLW classification system and protection of an inadvertent intruder is reflected in the LLW classification tables in § 61.55. The regulatory basis for the current

10 CFR part 61 contains an analysis of a reference land disposal facility that evaluates the impacts of LLW disposal on an inadvertent intruder. This analysis supported the concentration-based LLW classification tables developed for § 61.55. However, differences between LLW disposal facilities, disposal inventories, and disposal practices would be captured using the approach outlined in the proposed rule.

This proposed rule would add a requirement in 10 CFR 61.13 for licensees to conduct a site-specific inadvertent intruder assessment to demonstrate compliance with § 61.42. The inadvertent intruder assessment would quantitatively estimate the radiological exposure of an inadvertent intruder at a LLW disposal site who is unknowingly exposed to radiation from the LLW following an assumed loss of institutional controls after the end of the active institutional control period. The results of the inadvertent intruder assessment would be compared to the performance objective in § 61.42. The inadvertent intruder assessment would assume that an inadvertent intruder occupies the disposal site and engages in agricultural and residential activities and other reasonably foreseeable pursuits that are consistent with the activities occurring in and around the site at the time of development of the inadvertent intruder assessment; identify barriers to inadvertent intrusion that inhibit contact with the waste or limit dose exposure from the waste and provide a basis for their degree of effectiveness; and account for uncertainties and variability in the projected performance of the disposal site and surrounding environment.

Along with this new inadvertent intruder assessment requirement, the NRC is proposing an inadvertent intruder annual dose limit of 5 mSv (500 mrem) for the compliance period in the 10 CFR 61.42 performance objective, consistent with the dose limit used to develop the LLW classification tables in the original 10 CFR part 61. The regulatory basis for the current 10 CFR part 61 assumed that inadvertent intrusion

occurred following a cessation of an active institutional control period administered by the landowner or custodial agent. Institutional control of the disposal site was expected to occur beyond the active institutional control period; however, control becomes increasingly difficult to assure for longer periods of time and thus it could not be relied upon to ensure safety. Therefore, an inadvertent intruder was assumed to occupy the LLW disposal site and engage in normal activities, such as agriculture or dwelling construction. The analysis in the regulatory basis assumed that the inadvertent intruder directly contacted the disposed LLW and was exposed to radionuclides through inhalation of contaminated air, direct radiation, ingestion of contaminated food and water, and inadvertent ingestion of soil. The NRC based the LLW classification tables in the current § 61.55 on radionuclide concentrations that would yield an annual dose of 5 mSv (500 mrem) and adjustments to those values based on expectations about the composition of waste streams, among other factors.

The annual dose limit used to develop the LLW classification tables was selected from a range of values that were consistent with exposure guidelines of different orders of magnitude that were applicable at that time. In NUREG-0945, the NRC selected the annual dose of 5 mSv (500 mrem) considering safety, costs, disposal efficiency, and the potential for increased disposal of waste containing long-lived radionuclides that could increase the hazard for long time periods. The NRC reaffirmed its selection in its denial of a petition for rulemaking PRM-61-2, "New England Coalition on Nuclear Pollution, Inc.; Denial of Petition for Rulemaking," dated March 29, 1994, and continues to believe that this dose limit provides an acceptable level of protection to an inadvertent intruder.

Given the uncertainty in predicting human behavior into the distant future and to limit associated speculation, the proposed inadvertent intruder assessment assumes an inadvertent intruder occupies the disposal site and engages in activities and other

reasonably foreseeable pursuits consistent with expected activities in and around the disposal site at the time of the assessment and that might unknowingly expose the person to radiation emitted or released from the waste in the disposal units. The NRC has prepared draft guidance in NUREG-2175, Revision 1, for the inadvertent intruder assessment that describes approaches that the NRC staff would find acceptable for determining reasonably foreseeable inadvertent intruder activities that are consistent with activities in and around the land disposal facility. The draft guidance also describes how licensees or applicants could take credit for physical characteristics (e.g., water quality) and societal information (e.g., land use patterns) related to the land disposal facility to limit speculation about the types of activities in which an inadvertent intruder might engage. The NRC is not proposing that licensees or applicants should assume that contact with the LLW by an inadvertent intruder is certain to occur. A 5 mSv (500 mrem) dose limit for the inadvertent intruder, compared to a 0.25 mSv (25 mrem) annual dose limit for the public during the compliance period in § 61.41, provides a dose limit that considers both the health risk to the inadvertent intruder and the likelihood of the inadvertent intruder receptor scenario. Furthermore, as in the current regulations, engineered barriers and disposal practices, such as greater disposal depth, could be considered in the inadvertent intruder assessment. For example, if the disposal site implements a protective cover of at least 5-m (16-ft) thickness, it would not be reasonable to consider a receptor scenario in which 1) a residential dwelling foundation is excavated below 5 m (16 ft) and 2) waste is exhumed from a disposal unit if it is not normal to construct foundations in the surrounding area to that depth.

In summary, the NRC proposes new regulations in 10 CFR 61.13(b) that would specify that licensees must conduct an inadvertent intruder assessment to demonstrate compliance with the inadvertent intruder dose limit of 5 mSv (500 mrem) in the proposed

10 CFR 61.42 for the duration of the compliance period. The dose limit would apply to a compliance period of 1,000 years after closure or 10,000 years after closure if there are significant quantities of long-lived radionuclides in the LLW that will be disposed after the effective date of this rulemaking. The licensee or applicant should provide a technical rationale to their regulator to support the decision to use a 1,000-year compliance period. Should a 10,000-year compliance period be necessary, the licensee or applicant would then be required to conduct performance period analyses beyond 10,000 years, to demonstrate that inadvertent intruder exposures are reduced to the extent reasonably achievable.

3) Operational Safety Assessment

Because GTCC waste may require additional operational safety procedures and specialized handling, the NRC proposes to add requirements to the analyses of the protection of individuals during operations in 10 CFR 61.13. Under the proposed rule, licensees would conduct an operational safety assessment to demonstrate with reasonable assurance that exposures to individuals during operation will be controlled to meet the requirements of 10 CFR part 20, thereby meeting the performance objective set forth in § 61.43 of this part.

The operational safety assessment would be required to include analyses of expected exposures due to routine operations and likely accidents during handling, storage, and disposal of waste. These analyses could be qualitative and could credit administrative controls and procedures. Operational safety assessments involving GTCC waste would also be required to include quantitative analyses of expected exposures due to unlikely accidents (including fire, handling events, and other credible accidents) and the identification of safety features to prevent and mitigate accidents. Draft NUREG-

2175, Revision 1 includes guidance on performing operational safety assessments for GTCC waste.

Licensees or applicants for licenses to operate LLW disposal facilities handling and disposing of Class A, B, and C wastes would complete operational safety assessments through mostly qualitative analyses using management controls such as operational procedures, training and qualifications, radiological protection systems, monitoring, and inspection. Existing LLW disposal facilities have been very successful using management controls to provide a high-level of protection to workers and the public during operations. Licensees of disposal facilities or applicants requesting authorization for handling and disposing of GTCC wastes would likely use similar approaches to satisfying operational safety requirements but, for some types of GTCC wastes, would likely need to complete a quantitative operational safety assessment comparable to what is done for nuclear facilities handling dangerous amounts of nuclear materials. Under the proposed rule, an operational safety assessment should be more detailed and comprehensive as the level of hazard posed by the waste increases.

4) Site Stability Assessment

The current regulations in § 61.50 require that LLW disposal sites not be susceptible to erosion, flooding, seismic activity, or other disruptive events or processes to such a degree or frequency that compliance with the 10 CFR part 61 performance objectives cannot be demonstrated with reasonable assurance. Under the proposed rule, licensees would conduct a site stability assessment to demonstrate with reasonable assurance that the § 61.44 performance objective for the stability at the disposal site after closure will be met. This proposed rule would provide more details in 10 CFR 61.13(d) and would require that the site stability assessment must provide reasonable

assurance that long-term stability of the disposal site can be ensured and that there will not be a need for ongoing active maintenance following site closure, thereby meeting the performance objective set forth in § 61.44 of this part.

The NRC has developed draft guidance stating that the site stability assessment should focus on stability of the wasteform, stability of the engineered land disposal facility, and geomorphic stability of the disposal site. For disposal of traditional LLW (i.e., the range and type of LLW that was analyzed for preparation of the current 10 CFR part 61), site stability assessments would likely focus on the wasteform and engineered features. For disposal of LLW containing significant quantities of long-lived radionuclides, the focus would likely be on the engineered land disposal facility and geomorphic stability of the disposal site. The extent of the site stability assessments would be strongly influenced by the radiological characteristics of waste to be disposed. Under the proposed rule, stability of wasteforms, disposal units, engineered barriers (such as cover systems), disposal site, land disposal facility, and the general environment may all be within the scope of the site stability assessment.

5) Performance Period Analyses

A long-term analysis (e.g., longer than 10,000 years) was not considered necessary under 10 CFR part 61, as originally written. The original regulatory system was designed to ensure that the short- and long-term impacts were limited by regulatory requirements such as the LLW classification system and based upon waste inventories expected to be disposed of at that time.

As set forth in the proposed § 61.13(e), licensees that plan to dispose of LLW containing significant quantities of long-lived radionuclides would be required to prepare long-term analyses, termed “performance period analyses,” that assess how the land

disposal facility and site characteristics limit the potential long-term radiological impacts, consistent with available data and current scientific understanding. The performance period analyses would be required only when a compliance period of 10,000 years is used by the licensee. The proposed metric for the performance period analyses is that releases of radioactivity from the disposal site and exposures to the inadvertent intruder must be reduced to the extent reasonably achievable during the performance period. The NRC considered a variety of approaches for metrics to evaluate these analyses. The metric was selected because it allows socioeconomic information to be considered in a risk-informed manner. Considering the timeframes involved, uncertainties may be considerable and therefore the precision typically assigned to a dose limit is not warranted. Although a dose limit would not be prescribed, it is recommended that doses or concentrations and fluxes of radionuclides in the environment be calculated, as they are an appropriate common metric for use in comparing alternative approaches. Acceptable approaches to performing the analyses for the performance period are described in draft guidance NUREG-2175, Revision 1.

In the performance period analyses, a licensee would be required to identify and describe the features of the design and site characteristics that will demonstrate that the performance objectives set forth in the proposed §§ 61.41(b) and 61.42(b) will be met with reasonable assurance. These analyses would also help determine whether additional measures are needed at a disposal site to ensure the protection of the general population and the inadvertent intruder from disposal of LLW containing long-lived radionuclides. The performance period analyses would determine whether new or additional limitations are needed for the disposal of some LLW streams at certain land disposal facilities.

No ending time for the performance period analyses is specified in this proposed rule. Several different factors influenced this decision. First, the analyses may demonstrate the time when the peak impact is likely to occur such that further calculation beyond when peak dose occurs is unnecessary. Because long-term impacts are driven by site-specific characteristics and the LLW that is disposed, the timing of peak impacts may differ substantially at each land disposal facility. A licensee must demonstrate that impacts are reduced to the extent reasonably achievable, ensuring that facilities and disposal units are not under-designed. Second, the analyses that are developed for the performance period may differ from traditional projections of long-term radiological doses. Performance period analyses may demonstrate that the performance period metrics have been satisfied irrespective of peak radiological impacts. There is uncertainty in the projected radiological risk to future populations from LLW disposal that may be based on different assumptions about the behavior and characteristics of future society. Because of this uncertainty, this proposed rule focuses on a demonstration of how the natural and engineered barriers of the disposal system could limit future releases of material rather than the exact radiological impact to an individual or group.

v. Revised Performance Objectives

The NRC is proposing revisions to the performance objectives found in §§ 61.41 through 61.44. The performance objectives at § 61.41, “Protection of the general population from releases of radioactivity,” and § 61.42, “Protection of individuals from inadvertent intrusion,” would be divided into two sections, (a) and (b), that distinguish between demonstrating meeting the dose limits for the compliance period and reducing releases of radioactivity from the land disposal site or reducing exposures to the inadvertent intruder to the extent reasonably achievable during the performance period.

Both §§ 61.41 and 61.42 also would include an item (c), that duplicates the current 10 CFR part 61 regulations that licensees who meet the criteria in § 61.1(b) would be required to comply with (instead of (a) and (b)).

The current performance objective at § 61.41 requires that concentrations of radioactive material that may be released from the disposal site to groundwater, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ of any member of the public. In this proposed rule, consistent with the direction provided in Staff Requirements—COMWDM-11-0002/COMGEA-11-0002—Revision To 10 CFR Part 61 (January 19, 2012), the NRC is proposing to change this to an annual dose equivalent of 25 mrem, rather than the current regulation's whole body and organ dose limits, to require licensees to use a dose methodology consistent with the dose methodology specified in the standards for radiation protection set forth in part 20 of this chapter. The weighting factors used in the calculation of the dose would be required to be consistent with the methodology used to perform the calculation.

The current performance objective at § 61.42 requires the design, operation, and closure of the land disposal facility must ensure protection of an inadvertent intruder into the disposal site who occupies the site or contacts the waste at any time after active institutional controls over the disposal site are removed. In this proposed rule, the NRC is proposing a new inadvertent intruder annual dose limit of 5 mSv (500 mrem) for the compliance period in the 10 CFR 61.42 performance objective, consistent with the dose limit used to develop the LLW classification tables in the original 10 CFR part 61. The dose limit would be imposed in § 61.42(a), which would not apply to licensees who meet the criteria in § 61.1(b). These licensees would instead comply with the current regulations that are preserved in § 61.42(c).

The current performance objective at § 61.43, “Protection of individuals during operations” requires that operations at the land disposal facility must be conducted in compliance with the standards for radiation protection set out in part 20 of this chapter, except for releases of radioactivity in effluents from the land disposal facility governed by § 61.41 of this part. In this proposed rule, the NRC is proposing to revise the performance objective at § 61.43 to specify an annual dose limit (rather than referencing § 61.41) and add that compliance with this section must be demonstrated through the operational safety assessment.

The current performance objective at 61.44, “Stability of the disposal site after closure,” requires that the disposal facility 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. In this proposed rule, the NRC is proposing to revise the performance objective at § 61.44 to indicate that compliance with this section must be demonstrated through the site stability assessment. The land disposal facility would be required to be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site. The NRC is not proposing to specify that stability of the disposal site must be demonstrated for the compliance period, based on the fact that instability is only significant if it translates to health and safety impacts and stakeholder input that such demonstration out to potentially 10,000 years is difficult to support with modeling tools currently available. Compliance with the 10 CFR 61.44 performance objective would require demonstration of long-term stability to the degree it is important to continue to isolate and contain the LLW. Some instability may be tolerable. Site stability would be required to be evaluated for the compliance period, but that demonstration could transition from justifying that

adequate dimensional stability will be achieved early in the compliance period to demonstrating that expected instability later in the compliance period would not compromise compliance with §§ 61.41 and 61.42.

vi. Flexibility for Facilities to Develop Site-Specific Waste Acceptance Criteria

The NRC is proposing to amend 10 CFR 61.58 to require land disposal facility licensees to implement WAC approved by the Commission (or Agreement State regulator) that provide reasonable assurance that the performance objectives of subpart C of 10 CFR part 61 will be met. The proposed revisions include a minimum set of requirements for determining waste that is acceptable for disposal. The proposed revisions (e.g., site-specific WAC, waste characterization, waste certification) would ensure that the type of information included in the WAC is adequate to characterize the waste and certify its acceptability for disposal.

The NRC's current waste acceptance requirements can be found in subpart D of 10 CFR part 61 and specify technical requirements for land disposal facilities for commercial LLW. The NRC is not proposing to revise the general organization of these requirements. The technical requirements specify the classes and characteristics of LLW that are acceptable for near-surface disposal, as well as other requirements. Section 61.55 defines the classes of LLW acceptable for near-surface disposal (i.e., the LLW classification system). Section 61.56 defines the minimum characteristics for all classes of LLW and characteristics intended to provide stability of certain LLW (i.e., Class B, Class C, and GTCC LLW). Additionally, § 61.52(a) specifies requirements for near-surface disposal facility operation, including segregation and intruder barrier requirements for various classes of LLW. In the current regulations, § 61.58 allows the NRC to authorize other provisions for the classification and characteristics of waste. The

NRC is proposing that the new waste acceptance requirements replace the requirements permitting alternative classification and characteristics in the current § 61.58. Requests for alternative classification and characteristics could still be made through § 61.6, "Exemptions."

Differences between actual site conditions and practices at land disposal facilities and the generic assumptions used to develop the LLW classification system may result in the radionuclide concentration limits to be overly restrictive. If radionuclide concentration limits are overly restrictive based on actual site characteristics, facility design, and operational practices, the LLW classification system would ensure the safe disposal of LLW, but it could impose unnecessary regulatory burdens on licensees and LLW generators. In addition, wastes may be proposed for disposal that are significantly different from those analyzed to develop the generic concentration limits found in the current regulation. The addition of the proposed requirement for an inadvertent intruder assessment would require that these significantly different wastes are analyzed to ensure that the 10 CFR part 61 performance objectives would be met prior to being accepted for disposal. The flexibility for licensees to develop site-specific WAC would provide assurance that public health and safety will be protected, while offering flexibility for facilities with strong site characteristics, design, and operational practices.

This proposed rule would revise 10 CFR 61.58 to require that WAC may be either generic WAC, based on the concentration limits in § 61.55 and the waste characteristics in 10 CFR 61.56, or site-specific WAC based on the results of the technical analyses described in § 61.13. Because licensees would be required to develop WAC for the acceptability of LLW for disposal, this proposed rule also would revise appendix G to 10 CFR part 20 to conform to the new requirements for LLW acceptance. Waste generators would continue to comply with LLW manifesting

requirements in appendix G to 10 CFR part 20 and should continue to classify LLW for shipment in accordance with the waste class (Class A, B, C, or GTCC), such that there are no changes to current LLW shipment and transportation practices and Department of Transportation regulations.

vii. Safety Case

Licensees are responsible for demonstrating that their land disposal facilities are constructed, operated, and closed safely. To this end, 10 CFR part 61 establishes the requirements that licensees must meet to operate a land disposal facility. While the NRC concluded that the requirements specified in § 61.10, “Content of applications,” through § 61.16, “Other information,” together with the performance objectives of subpart C and the technical requirements of subpart D, ensure that a licensee or an applicant demonstrates the safety of a proposed land disposal facility, the current regulations do not require the development of a “safety case”. As directed by the Commission in SRM-SECY-13-0075, and to better align with international practice and provide greater transparency of safety decisions with stakeholders, the NRC is proposing to add a requirement for a safety case. A safety case is a high-level evaluation of the information and analyses that support the licensee’s demonstration that the land disposal facility will be constructed and operated safely. The safety case, which would be a component of an application, would provide a summary of the safety basis that the disposal site will be capable of isolating waste and limiting releases to the environment; describe the strength and reliability of the technical analyses described in § 61.13; and include consideration of defense-in-depth protections and safety relevant aspects of the site, the facility design, and the managerial, engineering, regulatory, and institutional controls.

The purpose of a safety case is to inform the decision whether to grant a license for a land disposal facility and provide a summary of the safety basis that the land disposal facility will be designed, constructed, operated, and closed safely. As such, the NRC is proposing to amend § 61.10 to require that an application must include the safety case. This proposed rule would also amend 10 CFR 61.23 to require that the safety case is adequate to support the decision to issue a license.

The primary components of the safety case are the results of the § 61.13 analyses. The NRC envisions that the safety case for a land disposal facility would evolve over time as new information is gained during the various phases of the facility's development and operation (e.g., site-specific information on types, forms, and activities of LLW disposed at the site; hydrology; geography). Therefore, the NRC expects the safety case would be updated at license renewal if new information that could significantly impact safety of the facility is acquired. The NRC is also proposing to amend 10 CFR 61.28 to require that the application for site closure of a licensed land disposal facility include a final revision to the safety case.

Licensees who meet the criteria in § 61.1(b) would be required to provide their safety case upon license renewal and closure. These licensees would update the technical analyses component of the safety case consistent with the current 10 CFR part 61 regulations.

viii. Defense-in-Depth

The defense-in-depth principle has served as a cornerstone of the NRC's regulatory framework for nuclear reactors, and it provides an important tool for making regulatory decisions in the face of significant uncertainties. The NRC has applied the concept of defense-in-depth throughout its regulations to ensure the safety of licensed

facilities through requirements for multiple, independent layers of defense, and, where possible, redundant safety systems. Traditionally, the reliance on independence and redundancy of barriers has been used to provide assurance of safety when reliable, quantitative assessments of barrier reliability are unavailable. The NRC maintains, as it has in other regulations for disposal (such as for high-level radioactive waste), that the application of the defense-in-depth concept to a LLW land disposal facility is appropriate and reasonable.

Licensees applying defense-in-depth protections for land disposal facilities need to recognize differences between operating facilities and closed land disposal facilities. While waste is being disposed, and before a land disposal facility is closed, defense-in-depth protections, as with other operating nuclear facilities, provide for active and passive safety systems commensurate with the hazard and complexity of the activities. Licensees applying defense-in-depth principles for regulation of land disposal facility performance for long time periods following site closure, however, must account for the difference between an operating land disposal facility with active safety systems and the potential for active control and intervention (i.e., taking action to address) and a closed land disposal facility, which relies upon passive barriers. A closed disposal site is a passive system, and assessment of its safety over long timeframes is best evaluated through consideration of the relative likelihood of threats to its integrity and performance. With respect to the long-term performance of the disposal site, and in particular for the disposal of long-lived radionuclides, defense-in-depth is provided through the diversity and capabilities of the components and attributes of the disposal site (e.g., wasteform, container, engineered features, depth of the disposal unit below the land surface, hydrologic and geochemical characteristics).

Diversity in the capabilities of the components and attributes of the disposal site and its design increases the resilience of the disposal site to contend with unanticipated degradation or external challenges. This diversity also compensates, in part, for uncertainties in the long-term estimation of performance of the disposal site. 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 a timeframe of 10,000 years. Disposal of LLW is predicated on the expectation that attributes of the disposal site, in combination with engineered features, will minimize the migration of radionuclides away from the disposal site. However, the capabilities of site characteristics and engineered features are subject to many uncertainties. Engineered features generally are considered more durable over short time periods as compared to periods longer than a few hundred years when uncertainties in degradation rates and natural events may be more significant. The NRC expects that licensees will rely on both the natural site characteristics and the engineered features, in combination, to provide defense-in-depth protections and reasonable assurance that the overall performance of the disposal site will be adequate over long time periods.

Defense-in-depth includes, but is not limited to, the use of siting, wasteforms and radionuclide content, engineered features, and geologic features of the land disposal facility to enhance the waste isolation resiliency of the disposal site. In addition, defense-in-depth is used to mitigate the effects of large uncertainties identified during the development of the technical analyses. Therefore, NRC is proposing that licensees or applicants, as part of the safety case specified at § 61.10(b), 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.

ix. Safety Criteria and Limits for Licensing Near-Surface Disposal of GTCC Waste

The classification scheme for low-level radioactive wastes at 10 CFR part 61 is predicated on radiological risk, with Class A posing the lowest and GTCC posing the greatest risks. Commensurate with these risks, the regulations at 10 CFR part 61 provide for graded approaches for disposal of the different waste classes to ensure adequate protection of the health and safety of the public, inadvertent intruders, and workers.

For disposal of Class A, B, and C wastes, the NRC's existing regulations include requirements for disposal that align with the waste classes. For protection of inadvertent intruders, the NRC evaluated a variety of potential exposure pathways and receptors and developed limiting concentrations, as well as other requirements, to provide protection. Class A waste was assumed to be disposed with no intruder barriers and be disturbed by excavation for construction of a home after 100 years of institutional control. Class B waste was required to be disposed in a stable wastefrom. Class C waste was required to be disposed of a depth of at least 5 m or with a 500-year intruder barrier. The importance of disposal depth for Class C and GTCC waste was, and still is, that at a sufficient depth the exposure of inadvertent intruders would be via drilling to acquire resources rather than excavation of a foundation for construction of a home. Drilling typically results in disturbance of a much smaller volume of buried waste. Even if waste is disposed deeply at a facility the concentrations provided by table 1 and 2 of 10 CFR 61.55 are based on the assumption of shallow burial and subsequent excavation.

Unlike waste that has been disposed at currently operating LLW facilities, the radiological characteristics of GTCC wastes are quite varied—some GTCC wastes have mostly short-lived radionuclides while others have more long-lived radionuclides. The

proposed safety criteria and limits for licensing near-surface disposal of GTCC waste account for these unusual characteristics. Safety criteria would be provided for protection of the public after closure of the disposal facility (§ 61.41), protection of the public who may inadvertently use the disposal facility after closure (§ 61.42), and protection of the public during operations (§ 61.43). The NRC considered a variety of approaches to provide criteria that would ensure protection of public health and safety from the disposal of GTCC wastes. In the United States, there are multiple operating disposal facilities located in different environments using different designs. They also accept different concentrations and quantities of waste. Facilities that may be developed in the future are likely to have corresponding differences. Prescriptive design is difficult when applied to different facilities in different environments disposing of different wastes. High-quality, site-specific technical analyses can more effectively and efficiently be used to identify design, operational, and other limits to provide protection. GTCC wastes may have concentrations of short- and long-lived radionuclides that are significantly larger than in Class A, B, or C LLW.

Because GTCC wastes exceed the concentrations of Class C waste, additional prescriptive requirements are warranted. The NRC is proposing minimum requirements for GTCC waste of a 500-year intruder barrier and a 5-m (16-ft) disposal depth. This would ensure that at least 500 years of decay will occur before an intruder could interact with the waste and when they do interact it is unlikely to be from excavation given the depth at which the waste is disposed. Depending on the characteristics of the GTCC waste, an applicant would be able to identify in the technical analyses those additional barriers or performance characteristics that are necessary to provide protection, such as a greater disposal depth or an intruder barrier of greater longevity. The disposal depth will need to be maintained for as long as the waste is hazardous.

The NRC is proposing an upper limit for GTCC waste disposal of long-lived transuranic radionuclides of 370,000 becquerel per gram (Bq/g) (10,000 nCi/g). The NRC also considered not establishing an upper limit. Previously, the NRC staff had analyzed the disposal of different types of GTCC waste and determined that when the waste approaches concentrations of long-lived transuranic radionuclides of 370,000 Bq/g (10,000 nCi/g) it can be very difficult to establish that an intruder drilling into the waste well into the future would not receive an acute dose less than 0.5 mSv (500 mrem) (84 FR 35037; July 22, 2019). Because current engineering does not support the justification of performance of intruder barriers thousands of years into the future, the NRC is proposing an upper limit. However, with special technology or designs a licensee may be able to justify, through an exemption request, that performance criteria could be met even with small quantities in excess of this limit. Such circumstances would be evaluated on a case-by-case basis and would be expected to apply to only small volumes of waste at a single facility.

Safety of the public and workers during operation of a low-level waste disposal facility has traditionally been achieved using management controls, active and passive safety features, procedures, inspections, training, emergency response, and monitoring. The NRC evaluated accidents (e.g., fires and drops) when the waste classification system was developed, but accident scenarios did not result in modifications to limiting derived concentrations. The disposal of GTCC waste could, under certain accident conditions, result in increased offsite impacts to a member of the public. For this reason, the NRC is proposing requirements for an operational safety assessment in 10 CFR 61.13 and proposing that these assessments be quantitative for the disposal of GTCC wastes.

In addition, GTCC waste may have unique characteristics compared to Class A, B, and C low-level wastes. These characteristics include heat generation, radiolysis, criticality, and dispersibility. The NRC is proposing additional waste characteristics requirements specific to GTCC wastes that a licensee must consider. These requirements would ensure that the technical analyses are comprehensive and necessary restrictions, limits, or design modifications to account for the unique characteristics are identified and implemented.

x. Disposal Depth

The NRC proposes to include a minimum disposal depth requirement of 5 meters for GTCC wastes and for significant quantities of uranium. This approach would help ensure that uncertainties associated with future human activities and geomorphic evolution of landforms are mitigated by simple and easily implemented design-based requirements. A licensee would also be permitted to use greater disposal depth to mitigate uncertainties. The GTCC wastes would also be required to be disposed with intruder barriers that are designed to protect against an inadvertent intrusion for a least 500 years. Because the uranium is long-lived, the longevity of intruder barriers and site conditions need to be factored into the approach used to protect against an inadvertent intrusion at a closed disposal site.

Requiring that certain wastes must be disposed at a minimum depth is a method used throughout the world to limit the accessibility to the waste. Some wastes may contain radionuclides that persist for long periods of time (thousands of years and longer). Other wastes, such as some GTCC wastes, may contain short-lived radionuclides in concentrations that are higher than in A, B, and C wastes. In general, near-surface disposal is used as the disposal concept for wastes that contain limited

amounts of short- and long-lived radionuclides. The NRC also requires that inadvertent intruders be protected from the disposal of LLW. In the current regulations, use of the classification tables, site ownership requirements, and institutional controls provide this protection for Class A and B wastes. In addition, to achieve protection for Class C waste, the NRC currently requires that the waste must be disposed so that the top of the waste is a minimum of 5 meters below the top of the cover or must be disposed with intruder barriers that are designed to protect against an inadvertent intrusion for at least 500 years. The basis for this requirement is that if an intruder were to excavate into a closed disposal facility potentially large volumes of waste would be exhumed. Radiological impacts to inadvertent intruders are driven by the concentrations of radionuclides, which in turn are a product of the amount of waste exhumed and the volume of media in which it is dispersed in the environment. The imposition of a depth requirement for certain wastes ensures that normal means of excavation, if they were to occur, will not disturb the waste. Rather, drilling or some other form of less intrusive disturbance may occur.

The NRC is requiring different reference points for the determination of disposal depth for different types of waste. The NRC is requiring the reference point for determination of the disposal depth for Class C wastes to ensure that if inadvertent intrusion were to occur before sufficient decay of radioactivity in the waste, that the disturbance would not be from excavation, but rather from drilling for a well. For GTCC waste or significant quantities of depleted uranium the reference point for the depth requirement is the land surface. This is to help mitigate uncertainties in the long-term performance of the disposal system impacted by natural and anthropogenic surface processes and events for waste that will not decay sufficiently for long periods of time.

The NRC is proposing to revise its physical security regulations to clarify physical protection requirements for SNM being disposed in a near-surface disposal facility. These revisions would take into account the material attractiveness of the SNM and are intended to provide a set of security measures that would reduce the regulatory burden on licensees of such facilities.

As discussed in the DOE's "Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste" (DOE/EIS-0375) published in January 2016 [hereafter referred to as the DOE's FEIS], GTCC waste streams are quite varied. Some of the GTCC waste streams may contain quantities of SNM that would require physical protection measures. The current regulations at 10 CFR part 61 require any application to receive and possess SNM in quantities subject to the requirements of 10 CFR part 73 (Physical Protection of Plants and Materials) to include information on how the physical security requirements will be met (see 10 CFR 61.16). These requirements are limited to quantities of SNM prior to disposal and do not apply to quantities that have been disposed of.

Consistent with Section 274(b) of the Atomic Energy Act of 1954, as amended, Agreement States may regulate certain materials for the protection of public health and safety from radiation hazards. The NRC cannot relinquish its authority to regulate matters related to the common defense and security. The security requirements in 10 CFR part 73 were promulgated pursuant to the NRC's authority to promote the common defense and security. As such, this authority may not be relinquished to Agreement States. This means that Agreement State licensees disposing of GTCC waste are potentially subject to two regulators: the NRC for common defense and security requirements for certain quantities of SNM above the 10 CFR 150.14 mass thresholds and Agreement State regulators for public health and safety requirements for the same

SNM.²⁰ An Agreement State licensee possessing quantities of SNM subject to 10 CFR part 73 would either need to obtain an NRC license or become subject to an NRC order to allow for NRC oversight, inspection, and enforcement of the 10 CFR part 73 requirements. Agreement State licensing will be limited to those near-surface disposal facilities that can accept only those GTCC waste streams that do not exceed the mass thresholds of § 150.11.

The objective of physical protection of radioactive waste at a disposal facility is to prevent the theft or diversion of radioactive material with the intent of nefarious purposes (e.g., potential use in an improvised nuclear device [IND]), and limiting, as appropriate, the potential for a successful sabotage event. The regulations at 10 CFR part 73 require, in part, the establishment and maintenance of a physical protection system that will have capabilities for the protection of SNM at fixed sites. A low-level waste disposal facility is expected to only have dilute concentrations of SNM in quantities of low strategic significance; therefore, multiple thefts would be required for an adversary to obtain a formula quantity of plutonium, uranium-233, or high enriched uranium.

In the physical security context, material attractiveness refers to form and concentration of the material, the relative ease of theft or diversion, and the capability level required to process material containing SNM for use in an IND. Material in forms and concentrations that are more difficult to readily turn into an IND are considered less attractive for potential theft or diversion. A radioactive waste disposal facility presents some unique challenges to an adversary seeking to obtain SNM for use in an IND.

These challenges include the following:

- 1) *Radioactive waste containers are very similar in appearance*

²⁰ In SRM-SECY-20-0098, the Commission approved the staff's recommendations to explore regulatory approaches that would allow for a single regulator for an Agreement State licensee disposing of GTCC.

Radioactive waste containing SNM at a near-surface disposal facility can be expected to be stored in the same containers as other wastes (i.e., in 210 L (55 gallon) drums and standard waste boxes) that requires an adversary to have knowledge of which containers have the higher concentrations of SNM versus containers with lower concentrations or no SNM—increasing the volume of waste that would need to be stolen to obtain a quantity of SNM potentially useful for an IND;

2) Radioactive waste only contains dilute amounts of SNM

Processes and activities using SNM can generate waste material containing SNM; however, SNM that is readily separable from a waste stream is typically removed, resulting in low concentrations of SNM in waste materials. Low concentrations of SNM in waste materials present difficulties in separating SNM from waste material due to the need to process large volumes of waste material. Dilution of SNM in radioactive waste materials inhibits an adversary's ability to acquire and use the material in an IND. Greater levels of material dilution create a set of progressively greater complexities associated with material acquisition (because of material weight and size) and processing (because of larger equipment and process scales, increased processing timelines, and higher cost). Additionally, the increased time and resource burden on the adversary to process dilute material increases the chances for timely interruption of adversary actions and material recovery by law enforcement organizations. The SNM in waste material is typically highly dilute and distributed through a high volume of waste. This limits the attractiveness of this material as a target for theft or diversion; and

3) Separation of SNM as usable material for an IND can be complex

Separation of SNM from radioactive waste material for an IND can be complicated for radioactive waste streams due to the presence of both non-radioactive material and other radionuclides and isotopes of uranium and plutonium.

Radioactive waste containing low concentrations of SNM that is not readily separable from the radioactive waste presents adversaries with greater technical, operational, and logistical challenges when conducting SNM processing operations and constructing an IND. All of these challenges result in such waste materials being more difficult to steal and easier to recover. For example, obtaining a formula quantity of strategic SNM from radioactive waste at a concentration of 0.01% of SNM would require theft and subsequent processing of tens of tons of radioactive waste. Assuming that an adversary was able to select primarily those packages with plutonium at a concentration very near to a concentration of 0.01% (e.g., assume half of the diverted waste containers contain SNM at concentrations much less than 0.01%), an adversary would need 40 metric tons of radioactive waste or on the order of 100 waste drums. Although detection of the diversion of a single radioactive waste drum may go unnoticed, diversion or theft of tens of drums is easily detected. A large pickup truck (e.g., one-ton truck) could potentially remove five waste drums. Theft of 100 drums would be far more noticeable, take longer to load, and require significantly more SNM waste to be available at the time of the theft. Further, the additional limitation that the quantity is of low strategic significance would require multiple thefts even if the adversary successfully found and removed only those packages with an amount of SNM at the maximum quantity to be considered of low strategic significance (e.g., regardless of truck size and number of waste containers removed an adversary would need a larger quantity of low strategic significance material than is present at the facility, prior to disposal, to obtain sufficient material for the purpose of constructing an IND assuming the adversary could separate all the SNM from the waste). Multiple attempts at removing all the SNM waste containers present at a facility would be extremely unlikely to succeed without detection.

Additionally, the International Atomic Energy Agency (IAEA) has provided recommendations on physical protection (INFCIRC/225/Revision 5, IAEA Nuclear Security Series No. 13, IAEA, Vienna (2011)) that recognizes a graded approach for physical protection based on the attractiveness of the material. Paragraph 4.7 of the IAEA report states:

Nuclear material, which is in a form that is no longer useable for any nuclear activity, minimizes environmental dispersal and is practicably irrecoverable, may be protected against unauthorized removal in accordance with prudent management practice.

The limited attractiveness of radioactive waste with specific characteristics (i.e., quantity of material of low strategic significance containing very dilute concentrations of SNM such as 0.01%, SNM that is not readily separable from the non-SNM waste material using equipment commercially available to individuals—such as bulk screening and sifting equipment) provides a reasonable demarcation for physical protection of radioactive waste materials at a near-surface disposal facility.

The NRC is proposing a revision to its regulations at 10 CFR part 73 to include an exemption from the physical protection requirements in 10 CFR 73.67 for SNM of limited attractiveness at a near-surface disposal facility. The NRC's proposed approach is similar to exemptions currently specified at § 73.67(b)(1)(i) through (iii) that exempt materials containing SNM from the requirements of § 73.67 due to specific attributes and characteristics of the material. Adding an exemption to § 73.67(b)(1) for radioactive waste containing SNM of limited attractiveness would allow for more risk-informed security requirements for near surface disposal facilities accepting such waste than is currently provided for in § 73.56(b)(1)(i) through (iii).

The exemption from the requirements at § 73.67 for radioactive waste containing SNM to be disposed at a near-surface disposal facility that is of limited attractiveness for

theft and diversion would not exempt the licensee from physical protection and security requirements in other parts of NRC's regulations. Any near-surface disposal facility is still required to provide physical protection and security for radioactive material under 10 CFR part 20, subpart I, as well as other physical protection requirements under 10 CFR part 37 for radioactive waste regulated by that part. Additionally, this 10 CFR part 73 exemption would not allow for disposal of high-level radioactive wastes in a near-surface disposal facility nor would it provide for Agreement State authority over high-level radioactive waste. This proposed revision is intended to provide appropriate flexibility to Agreement State regulators to allow for the disposal of certain wastes that meet the requirements for safe disposal at a near-surface disposal facility. Draft NUREG-2175, Revision 1 would provide guidance regarding physical protection.

If the Agreement State licensee receives or possesses SNM above the 10 CFR 150.14 mass thresholds, then the licensee must satisfy the physical security requirements of § 73.67, a "common defense and security" regulation that can only be enforced by the NRC. The NRC's proposed exemption from the 10 CFR part 73 physical protection requirements of radioactive waste containing SNM of limited attractiveness at a near-surface disposal facility would provide additional flexibility to Agreement State regulators to allow for disposal of those wastes meeting the requirements for the exemption—as previously described, radioactive waste meeting the criteria for the 10 CFR part 73 exemption would be protected under the physical protection requirements of 10 CFR parts 20 and 37, as appropriate.

xii. Criticality Safety of GTCC Waste Streams

The current regulations at § 61.16(b) identify other safety information concerning criticality that, if appropriate, is required for demonstrating criticality safety. The NRC is

proposing to revise § 61.16(b) with respect to criticality safety during operations so that an applicant would not be required to consider radioactive waste containing fissile material meeting the requirements specified at § 71.15(c). As specified at § 61.23(j), the applicant must demonstrate the adequacy of its criticality safety procedures to protect the public health and safety and provide reasonable assurance that the requirements of § 70.24, "Criticality accident requirements," will be met, insofar as they are applicable to SNM to be possessed before disposal under the license. These requirements apply when a licensee is authorized to possess SNM in a quantity exceeding the amounts specified at § 70.24(a) (e.g., 700 grams (g) of U-235, 450 grams of plutonium).

Some of the GTCC waste streams described in the DOE's FEIS contain SNM in quantities and concentrations significantly greater than that associated with Class A, B, and C wastes. The NRC staff is proposing revisions to provide for appropriate criticality controls for GTCC waste 1) during the operation period of a near-surface disposal facility prior to disposal (i.e., receipt, handling, emplacement of waste) and 2) after the operational period has ended and the facility is closed (i.e., waste is no longer being disposed).

Most GTCC waste is expected to be packaged in a variety of different container types depending on the type of waste and radionuclides present (e.g., sealed sources in a 210 L (55-gallon) sized container, a stainless-steel activated metal canister, a standard waste box—that holds approximately five times more waste volume than a 210 L (55-gallon) drum). As GTCC waste containers are received at a near-surface disposal facility, the requirements for criticality safety would apply when the threshold amounts specified at § 70.24(a) are exceeded for those waste containers that are not yet disposed (i.e., waste containers on the surface of the facility). In general, criticality safety would be associated with the configuration of those waste packages containing SNM

during storage on the surface and how they are emplaced within a disposal unit (e.g., both the stacking of waste containers and the areal array of packages).

The NRC has previously considered specific configurations of waste packages containing fissile material in the context of transportation packages that are also appropriate for criticality safety during operations at a low-level waste facility with waste packages containing similar fissile material. In particular, 10 CFR part 71 provides exemptions from classification of radioactive material as fissile material when specific requirements are met (e.g., § 71.15(c) provides an exemption for low concentrations of solid fissile material commingled with solid nonfissile material meeting certain specifications). NUREG/CR-7239, "Review of Exemptions and General License for Fissile Material in 10 CFR [Part] 71," provides explanatory information on the background, intent, and anticipated use of the provisions to assist fissile material licensees in their interpretation and application of the provisions such that criticality safety is ensured during transportation activities. This document states that criticality safety risk depends on several factors including the mass, concentration, or isotopic distribution of the fissile material and the system geometry and surrounding materials (reflectors) that might reflect neutrons back into the package (NUREG/CR-7239, page 1).

The NRC is proposing to amend § 61.16 to adopt the exemption at 10 CFR 71.15 for the disposal of certain solid fissile material at low-level waste disposal facilities because the criticality considerations for transportation packages are also appropriate for operations at a low-level waste facility. The NRC's transportation regulations at 10 CFR 71.15 provide that certain material is exempt from classification as fissile material under conditions for the fissile material type, quantity, form, moderation, and mass concentration for which there are no credible means to achieve a critical condition under

normal conditions of transport or hypothetical accident conditions. The intent of including exemptions from classification as fissile material in the regulations is to reduce the burden and cost imposed for packages that contain quantities and concentrations of fissile material that are low risk in terms of potential for inadvertent criticality in transport. These packages can be shipped without a packaging assessment for criticality safety purposes and require little or no regulatory oversight (NUREG/CR-7239, page 16).

The exemption for low concentrations of solid fissile material at § 71.15(c) is a condition that is applicable to radioactive waste packages containing waste material that meets the requirements for the exemption. NUREG/CR-7239 considered a variety of scenarios and accident conditions in analyzing the safety margin provided by the low concentration exemption at § 71.15(c), which requires at least 2000 grams of solid nonfissile material for every gram of fissile material. These accident conditions included fire, water immersion, reconfiguration into a worst-case geometry, and the combining of material from multiple packages.

As stated in NUREG/CR-7239:

The criteria for exemption from classification as fissile material are designed to maintain the fissile concentration, fissile mass, and/or fissile enrichment sufficiently low that accidental criticality is not credible under normal conditions of transport or hypothetical accident conditions, as defined in 10 CFR 71. Under normal conditions of transport, a single package could easily be shown to remain subcritical; however, the fissile exemptions also consider the accumulation of fissile mass as a result of the commingling of multiple packages. Thus, the fissile mass or mass concentration must be sufficiently low, based on conservative assumptions, to assure a subcritical arrangement for transport of individual or multiple packages. The exemption criteria are based on worst-case or optimal conditions, including: unlimited accumulation; optimum moderation by water; presence of low-neutron-absorbing moderators such as beryllium, graphite, or hydrogenous material enriched in deuterium; spherical geometry; and pure fissile content (i.e., ^{239}Pu , ^{241}Pu , ^{235}U , or ^{233}U , without nonfissile uranium and plutonium nuclides). (See page 5.)

For purposes of ensuring criticality safety, the exemptions consider that the material can be released from any packaging during transport, may

reconfigure into a worst-case geometric arrangement, may combine with material from other transport vehicles, and may be subject to the fire and water immersion conditions assumed as part of the criticality safety assessment for package designs approved to transport fissile material. (See page 15.)

NUREG/CR-7239 is a bounding analysis for a near-surface disposal facility because the accidents analyzed for NUREG/CR-7239 (fire, water immersion, reconfiguration into worst-case geometry, unlimited accumulation from multiple packages) are representative of extreme accidents and conditions during operations at a disposal facility (e.g., handling accidents, flooding, fires). The concentrations that form the basis for the exemption at § 71.15(c) are based on accident scenarios analyzed in NUREG/CR-7239. Importantly, if the exemption at § 71.15(c) were adopted for low-level waste facilities, it would not restrict the number and configuration of the waste packages stored on the surface or emplaced within a disposal unit. However, such an exemption would place certain requirements on the commingling of fissile and nonfissile material and homogeneity of the wasteform, which are also addressed in NUREG/CR-7239.

Homogeneity of the wasteform is important to ensure that heterogeneities within the wasteforms are such that it would not be credible to accumulate the volume and configuration of fissile material to introduce criticality concerns. Small heterogeneous volumes can be expected to exist in a number of wasteforms, however, the requirement that 180 g of fissile material be distributed within a minimum of 360,000 g (360 kilogram (kg)) of contiguous nonfissile material provides added assurance that redistribution of the potentially heterogeneous portions of the fissile material will not result in a criticality concern (see NUREG/CR-7239 pages 20 and 21 for further details).

In summary, the NRC considers the exemption at § 71.15(c) and the associated criteria for its implementation to be appropriate for waste packages received, handled, stored, and emplaced at a near-surface disposal facility. NUREG/CR-7239 provides

extensive evaluations of criticality risk over a range of accident conditions designed to enhance the likelihood of a criticality (e.g., fire, waste immersion, reconfiguration into a worst-case geometry, and the combining of material from multiple packages). NUREG/CR-7239 demonstrated that even under these optimum conditions for a criticality to occur there is still a large safety margin in preventing a criticality (NUREG/CR-7239; Figure 3). The NRC is therefore proposing to revise § 61.16(b) with respect to criticality safety during operations so that an applicant would not be required to consider radioactive waste containing fissile material meeting the requirements specified at § 71.15(c). Draft guidance is provided in NUREG-2175, Revision 1 regarding criticality controls during operations.

Following the cessation of operations and after a near-surface facility is closed, the overall amount of GTCC waste disposed could contain significant amounts of fissile material (i.e., greater than a critical mass). The DOE's FEIS accounted for approximately 12,000m³ of waste that, when combined, have the potential to include large quantities of fissile material (e.g., tens to hundreds of kilograms). Depending on the wastefrom and disposal system design, reconcentration of fissile material could occur following disposal as containers degrade and radionuclides are mobilized by infiltrating water. An applicant should consider the potential for reconcentration of fissile material contained in GTCC waste at a facility that disposes of significant amounts of fissile material. The NRC is proposing to add a requirement in § 61.16(b)(3) that an applicant must provide information identifying the design attributes that limit the potential for reconcentration of fissile material following disposal when disposing of more than a critical mass of material in a disposal unit. Draft guidance is provided in NUREG-2175, Revision 1 to help determine what is a significant quantity of long-lived radionuclides. The NRC has also provided additional guidance in NUREG-2175 related to postclosure criticality safety

considerations. For example, NUREG-2175 contains guidance regarding the potential for reconcentration of fissile material.

Although the exemption at § 71.15(c) for designating SNM radioactive waste material as non-fissile was evaluated in the context of near-surface disposal of GTCC radioactive waste rather than Classes A, B, and, C low-level waste, the basis for this exemption is equally valid for Classes A, B, and C radioactive waste because radionuclides are fissile or non-fissile regardless of waste class. Application of this exemption to Classes A, B, and C low-level waste would provide licensees with the flexibility to dispose of certain, limited waste streams containing fissile material.

The Atomic Energy Act of 1954, as amended, (AEA) precludes the NRC from relinquishing its authority over SNM unless the material quantities are not sufficient to form a critical mass (i.e., AEA Sec. 274b.(3)). Those limits are defined in 10 CFR 150.11, "Critical mass." The Commission Staff Requirements Memorandum on SECY-98-226, "Issuance of a Section 274f, Atomic Energy Act Order to Exempt Envirocare of Utah, Inc. From Licensing Requirements for Special Nuclear Material in Diffuse Waste That Will be Regulated by the State of Utah," issued on October 22, 1998, allowed the NRC to conclude that an exemption from 10 CFR part 70 license requirements for a land disposal facility could be based on concentration limits and other considerations to ensure that quantities greater than a critical mass are safe. As stated in SECY-98-226: "At the time Part 150 was developed, the Commission likely did not envision that large quantities of diffuse waste containing low concentrations of SNM would be generated. Thus, mass limits that are in Part 150 have little relevance to large quantities of diffuse waste containing low U-235 concentrations, other than providing absolute assurance of criticality safety by preventing accumulation of a critical mass" (September 29, 1998).

For over 20 years, the NRC has implemented a process for commercial LLW sites located in an NRC Agreement State that allow for Agreement State authority over the receipt, possession, and disposal of quantities SNM greater than a critical mass that are safe under certain prescribed conditions. That process must have the support of the NRC Agreement State in which the commercial LLW site is located with an effective NRC Exemption Order for SNM.

Currently, there are two near-surface disposal facilities with an NRC Exemption Order for SNM:

- 1) NRC Exemption Order for SNM to EnergySolutions-Utah is from January 2003 (68 FR 7399; February 13, 2003); but, with the name change from Envirocare-Utah to EnergySolutions-Utah from May 2006 (71 FR 34168; June 13, 2006).
- 2) NRC Exemption Order for SNM to Waste Control Specialists LLC-Texas is from December 2014 (79 FR 73647; December 11, 2014), as supplemented by the five NRC letters dated September 23, 2016, September 26, 2017, December 19, 2018, December 7, 2020, and June 8, 2022.

The proposed changes to § 61.16(b)(1) and (2) for disposal of radioactive waste would not change the current orders for Energy Solutions-Utah and Waste Control Specialists LLC-Texas.

xiii. Agreement State Licensing of GTCC Waste Streams

The Agreement State licensing of GTCC waste streams is guided by a regulatory program that is adequate to protect public health and safety and compatible with NRC requirements.

1) *Relevant statutes*

Section 274b.(3) of the AEA provides that SNM in quantities sufficient to form a critical mass may not be relinquished by the NRC. This limitation is included in all agreement documents signed by the Chair of the NRC and the Governor of a State.

Section 274c of the AEA prescribes the types of regulatory authority that must be retained by the NRC. Specifically, the NRC must retain its regulatory authority for: the construction and operation of nuclear reactors, nuclear fuel cycle facilities and uranium enrichment facilities; the export from or import into the United States of source, byproduct, or SNM; or the disposal into the ocean or sea of any source, byproduct, or SNM. Section 274c.(4) also provides that the Commission may not relinquish its regulatory authority with respect to the disposal of such other byproduct, source, or SNM as the Commission determines by regulation or order should, because of the hazards or potential hazards thereof, not be disposed of without a license from the Commission.

Additionally, Section 274m of the AEA provides that no agreement entered under subsection (b), and no exemption granted pursuant to subsection (f), shall affect the authority of the NRC under section 2201(b) or (i) of this title to issue rules, regulations, or orders to protect the common defense and security, to protect restricted data or to guard against the loss or diversion of SNM.

Section 3 of the LLRWPA delineates the LLW disposal responsibilities between the States and the Federal Government. Section 3(b)(1) of the LLRWPA provides that the Federal Government is responsible for regulating and providing for the disposal of GTCC waste streams.

Prior to accepting GTCC waste for disposal, an Agreement State that currently has the authority to regulate LLW disposal would need to update its program to ensure that it has adequate and compatible legislation, regulations, licensing, inspection, staffing and training, enforcement, and incident response to support GTCC disposal.

These seven elements constitute the basis for the effective oversight of the disposal of GTCC waste.

An Agreement State that does not currently have LLW disposal authority would have to develop a LLW regulatory program and amend its Agreement with the NRC to provide authority to regulate LLW disposal in accordance with the procedures laid out in NMSS Procedure SA-700, "Processing an Agreement."

2) Relevant regulations

The NRC's regulations in 10 CFR part 150, "Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters in under Section 274," implement Section 274 of the AEA. Several 10 CFR part 150 regulations are germane to Agreement State licensing of near-surface disposal of GTCC waste and associated relinquishment of NRC regulatory authority to an Agreement State.

As some GTCC waste streams contain SNM, any relinquishment of regulatory authority must comply with the AEA Section 274b.(3) provision that such relinquishment be limited to SNM in quantities not sufficient to form a critical mass. The NRC implements this requirement through 10 CFR 150.11, "Critical mass."

Under the AEA and its regulations, the NRC cannot relinquish to an Agreement State the regulatory authority to license a near-surface disposal facility that can accept LLW, including GTCC waste streams, that have U-233, plutonium, enriched U-235, or a combination of these isotopes or elements above the § 150.11 mass thresholds. Consequently, Agreement States only have the authority to regulate near-surface disposal facilities that accept GTCC waste streams below the mass thresholds of § 150.11. However, this proposed rule would also revise the regulations at § 61.16(b) to specify that an applicant is not required to consider the quantity of SNM that has been disposed or radioactive waste containing fissile material that meets the exemption

requirements specified in § 71.15(c) for designating material as non-fissile for the purposes of criticality safety.

Additionally, §§ 150.14 and 150.15 contain requirements that limit the types and quantities of GTCC waste that can be regulated solely by an Agreement State. Section 150.14 provides that persons in Agreement States possessing, using, or transporting SNM of low strategic significance in quantities greater than 15 grams of plutonium or uranium-233 or uranium-235 (enriched to 20 percent or more in the U-235 isotope) or any combination greater than 15 grams when computed by the equation [Total mass (grams)=g U²³⁵ + g Pu + g U²³³] shall meet the physical protection requirements of § 73.67. The § 150.14 mass thresholds are the same as the 10 CFR part 73 minimum thresholds for one form of SNM of low strategic significance or a Category III quantity of SNM. This proposed rule would exempt the 10 CFR part 73 physical protection requirements of radioactive waste containing SNM of limited attractiveness at a near-surface disposal facility. The limited attractiveness of radioactive waste with specific characteristics (i.e., quantity of material of low strategic significance containing very dilute concentrations of SNM) provides a reasonable demarcation for physical protection of radioactive waste materials at a near-surface disposal facility. As discussed under section III.C.xi of this proposed rule, the exemption from the 10 CFR part 73 physical protection requirements of radioactive waste containing SNM of limited attractiveness at a near-surface disposal facility would provide additional flexibility to Agreement State licensees for those wastes meeting the requirements for the exemption.

Likewise, a provision of 10 CFR 150.15 may also restrict the scope of potential Agreement State regulation of GTCC waste streams. Persons in Agreement States are not exempt from the Commission's licensing and regulatory requirements with respect to activities listed at § 150.15. In particular, § 150.15(a)(4) precludes, on a generic basis,

Agreement State authority for the transfer, storage, or disposal of radioactive waste material resulting from the separation in a production facility of SNM from irradiated nuclear reactor fuel (reprocessing waste). This exclusion was adopted by the Atomic Energy Commission (AEC) in 1962 without a distinction whether the radioactive waste was high-level or low-level waste. At that time, the AEC determined that high-level radioactive waste should not be disposed of without a license from the AEC and stated the States would have control over land disposal of LLW (27 FR 1350; February 14, 1962).

The concept of waste incidental to reprocessing, or waste that can be managed based on the risk rather than the source, has been recognized since 1969 when the AEC issued a proposed rulemaking regarding the siting of reprocessing facilities. Waste incidental to reprocessing can include a variety of items (e.g., ion exchange beds, sludges, contaminated laboratory items, clothing, tools, and equipment). The history of NRC's role in waste incidental to reprocessing is provided in NUREG-1854, "NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations." In 1993, the Commission approved specific criteria for determining whether a waste was incidental to reprocessing and appropriate for disposal in the near surface (58 FR 12342; March 4, 1993). The determination requires a review and approval under the AEA by the appropriate Federal regulator (NRC for commercial licensees; DOE for wastes designated a DOE responsibility) for the waste generator to treat the waste as incidental and appropriate for near surface disposal. The NRC is proposing to revise 10 CFR 150.15(a)(4) to maintain federal oversight in determining which wastes are incidental but also allow the Agreement States to regulate disposal sites that receive this waste.

3) Agreement State flexibilities offered in this proposed rule

In SRM-SECY-15-0094, the Commission directed the NRC staff to analyze whether, in accordance with Section 274c.(4) of the AEA, some GTCC waste streams could be disposed of in an Agreement State licensed near-surface disposal facility based upon their hazards. The Commission also directed the staff to proceed with a proposed rule to establish the regulatory requirements in 10 CFR part 61 for those GTCC waste streams suitable for near-surface disposal.

This proposed rule would implement the Commission's direction to amend the land disposal regulations to allow for near-surface disposal of some GTCC waste streams and allow for Agreement State regulation of those waste streams. Specifically, this proposed rule would exempt radioactive waste containing SNM of limited attractiveness from the 10 CFR part 73 physical protection requirements at a near-surface disposal facility. This exemption would provide additional flexibility to Agreement State licensees for those wastes meeting the requirements for the exemption. Radioactive waste meeting the criteria for the 10 CFR part 73 exemption would be protected under the physical protection requirements of 10 CFR parts 20 and 37, as appropriate. This proposed rule would also amend § 61.16(b) with respect to criticality safety during operations so that an applicant would not be required to consider the quantity of SNM that has been disposed or radioactive waste containing fissile material that meets the exemption requirements specified in § 71.15(c). For waste meeting the exemption criteria in § 71.15(c) licensees would not be required to provide proposed procedures for avoiding accidental criticality.

IV. Specific Requests for Comments

The NRC is seeking advice and recommendations from the public on the proposed rule. We are particularly interested in comments and supporting rationale from the public on the following:

1. This proposed rule would require an application for a LLW disposal facility to include a description of the facility's safety case. The safety case would be a component of the application that describes the safety relevant aspects of the site, the facility design, and the management and regulatory controls to demonstrate that the land disposal facility will be constructed and operated safely and provide reasonable assurance that the disposal site will meet the performance objectives in subpart C of part 61, including a description of the defense-in-depth protections that enhance the resiliency of the facility. The safety case is required in many international standards for radioactive waste disposal facilities. Most of the elements of a safety case are required by the current 10 CFR part 61 regulations, but those regulations do not require a concise summary of the safety basis for licensing the facility.

- Should the NRC retain the safety case for licensing a land disposal facility?
- Should the NRC include a description of defense-in-depth protections as part of the safety case?

Please provide the basis for your response.

2. The NRC's current regulations at 10 CFR 61.12(c) and (d) require an applicant to include in its application "a description of the principal design criteria and their relationship to the performance objectives" and "a description of the design basis natural events or phenomena and their relationship to the principal design criteria," respectively. Principal design criteria establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components to provide reasonable assurance that a land disposal facility can be operated and closed without

undue risk to the health and safety of the public. This information is part of the specific technical information under 10 CFR 61.12 that the NRC requires to be included “for demonstration that the performance objectives of subpart C of this part and the applicable technical requirements of subpart D of this part will be met.” The NRC is considering whether the principal design criteria is relevant to applications and whether the other technical information in 10 CFR 61.12 and other requirements in subparts C and D of 10 CFR part 61 are sufficient to determine whether the facility will provide adequate protection of public health and safety and the environment.

- How do current or potential new facility applications under 10 CFR part 61 use principal design criteria in its design of a facility?
- Should the NRC remove or otherwise amend its requirements for an applicant to include principal design criteria in its application for a facility license? Please provide the basis for your response.

3. The current regulations at 10 CFR part 61 require any application to receive and possess SNM in quantities subject to the requirements of 10 CFR part 73, Physical Protection of Plants and Materials,” must include information on physical security measures, if appropriate (see 10 CFR 61.16). The current regulations at 10 CFR part 73 (a “common defense and security” regulation) can only be enforced by the NRC. For requirements under 10 CFR part 73, an Agreement State licensee most likely would either need to obtain an NRC license or become subject to an NRC order to allow for NRC oversight, inspection, and enforcement of the 10 CFR part 73 requirements. The NRC is proposing revisions to its regulations at 10 CFR part 73 by including an exemption from the 10 CFR part 73 physical protection requirements of radioactive waste containing SNM of limited attractiveness at a near-surface disposal facility. The NRC’s proposed approach is similar to exemptions currently specified at

§§ 73.67(b)(1)(i) through (iii) that exempt materials containing SNM from the requirements of § 73.67 due to specific attributes/characteristics of the material. By exempting radioactive waste containing SNM of limited attractiveness for theft and diversion at a near-surface disposal facility, this proposed rule would provide a clear and straight forward designation for radioactive waste at a near-surface disposal facility and would provide additional flexibility for Agreement State regulation of GTCC waste. The proposed exemption would reduce the regulatory burden on waste disposal licensees by reducing NRC oversight (e.g., inspections) for the protection of low concentrations of SNM.

The NRC is interested in receiving comments on other possible regulatory approaches that would allow for a single regulator for an Agreement State licensee disposing of GTCC waste. In development of the proposed 10 CFR part 73 exemption, the NRC explored providing a security exemption for low concentrations of SNM in 10 CFR part 61 and 10 CFR 150.14. However, while 10 CFR part 61 applies to near-surface disposal facilities and thus it would be clear which licensees the exemption would apply to, the NRC is concerned that this approach might be more confusing, require numerous cross-references to other regulations, and depart from the structure for physical security requirements in other parts of the NRC's regulations.

- Should the NRC provide a security exemption for low concentrations of SNM in 10 CFR 150.14 and part 61 rather than placing the exemption in 10 CFR part 73? Please provide the basis for your response.

4. The NRC is proposing to revise § 61.16(b) with respect to criticality controls to specify that an applicant is not required to consider, as part of its SNM inventory, radioactive waste containing low concentrations of fissile material that meet the

requirements specified at § 71.15(c) to allow the material to be classified as nonfissile. As discussed in section III.C.xii (Criticality Safety of GTCC Waste Streams) of this document, the NRC considers the exemption specified at § 71.15(c) and its associated criteria for its implementation as appropriate for waste packages received, handled, stored and emplaced at a near-surface disposal facility, and it ensures criticality controls are appropriate to potential likelihood for an accidental criticality to occur. NUREG/CR-7239 demonstrated that even under these optimum conditions for a criticality to occur there is still a large safety margin in preventing a criticality for radioactive waste meeting the requirements specified at § 71.15(c). The revision to § 61.16(b) would not provide flexibility to Agreement States regarding the critical mass thresholds specified at § 150.11. The NRC is interested in receiving comments on use of the concentration limit specified at § 71.15(c) as an alternative approach for estimating the critical mass amounts possessed at a near-surface disposal facility. The current approach for addressing low concentrations of certain isotopes in radioactive waste with respect to § 150.11 thresholds for critical mass has been to issue orders (see section III.C.xii of this document for further discussion on NRC orders). Use of an alternative approach for estimating the critical mass amounts based on the concentration limit specified at § 71.15(c) could provide further flexibility to Agreement States by eliminating the need for NRC review and orders associated with determining critical mass amounts (e.g., radioactive waste meeting the requirements specified at § 71.15(c) would not be considered in estimating the mass of the isotopes listed in § 150.11). In particular:

- Should the NRC use the requirements specified at § 71.15(c) as an alternative approach in determining whether or not a near-surface disposal facility possess more than the critical mass specified at § 150.11?

- Should the alternative approach be applicable to Class A, B, and C radioactive wastes, as well as GTCC radioactive waste?

Please provide the basis for your response.

V. Section-by-Section Analysis

The following paragraphs describe the specific changes proposed by this rulemaking.

Section 20.1003 Definitions

This proposed rule would revise the definition of *Waste* to remove “transuranic waste” and to include radioactive material resulting from the production of medical isotopes.

Appendix G to Part 20 Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests

This proposed rule would revise paragraphs I.D.4 and I.E.2(d) by adding a caveat for a waste facility that has established waste acceptance criteria (WAC) under § 61.58; it would amend paragraph II to add equivalent State regulations and certification requirements for waste consigned to a land disposal facility; paragraphs III.A.1 and 3 to include a land disposal facility that has established WAC under § 61.58 and paragraph III.A.2 to label disposal containers in accordance with § 61.57; and paragraphs III.C.3 and 5 to include a land disposal facility that has established WAC under § 61.58 and paragraph III.C.4 to label disposal containers in accordance with § 61.57.

Nomenclature Changes

Throughout 10 CFR part 61, this proposed rule would:

Sections	Remove:	Replace with:
	Post-closure	postclosure
61.3, 61.9(e), 61.9a, 61.20(b), 61.22(b), 61.24, 61.25, 61.26(a), 61.29, 61.32(a) and (b), 61.53, 61.56(a)(3) and (6), 61.59(b), 61.61, 61.62, 61.63, 61.71, 61.73, 61.80, 61.81, 61.82	shall	must
61.4, 61.9(e)(2)	http	https

Section 61.1 Purpose and scope

This proposed rule would remove the last sentence in paragraph (a), redesignate paragraphs (b) and (c) as paragraphs (c) and (d) and make minor administrative changes, and add new paragraph (b) that adds criteria applicable to existing land disposal facilities.

Section 61.2 Definitions

This proposed rule would add definitions for *Compliance period*, *Defense-in-depth*, *Inadvertent intruder assessment*, *Long-lived radionuclide*, *Model support*, *Operational safety assessment*, *Performance assessment*, *Performance period*, *Performance period analyses*, *Safety case*, *Significant quantities*, *Site stability*

assessment, Technical analyses, and Waste acceptance criteria. This proposed rule also revises the definitions for *Active maintenance, Buffer zone, Chelating agent, Disposal, Disposal unit, Engineered barrier, Inadvertent intruder, Intruder barrier, Land disposal facility, Monitoring, Near-surface disposal facility, Site closure and stabilization, Stability, State, Tribal governing body, and Waste.* In addition, this section would be revised to make minor editorial and conforming changes.

Section 61.4 Communications

This proposed rule would replace the word “practicable” with “practical,” the term “CD ROM” with the phrase “digital media,” and the protocol “http” with “https.”

Section 61.7 Concepts

This proposed rule would revise paragraph (a); redesignate paragraphs (b) and (c) as paragraphs (c) and (d); and add new paragraph (b) with performance objectives.

Section 61.8 Information collection requirements: OMB approval

This proposed rule would add sections “61.41” and “61.42” to the list of sections with OMB-approved information collection requirements.

Section 61.9 Employee Protection

This proposed rule would replace gendered terms with inclusive, gender-neutral language in paragraphs (a)(1)(i) and (iii), (a)(3), (b), (d), and (f).

Section 61.10 Content of application

This proposed rule would redesignate the section as paragraph (a) and revise to include technical analyses and add new paragraph (b) requiring the inclusion of the safety case with an application.

Section 61.12 Specific technical information

This proposed rule would revise the introductory text of this section for clarity; paragraphs (a) and (b) to add more features to the required descriptions in the technical information; paragraph (c) to add clarity; paragraph (d) by adding example phenomena; paragraph (e) by making grammatical changes for clarity; and paragraphs (f) and (h) through (l) for clarity.

Section 61.13 Technical analyses

This proposed rule would revise this section to add greater clarity on the technical analyses required to be included with an application submitted in accordance with § 61.10.

Section 61.14 Institutional information

This proposed rule would remove the comma after the word “met” to correct an editorial error.

Section 61.16 Other Information

This proposed rule would revise paragraph (a) for clarity and paragraphs (b)(1) and (2) to include information about radioactive waste containing fissile material; and would add new paragraph (b)(3) to add information about an application for disposal of Greater-Than-Class C (GTCC) waste.

Section 61.23 Standards for issuance of a license

This proposed rule would revise paragraphs (b) through (e) to include WAC and paragraph (f) to change from “applicant” to “application” and paragraph (j) to add requirements if those in § 70.24 apply; and add new paragraph (m) with a requirement for an adequate safety case.

Section 61.24 Conditions of licenses

This proposed rule would remove the phrase “of this part” in paragraph (j); revise paragraph (i) to include requirements for preventing criticality; and add paragraph (l) regarding operation of a land disposal facility.

Section 61.25 Changes

This proposed rule would correct the words “which” to “that” wherever it may appear; revise paragraph (a)(3) by adding “so orders” after the phrase “if the Commission” and revise paragraph (b) to add WAC changes. This proposed rule also would redesignate paragraph (c) as paragraph (d) and add new paragraph (c) regarding WAC changes.

Section 61.27 Application for renewal or closure

This proposed rule would correct the word “shall” to “does” in paragraph (a).

Section 61.28 Contents of application for closure

This proposed rule would revise paragraph (a) introductory text to provide additional clarity, redesignate paragraph (a)(3) as paragraph (a)(4), and add new

paragraph (a)(3) regarding revisions to technical analyses, revise the introductory text of redesignated paragraph (a)(4) to provide clarity, and would add paragraph (a)(5) to include a new requirement for the site closure plan, and in paragraph (c), correct the word “shall” to “will”.

Section 61.29 Post-closure observation and maintenance

This proposed rule would revise the section heading to read “Postclosure observation and maintenance.” It also would correct the reference “§ 61.28” to read “§ 61.28(c)”.

Section 61.30 Transfer of license

This proposed rule would revise paragraph (a) introductory text by replacing the phrase “The license shall be transferred when” with “The license amendment request will be approved and the license transferred if”.

Section 61.32 Facility information and verification

This proposed rule would revise paragraph (c) to remove “Shall” and add in its place “Applicants and licensees specified in paragraph (a) of this section must”.

Section 61.41 Protection of the general population from releases of radioactivity

This proposed rule would redesignate the section as paragraph (a) and revise to provide clarity and change “land disposal facility” to read as “disposal site”; and how to demonstrate compliance and add paragraph (b) regarding releases of radioactivity as ALARA and paragraph (c) requirements for licensees who meet the criteria in § 61.1(b)(1).

Section 61.42 Protection of individuals from inadvertent intrusion

This proposed rule would redesignate the section as paragraph (a) and revise to include dose to any inadvertent intruder and add paragraph (b) on exposures to an inadvertent intruder and paragraph (c) requirements for licensees who meet the criteria in § 61.1(b)(1).

Section 61.43 Protection of individuals during operations

This proposed rule would revise this section to include an annual dose limit of 0.25 mSv (25 mrem) to a member of the public and a compliance requirement that must be demonstrated through the operational safety assessment.

Section 61.44 Stability of the disposal site after closure

This proposed rule would revise this section to include the land disposal facility, the institutional control period, specification of “practicable” as “practical” and “closure” as “site closure,” and a compliance requirement that must be demonstrated through the site stability assessment.

Section 61.50 Disposal site suitability requirements for land disposal

This proposed rule would revise and restructure paragraph (a) to provide clarity and new requirements for disposal site suitability.

Section 61.51 Disposal site design for land disposal

This proposed rule would revise paragraphs (a)(1), (4), and (6) for clarity.

Section 61.52 Land disposal facility operation and disposal site closure

This proposed rule would revise paragraph (a)(1) for clarity; redesignate paragraphs (a)(3) through (a)(11) as paragraphs (a)(5) through (a)(13) and revise redesignated paragraphs (a)(5), (10), and (13) for clarity, and add new paragraphs (a)(3), (4), to include GTCC waste requirements and add paragraphs (a)(14) through (18) regarding waste disposal requirements.

Section 61.53 Environmental monitoring

This proposed rule would revise paragraphs (a) and (b) to provide additional clarity, revise paragraph (d) to add a reference to § 61.29 that describes the licensee's responsibilities for postclosure observation and maintenance of the disposal site.

Section 61.55 Waste classification

This proposed rule would revise paragraph (a) by 1) replacing the term "waste form" with "wasteform," wherever it may appear; 2) adding a period to the end of the introductory text to paragraph (a); 3) revising paragraphs (a)(2)(i) through (iii) by adding a new last sentence to each paragraph that clarifies the classes of waste, and replacing the phrase "§ 61.56." with "§ 61.56(a) and (b)." in paragraphs (a)(2)(ii) and (iii); 4) redesignating paragraph (a)(2)(iv) as paragraph (a)(2)(v), adding new paragraph (a)(2)(iv) for GTCC waste, and revise redesignated paragraph (a)(2)(v) for waste that is not generally acceptable for near-surface disposal; 5) replacing the phrase "not generally acceptable for near-surface disposal" with "Greater-Than-Class C" in paragraphs (a)(3)(iii) and (a)(4)(iv), and 6) revising paragraph (a)(6) to add "of this section".

This proposed rule would replace the phrases “shall be” and “shall be that” with “is” in paragraphs (a)(3) introductory text, paragraph (a)(3)(iv), (a)(4) introductory text, paragraph (a)(4)(v), (a)(5) introductory text, and paragraphs (a)(5)(i) and (ii).

Additionally, this proposed rule would revise table 2 to paragraph (a)(4)(v) to 1) correct a typo in the first row (adding a hyphen), 2) revise “shall be” to “are” in footnote 1, and 3) include waste that is GTCC to footnote 1.

This proposed rule also would add paragraph (a)(5)(iii) and add and reserve paragraph (b) as an editorial correction.

Section 61.56 Waste characteristics

This proposed rule would 1) revise the introductory text to paragraph (a) to replace the phrase “are minimum requirements for all classes of waste” with “apply for all waste,” 2) revise paragraph (a)(3) to remove “in no case shall” and add “must not” before “exceed”, and 3) revise paragraphs (a)(8) and (b)(3) to replace the word “practicable” with “practical”, 4) replace the word “since” with “because” in the introductory text to paragraph (b), 5) replace the phrase “waste form” with “wasteform” in paragraph (b)(1), 6) replace the phrase “in no case shall the liquid” with the phrase “the liquid must not” in paragraph (b)(2).

This proposed rule also would add paragraph (c) to include additional requirements for the near-surface disposal of GTCC waste.

Section 61.57 Labeling

This proposed rule would revise this section to include labeling requirements for site-specific WAC.

Section 61.58 Alternate requirements for waste classification and characteristics

This proposed rule would revise the section heading to read “Waste acceptance” and add paragraphs (a) through (e) to provide WAC.

Section 61.59 Institutional requirements

This proposed rule would revise paragraph (b) by revising for active voice and removing the reference to § 61.13. In addition, this section would be revised to make minor editorial and conforming changes.

Section 61.62 Funding for disposal site closure and stabilization

This proposed rule would replace the word “practicable” with “practical” in paragraphs (a) and (f).

Section 61.80 Maintenance of records, reports, and transfers

This proposed rule would correct paragraph (i)(1) to correct the reference from “§ 60.4” to “§ 61.4” and remove the phrase “of this chapter,” wherever it may appear; remove the phrase “by waste class” in paragraph (i)(2); redesignate the last sentence of paragraph (i)(2) as new paragraph (i)(3); replace the phrase “That required in 10 CFR part 20, appendix G,” with “That information required in appendix G to part 20 of this chapter” in paragraph (i)(1)(i); and add paragraphs (m), and (n) adding waste recordkeeping requirements. In addition, this section would be revised to make minor editorial and conforming changes.

Section 61.81 Tests at land disposal facilities

This proposed rule would add and reserve paragraph (b) as an editorial correction.

Section 73.67 Licensee fixed site and in-transit requirements for the physical protection of special nuclear material of moderate and low strategic significance.

This proposed rule would revise paragraph (b)(1)(iii) by removing the period at the end of the sentence and adding “, or” in its place, and add paragraph (b)(1)(iv) to add requirements for radioactive waste under 10 CFR part 61 or Agreement State equivalent regulations.

Section 150.11 Critical mass

This proposed rule would replace the word “he” with the words “the person” in paragraph (b).

Section 150.14 Commission regulatory authority for physical protection

This proposed rule would redesignate the section as paragraph (a). This proposed rule also would add and reserve paragraph (b) as an editorial correction.

Section 150.15 Persons not exempt

This proposed rule would replace the phrase “Greater than Class C waste” with the phrase “Greater-Than-Class C waste,” wherever it may appear. This proposed rule also would capitalize the word “agreement” in paragraph (a) introductory text, and revise paragraph (a)(4) to replace the phrase “contaminated equipment” with the phrase “contaminated equipment or to waste incidental to reprocessing that has been evaluated and approved as material to be disposed at a near-surface land disposal facility”. This

proposed rule also would redesignate paragraphs (a)(8) and (a)(9) as paragraphs (a)(7)(iv) and (a)(8), and revise paragraph (b) to remove the word “shall”.

VI. Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this rule, if adopted, will not have a significant economic impact on a substantial number of small entities. This proposed rule affects only the licensing and operation of LLW disposal facilities. The companies that own these facilities do not fall within the scope of the definition of “small entities” set forth in the Regulatory Flexibility Act or the size standards established by the NRC (10 CFR 2.810).

Any small entity subject to this regulation that determines, because of its size, it is likely to bear a disproportionate adverse economic impact should notify the Commission of this opinion in a comment that indicates —

a) The licensee’s size and how the proposed regulation would impose a significant economic burden on the licensee as compared to the economic burden on a larger licensee;

b) How the proposed regulations could be modified to take into account the licensee’s differing needs or capabilities;

c) The benefits that would accrue or the detriments that would be avoided if the proposed regulations were modified as suggested by the licensee;

d) How the proposed regulation, as modified, would more closely equalize the impact of NRC regulations or create more equal access to the benefits of Federal programs as opposed to providing special advantages to any individual or group; and

e) How the proposed regulation, as modified, would still adequately protect public health and safety.

Comments should be submitted as indicated under the ADDRESSES section in this document.

VII. Regulatory Analysis

The NRC has prepared a draft regulatory analysis on this proposed rule. The analysis examines the costs and benefits of the alternatives considered by the NRC. The NRC requests public comment on the draft regulatory analysis. The regulatory analysis is available as indicated in the “Availability of Documents” section of this document. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES section of this document.

VIII. Backfitting and Issue Finality

The NRC has determined that the backfitting provisions in 10 CFR 50.109, 70.76, 72.62, and 76.76 and the issue finality provisions in 10 CFR part 52 do not apply to this proposed rule. This rulemaking would apply to applicants for a new low-level waste facility license, current low-level waste facility licensees, and current low-level waste facility licensees that submit an application for a license amendment to receive GTCC waste or significant quantities of long-lived radionuclides, the application for which is submitted after the effective date of this rulemaking. These licensees would be regulated in accordance with 10 CFR part 61. As 10 CFR part 61 contains no backfitting provisions, and these licensees are not within the scope of an NRC regulation that

contains a backfitting or issue finality provision, this proposed rule is not within the scope of the NRC's backfitting and issue finality provisions.

IX. Cumulative Effects of Regulation

Cumulative effects of regulation (CER) describes the challenges that licensees, certificate holders, States, or other entities may encounter while implementing new regulatory requirements (e.g., rules, generic letters, orders, backfits, inspection findings). The CER is an organizational effectiveness challenge that results from a licensee or impacted entity implementing a significant number of new and complex regulatory actions stemming from multiple regulatory actions, within a limited implementation period and with available resources (which may include limited available expertise to address a specific issue). The CER can potentially distract licensee or entity staff from executing other primary duties that ensure safety or security. The NRC is specifically requesting comment on the cumulative effects of this rulemaking. In developing comments on CER, consider the following questions:

1. In light of any current or projected CER challenges, does the proposed rule's effective date, compliance date, or submittal date(s) provide sufficient time to implement the new proposed requirements, including changes to programs, procedures, and the facility?
2. If CER challenges currently exist or are expected, what should be done to address them? For example, if more time is required for implementation of the new requirements, what period of time is sufficient?

3. What other (NRC or other agency) regulatory actions (e.g., orders, generic communications, license amendment requests inspection findings of a generic nature) influence the implementation of the proposed rule's requirements?
4. Are there unintended consequences? Does the proposed rule create conditions that would be contrary to the proposed rule's purpose and objectives? If so, what are the unintended consequences, and how should they be addressed?
5. Please comment on the NRC's cost and benefit estimates in the regulatory analysis that supports the proposed rule.

X. Plain Writing

The Plain Writing Act of 2010 (Pub. L. 111-274) requires Federal agencies to write documents in a clear, concise, and well-organized manner. The NRC has written this document to be consistent with the Plain Writing Act as well as the Presidential Memorandum, "Plain Language in Government Writing," published June 10, 1998 (63 FR 31885). The NRC requests comment on this document with respect to the clarity and effectiveness of the language used.

XI. Environmental Assessment and Proposed Finding of No Significant Environmental Impact

The Commission has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in subpart A of 10 CFR part 51, that this rule, if adopted, would not be a major Federal action significantly affecting the

quality of the human environment, and an environmental impact statement is not required. The basis of this determination reads as follows:

A. The Action and the Need for the Action

The action is to add new and amend the existing requirements in 10 CFR parts 20, 61, 73, and 150. The NRC is amending its regulations that apply to LLW disposal facilities to require new and revised site-specific technical analyses to permit the development of site-specific criteria for LLW acceptance based on the results of the technical analyses, and to facilitate implementation and better align the requirements with current health and safety standards. Although several Agreement State programs have currently implemented similar changes, these new and amended NRC requirements would ensure that LLW streams that are significantly different from those considered in the regulatory basis for the current regulations can be disposed of safely and meet the performance objectives for land disposal nationwide. Case-by-case application of the new requirements for existing licensees are described in section III.C.ii of this document. These amendments would increase reliance on the use of site-specific information to ensure public health and safety is protected. These amendments would revise the existing technical analysis for protection of the general population (i.e., performance assessment) to include a 1,000-year compliance period; add a new site-specific technical analysis for the protection of inadvertent intruders (i.e., intruder assessment) that would include a 1,000-year compliance period and a dose limit; revise the requirements of the performance and intruder assessments to include a 10,000-year compliance period for those land disposal facilities that will dispose of significant quantities of long-lived radionuclides; add a new analysis for the disposal of significant quantities of long-lived radionuclides (i.e., performance period analyses) that would

include a post-10,000-year performance period and reasonably demonstrate exposures to an intruder and the general population will be reduced to the extent reasonably achievable; and revise the application for closure to include updates to the safety case and the technical analyses to ensure protection of public health and safety and the environment from such wastes. The technical analysis and disposal requirements are retained for Class A, B, and C waste while new requirements for technical analysis and disposal are added for GTCC waste. The NRC would also be adding a new requirement to develop criteria for the acceptance of LLW for disposal using either generic WAC or site-specific WAC. Additionally, the amendments would facilitate practical implementation and better align the requirements with current health and safety standards. Revisions to the NRC's draft guidance document, NUREG-2175, "Guidance for Conducting Technical Analyses for 10 CFR Part 61," dated March 31, 2015, will facilitate the development of information and analyses to support licensees or license applicants in addressing these regulatory requirements on a site-specific basis.

B. Environmental Impact of the Action

The rulemaking would modify the analyses that licensees need to perform to demonstrate compliance with the subpart C of 10 CFR part 61 performance objectives and to permit the development of generic criteria for LLW acceptance or site-specific criteria for LLW acceptance based on the results of these analyses. These amendments would not authorize the construction of LLW disposal facilities and do not authorize the disposal of additional LLW in existing facilities. Licensees and applicants would need to request and receive separate regulatory approval before construction of new disposal facilities or disposal of additional LLW in existing facilities. Consequently, this rulemaking provides the basis for any procedure granting the license but does not, by its own

operation, provide a license for construction or disposal activities, but rather applicants must comply with the relevant NRC or Agreement State regulations before they can receive a license. Therefore, this rulemaking will not result in any physical impacts to the environment, and the NRC has determined that the action would result in no significant environmental impacts.

C. Alternatives to the Action

As an alternative to the action, the NRC staff considered the “no-action” alternative. Under this alternative, the NRC would not modify its LLW regulations. No performance period analyses would be required, no period of compliance would be specified, no intruder assessment would be required, and the development of a waste acceptance plan would not be required. However, requiring new and revised site-specific technical analyses to demonstrate compliance with the subpart C performance objectives and development of LLW site-specific acceptance criteria for LLW acceptance would ensure the safe disposal nationwide of waste streams not previously analyzed in the development of part 61, including future waste streams, and would provide assurance that these waste streams comply with the subpart C of 10 CFR part 61 performance objectives. Case-by-case application of the new requirements for existing licensees is described in section III.C.ii of this document. Further, these analyses would identify any additional measures that would be prudent to implement, and these amendments would improve the efficiency of the regulations by making changes to facilitate implementation and better align the requirements with current health and safety standards. If the NRC did not implement this action, there is no assurance that future LLW streams not analyzed when 10 CFR part 61 was developed will comply with the subpart C of 10 CFR part 61 performance objectives nationwide. These LLW streams

would be allowed to be disposed under 61.55(a)(6) as Class A waste as long as the other requirements for the waste are met such as 61.56.

D. Alternative Use of Resources

This action would not result in any irreversible commitments of resources. The determination of this environmental assessment is that there will be no significant effect on the quality of the human environment from this action. Public stakeholders should note that comments on any aspect of this environmental assessment may be submitted to the NRC as indicated under the ADDRESSES section.

The NRC has sent a copy of the environmental assessment and this proposed rule to every State Liaison Officer and has requested comments.

XII. Paperwork Reduction Act Statement

This proposed rule contains new or amended collections of information subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501-21). This proposed rule has been submitted to the Office of Management and Budget for review and approval of the information collections. The proposed changes to 10 CFR parts 20, 73 and 150 do not contain any new or amended collections of information subject to the Paperwork Reduction Act of 1995.

Type of submission, new or revision: Revision.

The title of the information collection: Information Collections Contained in the Integrated Low-Level Radioactive Waste Disposal Proposed Rule

The form number if applicable: Not applicable.

How often the collection is required or requested: Information is required to be submitted with an application for a new facility or an amendment to an existing facility. Records are required to be retained as they are generated or completed.

Who will be required or asked to respond: Current and future LLW disposal facilities that are regulated by the NRC or an Agreement State.

An estimate of the number of annual responses: 4

The estimated number of annual respondents: 4

An estimate of the total number of hours needed annually to comply with the information collection requirement or request: New applicants and current LLW disposal facility licensees seeking to amend their licenses to address the requirements in these amendments would incur a reporting burden to describe various analyses and site-specific waste acceptance criteria (WAC) beginning approximately 3 years after publication of the final rule, based on Agreement State implementation of the final rule. The estimated one-time reporting burden per licensee to describe these analyses is 1,450 hours, and 200 hours to update these analyses at site closure. The rule would require an additional 40 hours of annual recordkeeping per licensee reflecting the expected increase in the use of site-specific information. Implementation of the final rule will impose new labeling requirements that will increase the third-party disclosure requirements on licensees. No change in third-party disclosure burden is expected for

three years while the Agreement States adopt the rule changes. The NRC does not expect to receive any new license applications, license amendment applications, or license closure applications within the OMB information collection period of 3 years following publication of the final rule.

Abstract: The NRC is proposing to amend its regulations to require LLW disposal facilities to conduct site-specific technical analyses to demonstrate compliance with the performance objectives of 10 CFR part 61. The intent of the rule is to ensure performance objectives are met at disposal sites for disposal of LLW that was not analyzed in the original 10 CFR part 61 regulatory basis (e.g., significant quantities of depleted uranium, GTCC waste). The site-specific technical analyses would include compliance period analyses with both a performance assessment and an intruder assessment, performance period analyses to evaluate how the disposal system could mitigate the risk from long-lived LLW, and an LLW acceptance plan identifying the WAC for the disposal facility. In addition, licensees must review their LLW acceptance plan annually and update analyses as part of the application for closure.

The information collection would be conducted to demonstrate compliance with the performance objectives in 10 CFR part 61 and develop criteria for LLW acceptance based on the results of these analyses that would continue to ensure the safe disposal of LLW. Information would be used by the NRC to ensure compliance with the performance objectives in subpart C of 10 CFR part 61 to ensure that LLW streams that are significantly different from those considered during the development of the original regulations can be disposed of safely and meet the performance objectives for land disposal of LLW. These amendments would also increase the use of site-specific information to better ensure that public health and safety continues to be protected. New

or revised responses to or recordkeeping requirements for the collection of information are found in 10 CFR 61.10, 61.12, 61.13, 61.16, 61.24, 61.28, 61.58 and 61.80.

The NRC is seeking public comment on the potential impact of the information collection contained in this proposed rule and on the following issues:

1. Is the proposed information collection necessary for the proper performance of the functions of the NRC, including whether the information will have practical utility? Please explain your answer.
2. Is the estimate of the burden of the proposed information collection accurate? Please explain your answer.
3. Is there a way to enhance the quality, utility, and clarity of the information to be collected? Please explain your answer.
4. How can the burden of the proposed information collection on respondents be minimized, including the use of automated collection techniques or other forms of information technology?

A copy of the OMB clearance package and proposed rule is available in ADAMS under Accession No. ML23242A260 or can be obtained free of charge by contacting the NRC's Public Document Room reference staff at 1-800-397-4209, at 301-415-4737, or by email to PDR.Resource@nrc.gov. You may obtain information and comment submissions related to the OMB clearance package by searching on <https://www.regulations.gov> under Docket ID NRC-2011-0012.

You may submit comments on any aspect of this proposed information collections, including suggestions for reducing the burden and on the above issues, by the following methods:

- **Federal rulemaking website:** Go to <https://www.regulations.gov> and search for Docket ID NRC-2011-0012.

- **Mail comments to:** FOIA, Library, and Information Collections Branch, Office of the Chief Information Officer, Mail Stop: T6-A10M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001 or to the OMB reviewer at: OMB Office of Information and Regulatory Affairs (3150-0135), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street, NW, Washington, DC 20503.

Submit comments by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the NRC staff is able to ensure consideration only for comments received on or before this date.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

XIII. Coordination with NRC Agreement States

The NRC has coordinated with the Agreement States during this rulemaking. Agreement State representatives served on the rulemaking working group that developed this proposed rule, and other Agreement State representatives participated on the steering committee for this proposed rule.

XIV. Compatibility of Agreement State Regulations

On the basis of the “Agreement State Program Policy Statement” approved by the Commission on October 2, 2017, and published in the Federal Register (82 FR 48535; October 18, 2017), NRC program elements can be placed into six categories (A, B, C, D, NRC, or health and safety (H&S)) to form the basis for evaluating and classifying the program elements. Under the Policy Statement, a program element means any component or function of a radiation control regulatory program, including regulations and other legally binding requirements imposed on regulated persons, which contributes to implementation of that program.

Compatibility Category A are those program elements that include basic radiation protection standards and scientific terms and definitions that are necessary to understand radiation protection concepts. Compatibility Category A program elements adopted by an Agreement State should be essentially identical to those of the NRC to provide uniformity in the regulation of agreement material on a nationwide basis.

Compatibility Category B pertains to a limited number of program elements that cross jurisdictional boundaries and should be addressed to ensure uniformity of regulation on a nationwide basis. For Compatibility Category B, the Agreement State program element shall be essentially identical to that of NRC.

Compatibility Category C are those program elements that are important for an Agreement State to have in order to avoid conflict, duplication, gaps, or other conditions that would jeopardize an orderly pattern in the regulation of agreement material on a national basis. An Agreement State program shall embody the essential objectives of the Category C program elements. Under Category C, Agreement State program elements may be more restrictive than NRC program elements; however, they should not be so restrictive as to prohibit a practice authorized by the Atomic Energy Act of 1954 (AEA),

as amended, and in the national interest without an adequate public health and safety or environmental basis related to radiation protection.

Compatibility Category D are those program elements that do not meet any of the criteria of Category A, B, or C, above, and are not required to be adopted by Agreement States for purposes of compatibility. An Agreement State has the flexibility to adopt and implement program elements within the State's jurisdiction that are not addressed by the NRC or that are not required for compatibility (i.e., Compatibility Category D). However, such program elements of an Agreement State relating to agreement material shall (1) not create conflicts, duplications, gaps, or other conditions that would jeopardize an orderly pattern in the regulation of agreement material on a nationwide basis; (2) not preclude a practice authorized by the AEA and in the national interest; and (3) not preclude the ability of the NRC to evaluate the effectiveness of Agreement State programs for agreement material with respect to protection of public health and safety.

Compatibility Category NRC are those program elements that address areas of regulation that cannot be relinquished to the Agreement States under the AEA, or provisions of Title 10 of the Code of Federal Regulations. The NRC maintains regulatory authority over these program elements and the Agreement States must not adopt these NRC program elements. However, an Agreement State may inform its licensees of these NRC requirements through a mechanism under the State's administrative procedure laws, as long as the State adopts these provisions solely for the purposes of notification, and does not exercise any regulatory authority as a result.

Category H&S program elements embody the basic health and safety aspects of the NRC's program elements. Although H&S program elements are not required for purposes of compatibility, they do have particular health and safety significance. The

Agreement State must adopt the essential objectives of such program elements to maintain an adequate program.

The proposed rule is a matter of compatibility between the NRC and the Agreement States, thereby providing consistency among Agreement State and NRC requirements. All Agreement States would be required to adopt those aspects of the proposed rule in 10 CFR parts 20 and 150, 10 CFR 61.55 through 61.58, and the definition of waste acceptance criteria in 10 CFR 61.2 since they have cross jurisdictional impacts regardless of whether or not they have exercised their authority to license an operating LLW disposal facility. These proposed revisions are designated as Compatibility Category B, with the exception of 10 CFR 61.58 which is Compatibility Category C. Agreement States that have exercised their assumed authority to regulate the land disposal of byproduct, source, or special nuclear waste materials received from other persons and plan to authorize a LLW disposal facility within their State to receive significant quantities of long-lived radionuclides, and/or receive GTCC waste streams acceptable for near-surface disposal, would be required to develop compatible requirements to 10 CFR part 61 in accordance with the assigned Compatibility Category designations. Agreement States that do not have authority or do not plan to license a LLW disposal facility within their State are not required to adopt the amendments to 10 CFR Part 61, except for 10 CFR 61.55 through 61.58 and the definition of waste acceptance criteria in 10 CFR 61.2. The compatibility (A, B, C, D, and NRC) and adequacy (H&S) categories are designated in the following tables:

Draft Compatibility Table for 10 CFR Part 20

Section	Change	Subject	Compatibility	
			Existing	New

20.1003	Amend	Definition-Waste.	B	B
App.G I.D	Amend	Manifest.	B	B
App.G I.E	Amend	Manifest.	B	B
App.G II	Amend	Certification.	B	B
App.G III.A	Amend	Control and Tracking.	B	B
App.G III.C	Amend	Control and Tracking.	B	B

Draft Compatibility Table for 10 CFR Part 61

Section	Change	Subject	Compatibility	
			Existing	New
61.1	Amend	Purpose and scope.	D	D
61.2	Amend	Definition-Active maintenance.	H&S	H&S
61.2	Amend	Definition-Buffer zone.	D	D
61.2	Amend	Definition-Chelating agent.	D	D
61.2	New	Definition-Compliance period.	-	C
61.2	New	Definition-Defense-in-depth.	-	H&S
61.2	Amend	Definition-Disposal.	C	C
61.2	Amend	Definition-Disposal unit.	D	D
61.2	Amend	Definition-Engineered barrier.	D	D
61.2	Amend	Definition-Inadvertent intruder.	C	C
61.2	New	Definition-Inadvertent intruder assessment.	-	H&S
61.2	Amend	Definition-Intruder barrier.	C	C
61.2	Amend	Definition-Land disposal facility.	B	B
61.2	New	Definition-Long-lived radionuclide.	-	B
61.2	New	Definition-Model support.	-	H&S
61.2	Amend	Definition-Monitoring.	C	C
61.2	Amend	Definition-Near-surface disposal facility.	D	D
61.2	New	Definition-Operational safety assessment.	-	H&S
61.2	New	Definition-Performance assessment.	-	H&S
61.2	New	Definition-Performance period.	-	C
61.2	New	Definition-Performance period analyses.	-	C
61.2	New	Definition-Safety case.	-	H&S
61.2	New	Definition-Significant quantities.	-	B
61.2	Amend	Definition-Site closure and stabilization.	D	D

61.2	New	Definition-Site stability assessment.	-	D
61.2	Amend	Definition-Stability.	D	D
61.2	Amend	Definition-State.	D	D
61.2	New	Definition-Technical analyses.	-	C
61.2	Amend	Definition-Tribal governing body.	D	D
61.2	Amend	Definition-Waste.	B	B
61.2	New	Definition-Waste acceptance criteria.	-	B
61.3	Amend	License Required.	C	C
61.4	Amend	Communications.	D	D
61.7	Amend	Concepts.	H&S	H&S
61.8	Amend	Information collection requirements: Office of Management and Budget approval.	D	D
61.9	Amend	Employee protection.	D	D
61.9a	Amend	Completeness and accuracy of information.	D	D
61.10(a)(1)	Amend/ Revised Compatibility Category	Content of application.	D	H&S
61.10(a)(2)	Amend	Content of application.	D	D
61.10(b)	New	Content of application.	-	H&S
61.12	Amend/ Revised Compatibility Category	Specific technical information.	D	H&S
61.13	Amend/ Revised Compatibility Category	Technical analyses.	H&S	C
61.16(a)	Amend	Other information.	NRC	NRC
61.16(b)	Amend/ Revised Compatibility Category	Other information.	NRC	C
61.20	Amend	Filing and distribution of application.	D	D
61.22	Amend	Updating of application.	D	D
61.23(b)	Amend	Standards for issuance of a license.	H&S	H&S
61.23(c)	Amend	Standards for issuance of a license.	H&S	H&S
61.23(d)	Amend	Standards for issuance of a license.	H&S	H&S
61.23(c)	Amend	Standards for issuance of a license.	H&S	H&S

61.23(f)	Amend	Standards for issuance of a license.	H&S	H&S
61.23(g)	Amend	Standards for issuance of a license.	H&S	H&S
61.23(j)	Amend/ Revised Compatibility Category	Standards for issuance of a license.	NRC	H&S
61.23(m)	New	Standards for issuance of a license.	-	H&S
61.24	Amend	Conditions of licenses.	D	H&S
61.25	Amend/ Revised Compatibility Category	Changes.	D	H&S
61.26	Amend	Amendment of license.	D	D
61.28(a)	Amend/ Revised Compatibility Category	Contents of application for closure.	D	H&S
61.29	Amend	Postclosure observation and maintenance.	D	D
61.30	Amend	Transfer of license.	H&S	H&S
61.32	Amend	Facility information and verification.	D	D
61.41(a)	Amend	Protection of the general population from releases of radioactivity.	A	A
61.41(b)	New	Protection of the general population from releases of radioactivity.	-	C
61.41(c)	New	Protection of the general population from releases of radioactivity.	-	C
61.42(a)	Amend	Protection of individuals from inadvertent intrusion.	H&S	A
61.42(b)	New	Protection of individuals from inadvertent intrusion.	-	C
61.42(c)	New	Protection of individuals from inadvertent intrusion.	-	C
61.43	Amend	Protection of individuals during operations.	H&S	C
61.44	Amend	Stability of the disposal site after closure.	H&S	H&S
61.50	Amend	Disposal site suitability requirements for land disposal.	H&S	H&S
61.51	Amend	Disposal site design for land disposal.	H&S	H&S

61.52	Amend	Land disposal facility operation and disposal site closure.	H&S	H&S
61.53	Amend	Environmental monitoring.	H&S	H&S
61.55	Amend	Waste classification.	B	B
61.56	Amend	Waste characteristics.	H&S	H&S
61.57	Amend	Labeling.	H&S	H&S
61.58	Retitled, Amend, and Revised Compatibility Category	Waste acceptance. (Previously titled Alternative requirements for waste classification and characteristics)	D	C
61.59	Amend	Institutional requirements.	H&S	H&S
61.61	Amend	Applicant qualifications and assurances.	D	D
61.62	Amend	Funding for disposal site closure and stabilization.	H&S	H&S
61.63	Amend	Financial assurances for institutional controls.	H&S	H&S
61.71	Amend	State and Tribal government consultation.	D	D
61.73	Amend	Commission approval of proposals.	D	D
61.80	Amend	Maintenance of records, reports, and transfers.	C	C
61.81	Amend	Tests at land disposal facilities.	D	D
61.82	Amend	Commission inspections of land disposal facilities.	D	D

Draft Compatibility Table for 10 CFR Part 150

Section	Change	Subject	Compatibility	
			Existing	New
150.11	Amend	Critical mass.	B	B
150.14	Amend	Commission regulatory authority for physical protection.	NRC	NRC
150.15	Amend	Persons not exempt.	NRC	NRC

XV. Voluntary Consensus Standards

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or

adopted by voluntary consensus standards bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical. In this proposed rule, the NRC is proposing to amend its regulations that govern LLW disposal facilities to require new licensees or existing licensees wanting to accept GTCC waste or a significant quantity of long-lived radionuclides to develop new and revised site-specific technical analyses and to permit the development of site-specific WAC based on the results of these analyses. These amendments would ensure that LLW streams that are significantly different from those considered in the regulatory basis for the current regulations can be disposed of safely and meet the performance objectives for land disposal of LLW. These amendments would also increase the use of site-specific information to ensure public health and safety is protected. This action does not constitute the establishment of a standard that contains generally applicable requirements.

XVI. Availability of Guidance

The NRC is issuing revised draft guidance in NUREG-2175, Revision 1, “Guidance for Conducting Technical Analyses for 10 CFR Part 61,” for the implementation of the proposed requirements in this rulemaking. The guidance is available in ADAMS as shown in the “Availability of Documents” section of this document. You may obtain information and comment submissions related to the previous draft guidance document that was issued concurrent with the LLW disposal proposed rule in March 2015 by searching on <https://www.regulations.gov> under Docket ID NRC-2015-0003. All subsequent changes to this guidance for this rulemaking can be found under Docket ID NRC-2011-0012.

In the draft NUREG-2175, Revision 1, the NRC provides guidance on conducting technical analyses (i.e., performance assessment, inadvertent intruder assessment, operational safety assessment, site stability assessment, and performance period analyses) to demonstrate compliance with the performance objectives in 10 CFR part 61. This guidance should facilitate licensees' implementation of the amendments in this proposed rule as well as assist regulatory authorities in reviewing the technical analyses. This guidance would apply to all waste streams disposed of at a land disposal facility licensed under 10 CFR part 61, including waste streams with significant quantities of long-lived radionuclides (e.g., significant quantities of depleted uranium), blended waste, and GTCC waste.

In addition, the draft revision to NUREG-2175 provides detailed guidance in new areas, such as waste acceptance, defense-in-depth, determination of significant quantities, and GTCC waste disposal considerations. This guidance discusses the use of a graded level of effort needed to risk-inform the analyses for the compliance period (1,000 or 10,000 years after disposal site closure) and cover the performance period analyses that should be performed for analysis of long-lived waste beyond 10,000 years. Additional topics covered in this document include 1) identification and screening of the features, events, and processes to develop scenarios for technical analyses; 2) use of the waste classification tables or the results of the technical analyses to develop generic or site-specific WAC; and 3) use of performance confirmation to evaluate and verify the accuracy of information used to demonstrate compliance prior to site closure.

You may submit comments on this revised draft regulatory guidance by the methods outlined in the ADDRESSES section of this document.

XVII. Public Meeting

The NRC will conduct a public meeting on the proposed rule for the purpose of describing the proposed rule and implementation guidance to the public and answering questions from the public on the proposed rule and implementation guidance.

The NRC will publish a notice of the location, time, and agenda of the meeting on Regulations.gov and on the NRC’s public meeting website within at least 10 calendar days before the meeting. Stakeholders should monitor the NRC’s public meeting website for information about the public meeting at: <https://www.nrc.gov/public-involve/public-meetings/index.cfm>.

XVIII. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the following methods, as indicated.

DOCUMENT	ADAMS ACCESSION NO. / WEB LINK / FEDERAL REGISTER CITATION
Proposed Rule Package Documents	
SECY-24-XXXX, “Proposed Rule: Integrated Low-Level Radioactive Waste Disposal (RIN 3150-AI92)”	ML23242A261
Proposed rule draft Federal Register notice	ML23242A261
Proposed rule draft regulatory analysis	ML23242A259
Summary of GTCC regulatory basis comments	ML23226A106
Proposed rule draft information collection supporting statement for 10 CFR Part 61	ML23242A260
Draft guidance NUREG-2175, Revision 1, “Guidance for Conducting Technical Analyses for 10 CFR Part 61,” Draft Report for Comment, [Month 2024]	ML23255A282

Historical Low-Level Waste Rulemaking Documents	
<i>Federal Register</i> Notice for the Licensing of Byproduct Material, Atomic Energy Commission, February 14, 1962	27 FR 1350
<i>Federal Register</i> Notice for the Licensing Requirements for Land Disposal of Radioactive Waste Proposed Rule, July 24, 1981	46 FR 38081
<i>Federal Register</i> Notice for the Licensing Requirements for Land Disposal of Radioactive Waste Final Rule, December 27, 1982	47 FR 57446
NUREG-0945, "Final Environmental Impact Statement on 10 CFR Part 61 Licensing Requirements for Land Disposal of Radioactive Waste," Volume 1: Summary and Main Report, November 1982	ML052590184
NUREG-0945, "Final Environmental Impact Statement on 10 CFR Part 61 Licensing Requirements for Land Disposal of Radioactive Waste," Volume 2: Appendices A-B, November 1982	ML052920727
NUREG-0945, "Final Environmental Impact Statement on 10 CFR Part 61 Licensing Requirements for Land Disposal of Radioactive Waste," Volume 3: Appendices C-F, November 1982	ML052590187
PRM-61-2, "New England Coalition on Nuclear Pollution, Inc.; Denial of Petition for Rulemaking," March 29, 1994	ML093490607
SECY-98-226, "Issuance of a Section 274f, Atomic Energy Act Order to Exempt Envirocare of Utah, Inc. from the Licensing Requirements for Special Nuclear Material in Diffuse Waste That Will Be Regulated by the State of Utah," September 29, 1998	ML992870055
SRM-SECY-98-226, "Issuance of a Section 274f, Atomic Energy Act Order to Exempt Envirocare of Utah, Inc. from the Licensing Requirements for Special Nuclear Material in Diffuse Waste That Will Be Regulated by the State of Utah," October 22, 1998	ML003752670
<i>Federal Register</i> Notice for Envirocare of Utah, Inc.: Order Modifying Exemption From Requirements Relative to Possession of Special Nuclear Material, February 13, 2003	68 FR 7399
<i>Federal Register</i> Notice for In the Matter of EnergySolutions, LLC (formerly Envirocare of	71 FR 34168

Utah, LLC) Order Modifying Exemption from 10 CFR Part 70, June 13, 2006	
SRM-COMWDM-11-0002/COMGEA-11-0002, Revision to 10 CFR Part 61, January 19, 2012	ML120190360
SECY-13-0075, "Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN-3150-AI92)," July 18, 2013	ML13128A160 (package)
SRM-SECY-13-0075, "Staff Requirements—SECY-13-0075—Proposed Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN-3150-AI92)," February 12, 2014	ML14043A371
<i>Federal Register</i> Notice for Supersede Exemption for Waste Control Specialists, LLC: Andrews County, Texas, December 11, 2014	79 FR 73647
<i>Federal Register</i> Notice for the Low-Level Radioactive Waste Disposal Proposed Rule, March 26, 2015	80 FR 16081
NUREG-2175, "Guidance for Conducting Technical Analyses for 10 CFR Part 61," March 2015	ML15056A516
<i>Federal Register</i> Notice for the Low-Level Radioactive Waste Disposal Proposed Rule and draft NUREG reopening of comment period, August 27, 2015	80 FR 51964
SECY-16-0106, "Final Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN 3150-AI92)," September 15, 2016	ML16188A290 (package)
SRM-SECY-16-0106, "Staff Requirements—SECY-16-0106—Final Rule: Low-Level Radioactive Waste Disposal (10 CFR Part 61) (RIN 3150-AI92)," September 8, 2017	ML17251B147
NRC Letter – "Response to Request For Possession Time Extension in The U.S. Nuclear Regulatory Commission Exemption Order Condition 8.B.4 At Waste Control Specialists LLC (CAC No. L00904)," September 23, 2016	ML16097A265
NRC Letter – "Closing NRC Review of WCS Request Dated December 4, 2014," September 26, 2017	ML17234A415
NRC Letter – "Response to The August 30, 2018, Waste Control Specialists LLC Request to Extend the Possession Time in the NRC Special Nuclear Material Exemption Order Condition 8.B.4 to Waste Control Specialists LLC.," December 19, 2018	ML18269A318

NRC Letter – “NRC Response Letter for Extending Possession Time of LANL Waste until 12-23-2022,” December 7, 2020	ML20252A182
NRC Letter – “NRC Response Letter for WCS Request to Extend Possession Time of LANL Waste until December 31, 2024,” June 8, 2022	ML22094A131
SRM-M140918, “Staff Requirements - Briefing on Management of Low-Level Waste, High-Level Waste, and Spent Nuclear Fuel, 9:00 A.M., Thursday, September 18, 2014, Commissioners’ Conference Room, One White Flint North, Rockville, Maryland (Open to Public Attendance),” September 24, 2014	ML14267A365
Letter from TCEQ regarding the authority and jurisdiction regarding GTCC type waste streams, January 30, 2015	ML15034A181
SECY-15-0094, “Historical and Current Issues Related to Disposal of Greater-Than-Class C Low-Level Radioactive Waste,” July 17, 2015	ML15162A849 (package)
SRM-SECY-15-0094, “Staff Requirements - Historical and Current Issues Related to Disposal of Greater-Than-Class C Low-Level Radioactive Waste,” December 22, 2015	ML15356A623
NUREG/CR-7239, “Review of Exemptions and General Licenses for Fissile Material in 10 CFR [part] 71,” January 2018	ML18052A520
SRM-M181011, “Staff Requirements Memorandum—Briefing on Strategic Programmatic Overview of the Decommissioning and Low-Level Waste and Spent Fuel Storage and Transportation Business Lines, 9:00 A.M., Thursday, October 11, 2018, Commissioners’ Conference Room, One White Flint North, Rockville, Maryland (Open to Public Attendance),” October 23, 2018	ML18296A479
Letter from Governor Greg Abbott, State of Texas, to the NRC, April 26, 2019	ML19121A544
Letter from the NRC to Governor Greg Abbott, State of Texas, June 5, 2019	ML19129A300
Draft Regulatory Basis, “Disposal of Greater-than-Class C (GTCC) and Transuranic Waste,” Draft Report for Comment, June 27, 2019	ML19059A403
<i>Federal Register</i> Notice for Greater-Than-Class-C and Transuranic Waste Draft	84 FR 35037

Regulatory Basis request for comment, July 22, 2019	
<i>Federal Register</i> Notice for Greater-Than-Class-C and Transuranic Waste Draft Regulatory Basis extension of comment period, September 13, 2019	84 FR 48309
SECY-20-0098, "Path Forward and Recommendations for Certain Low-Level Radioactive Waste Disposal Rulemakings," October 21, 2020	ML20143A164 (package)
SRM-SECY-20-0098, "Staff Requirements—SECY-20-0098—Path Forward and Recommendations for Certain Low-Level Radioactive Waste Disposal Rulemakings," April 5, 2022	ML22095A227
NUREG-1573, "A Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities: Recommendations of NRC's Performance Assessment Working Group," October 2000	ML003770778
NRC Procedure SA-700, "Processing an Agreement," June 15, 2022	ML22138A414
January 23, 2024 Public Meeting Summary, Integrated Low-Level Radioactive Waste Disposal Rulemaking, January 23, 2024	ML24045A173
May 17, 2023 Public Meeting Summary, Integrated Low-Level Radioactive Waste Disposal Rulemaking, June 12, 2023	ML23145A268
Presidential Memorandum, "Plain Language in Government Writing," June 10, 1998	63 FR 31885
<i>Federal Register</i> Notice for Agreement State Program Policy Statement, October 18, 2017	82 FR 48535
International Atomic Energy Agency, Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5), IAEA Nuclear Security Series No. 13, IAEA, Vienna (2011)	https://doi.org/10.61092/iaea.ko2c-dc4q

The NRC may post materials related to this document, including public comments, on the Federal rulemaking website at <https://www.regulations.gov> under Docket ID NRC-2011-0012. In addition, the Federal rulemaking website allows members of the public to receive alerts when changes or additions occur in a docket folder. To

subscribe: 1) navigate to the docket folder (NRC-2011-0012); 2) click the “Subscribe” link; and 3) enter an email address and click on the “Subscribe” link.

List of Subjects

10 CFR part 20

Byproduct material, Criminal penalties, Hazardous waste, Licensed material, Nuclear energy, Nuclear materials, Nuclear power plants and reactors, Occupational safety and health, Packaging and containers, Penalties, Radiation protection, Reporting and recordkeeping requirements, Source material, Special nuclear material, Waste treatment and disposal.

10 CFR part 61

Criminal penalties, Hazardous waste, Indians, Intergovernmental relations, Low-level waste, Nuclear energy, Nuclear materials, Penalties, Reporting and recordkeeping requirements, Waste treatment and disposal, Whistleblowing.

10 CFR part 73

Criminal penalties, Exports, Hazardous materials transportation, Imports, Incorporation by reference, Nuclear energy, Nuclear materials, Nuclear power plants and reactors, Penalties, Reporting and recordkeeping requirements, Security measures.

10 CFR part 150

Criminal penalties, Hazardous materials transportation, Intergovernmental relations, Nuclear energy, Nuclear materials, Penalties, Reporting and recordkeeping requirements, Security measures, Source material, Special nuclear material.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 552 and 553, the NRC is proposing to adopt the following amendments to 10 CFR parts 20, 61, 73, and 150:

PART 20 – STANDARDS FOR PROTECTION AGAINST RADIATION

1. The authority citation for part 20 continues to read as follows:

Authority: Atomic Energy Act of 1954, secs. 11, 53, 63, 65, 81, 103, 104, 161, 170H, 182, 186, 223, 234, 274, 1701 (42 U.S.C. 2014, 2073, 2093, 2095, 2111, 2133, 2134, 2201, 2210h, 2232, 2236, 2273, 2282, 2021, 2297f); Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); Low-Level Radioactive Waste Policy Amendments Act of 1985, sec. 2 (42 U.S.C. 2021b); 44 U.S.C. 3504 note.

2. In § 20.1003, revise the definition of “Waste” to read as follows:

§ 20.1003 Definitions.

* * * * *

Waste means those low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level radioactive waste means radioactive waste not classified as high-level radioactive waste, spent nuclear fuel, or byproduct material

as defined in paragraphs (2), (3), and (4) of the definition of *Byproduct material* set forth in this section. Low-level waste also includes radioactive material resulting from the production of medical isotopes that has been permanently removed from a reactor or subcritical assembly for which there is no further use and the disposal of which can meet the requirements of this part.

* * * * *

3. In appendix G to 10 CFR part 20:

a. Remove the last sentence in paragraph I.D.4 and add, in its place, “Unless the disposal facility has established waste acceptance criteria under § 61.58 of this chapter, waste not meeting the structural stability requirements of § 61.56(b) of this chapter must be identified;”;

b. Remove the text “10 CFR 61.56(b);” in paragraph I.E.2(d) and add, in its place, “10 CFR 61.56(b), or the disposal facility’s waste acceptance criteria established under 10 CFR 61.58;”;

c. Revise paragraph II; and

d. Revise paragraphs III.A.1 through 3, and III.C.3 through 5.

The revisions read as follows:

Appendix G to Part 20—Requirements for Transfers of Low-Level Radioactive Waste Intended for Disposal at Licensed Land Disposal Facilities and Manifests

* * * * *

II. Certification

An authorized representative of the waste generator, processor, or collector must certify by signing and dating the shipment manifest that the transported materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of

Transportation and the Commission, and equivalent Agreement State regulations. For materials that are consigned to a land disposal facility or waste collector, the authorized representative must certify that the materials are classified per the applicable requirements of part 61 of this chapter, meet the land disposal facility's waste acceptance criteria, and are in proper condition for disposal as described in accordance with the applicable requirements in this part and in part 61 of this chapter, or equivalent Agreement State regulations. If the land disposal facility to which the material is consigned has established waste acceptance criteria under § 61.58, the authorized representative must certify that the material meets the waste acceptance criteria in accordance with the land disposal facility's authorized waste certification program. A collector in signing the certification is certifying that nothing has been done to the collected waste which would invalidate the waste generator's certification.

III. Control and Tracking

A. * * *

1. Prepare all wastes so that the waste is classified according to § 61.55 and meets the waste characteristics requirements in § 61.56 of this chapter, or if the land disposal facility to which the material is consigned has established waste acceptance criteria under § 61.58, prepare the waste so that it meets the land disposal facility's waste acceptance criteria;

2. Label each disposal container (or transport package if potential radiation hazards preclude labeling of the individual disposal container) of waste in accordance with § 61.57 of this chapter;

3. Conduct a quality assurance program, which must include management evaluation of audits, to ensure compliance with both §§ 61.55 and 61.56 of this chapter

or, if the land disposal facility to which the material is consigned has established waste acceptance criteria under § 61.58, to ensure the waste meets the land disposal facility's waste acceptance criteria;

* * * * *

C. * * *

3. Prepare all wastes so that the waste is classified according to § 61.55 of this chapter and meets the waste characteristics requirements in § 61.56 of this chapter, or if the land disposal facility to which the material is consigned has established waste acceptance criteria under § 61.58, prepare the waste so that it meets the land disposal facility's waste acceptance criteria;

4. Label each package of waste, in accordance with § 61.57 of this chapter;

5. Conduct a quality assurance program (which must include management evaluation of audits) to ensure compliance with both §§ 61.55 and 61.56 of this chapter or, if the land disposal facility to which the material is consigned has established waste acceptance criteria under § 61.58, to ensure the waste meets the land disposal facility's waste acceptance criteria;

* * * * *

PART 61 – LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE

4. The authority citation for part 61 continues to read as follows:

Authority: Atomic Energy Act of 1954, secs. 53, 57, 62, 63, 65, 81, 161, 181, 182, 183, 223, 234 (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2111, 2201, 2231, 2232, 2233, 2273, 2282); Energy Reorganization Act of 1974, secs. 201, 206, 211 (42 U.S.C. 5841, 5846, 5851); Low-Level Radioactive Waste Policy Amendments Act of 1985, sec. 2 (42 U.S.C. 2021b); 44 U.S.C. 3504 note.

5. In part 61:

a. Wherever it may occur, remove the word “shall” and add in its place the word, “must”;

b. Wherever it may occur, remove the protocol “http” and add in its place the protocol “https”; and

c. Wherever it may occur, remove the word “post-closure” and add in its place the word, “postclosure”.

6. In § 61.1, in paragraph (a) remove the last sentence; redesignate paragraphs (b) and (c) as paragraphs (c) and (d); and in redesignated paragraph (c) remove the parenthetical “(a-1)”; and add new paragraph (b) to read as follows:

§ 61.1 Purpose and scope.

* * * * *

(b)(1) Licensees need not comply with the requirements in §§ 61.13(a) through 61.13(e), 61.41(a) and (b), 61.42(a) and (b), and 61.58, if the following criteria are met:

(i) The land disposal facility license was originally issued before **[30 DAYS**

AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]; and

(ii) The licensee does not accept Greater-Than-Class C waste or a significant quantity of long-lived radionuclides. For purposes of this paragraph, an amount greater than or equal to 10 metric tons of depleted uranium is considered a significant quantity of long-lived radionuclides.

(2) Licensees who meet the criteria of § 61.1(b)(1)(i) and (ii) and who choose not to comply with the requirements in §§ 61.13(a) through (e), 61.41(a) and (b), 61.42(a) and (b), and 61.58 must comply with §§ 61.13(f), 61.41(c), and 61.42(c).

* * * * *

7. In § 61.2:

a. Add definitions for *Compliance period*, *Defense-in-depth*, *Inadvertent intruder assessment*, *Long-lived radionuclide*, *Model support*, *Operational safety assessment*, *Performance assessment*, *Performance period*, *Performance period analyses*, *Safety case*, *Significant quantities*, *Site stability assessment*, *Technical analyses*, and *Waste acceptance criteria* in alphabetical order;

b. Revise the definitions for *Inadvertent intruder*, *Intruder barrier*, *Land disposal facility*, *Monitoring*, *Near-surface disposal facility*, *Stability*, *State*, *Tribal governing body*, and *Waste*;

c. In the definition for *Active maintenance* remove the phrase “during the period of institutional control”; add “of this part” after the references to §§ 61.41 and 61.42;

d. In the definition for *Buffer zone* add, as the last sentence, “The buffer zone provides controlled space to establish monitoring locations that are intended to provide an early warning of radionuclide movement, which allows a licensee to perform mitigative or corrective action that might be necessary.”;

e. In the definition for *Chelating agent* remove the parenthetical “(e.g., EDTA, DTPA)” and add in its place the parenthetical “(e.g., ethylenediaminetetraacetic, diethylenetriaminepentaacetic)”; and remove the phrase “glucinic acid” and add in its place the phrase, “gluconic acid”;

f. In the definition for *Disposal* remove the word “isolation” and add, in its place, the word “removal” and remove the phrase “by man and containing his food” and add, in its place, the phrase “by a person and containing the person’s food”;

g. In the definition for *Disposal unit* add the parenthetical phrase “(e.g., a trench)” after the phrase “for disposal” and remove the last sentence;

h. In the definition for *Engineered barrier* remove the phrase “land facility’s ability” and add, in its place, the phrase “disposal site’s ability”; and add “of this part” after the reference “subpart C”; and

i. In the definition for *Site closure and stabilization* remove the word “stabilization” and add in its place the word “stabilization” and remove the word “assure” and add in its place the phrase “ensure, to the extent practical,”.

The additions and revisions read as follows:

§ 61.2 Definitions.

As used in this part:

* * * * *

Compliance period means the time from the completion of site closure to 1,000 years after site closure for disposal sites that do not contain significant quantities of long-lived radionuclides. For disposal sites that contain significant quantities of long-lived radionuclides, the compliance period ends 10,000 years after closure of the disposal site.

* * * * *

Defense-in-depth means 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.

* * * * *

Inadvertent intruder means a person who might occupy the disposal site after closure and engage in agricultural and residential activities and other reasonably

foreseeable pursuits that might unknowingly expose the person to radiation emitted or released from the waste in the disposal units.

Inadvertent intruder assessment is an analysis that:

(1) Assumes an inadvertent intruder occupies the disposal site and engages in activities and other reasonably foreseeable pursuits consistent with expected activities in and around the disposal site at the time of the assessment and that might unknowingly expose the person to radiation emitted or released from the waste in the disposal units;

(2) Examines the capabilities of intruder barriers to inhibit an inadvertent intruder's contact with the waste in the disposal unit or to limit the inadvertent intruder's exposure to radiation from the disposal unit; and

(3) Estimates an inadvertent intruder's potential annual dose resulting from radiation emitted or released from the waste in the disposal unit, including an evaluation of the uncertainties.

* * * * *

Intruder barrier means an engineered structure over the waste that inhibits contact with waste and helps to ensure that radiation exposures to an inadvertent intruder will meet the performance objectives set forth in this part.

Land disposal facility means the land, building, structures, disposal sites, and equipment which are intended to be used for, or to support, the disposal of radioactive wastes. For purposes of this chapter, a "geologic repository" as defined in part 60 or 63 is not considered a land disposal facility.

* * * * *

Long-lived radionuclide means radionuclides where:

(1) More than 10 percent of the initial activity of the radionuclide remains after 1,000 years;

- (2) The peak activity from progeny occurs after 1,000 years; or
- (3) More than 10 percent of the peak activity of the radionuclide (including progeny) that occurs within 1,000 years remains after 1,000 years.

Model support is data and information that technically support the development of the numerical models or assessments and provide confidence in their results. Model support that involves multiple sources and types of information is generally more robust and can include laboratory or field tests, comparison to analogous systems, natural analogs, formal independent peer review, and comparison to monitoring data.

Monitoring means the collection of field observations and measurement data to evaluate the performance and characteristics of the disposal site.

Near-surface disposal facility means a land disposal facility in which radioactive waste is disposed generally within the upper 30 meters of the earth's surface.

Operational safety assessment is an assessment used to provide reasonable assurance that exposures will be controlled to meet the requirements of 10 CFR part 20, thereby meeting the performance objective for the protection of individuals during operations set forth in § 61.43 of this part. An operational safety assessment is more detailed and comprehensive as the level of hazard posed by the waste increases.

Performance assessment is an analysis used to demonstrate compliance with § 61.41(a) and (b) that identifies the features, events, and processes that could affect the performance of the disposal site; and estimates the potential dose as a result of releases caused by all significant features, events, and processes including an evaluation of the uncertainties.

Performance period is the timeframe established for those sites that contain significant quantities of long-lived radionuclides for considering waste and disposal site

characteristics to evaluate the anticipated performance of the disposal site after the compliance period.

Performance period analyses are analyses used to demonstrate compliance with §§ 61.41(b) and 61.42(b) by providing information, consistent with available data and current scientific understanding, that demonstrates that releases of long-lived radioactive waste from a disposal site are reduced to the extent reasonably achievable during the performance period.

* * * * *

Safety case is a high-level evaluation of the information and analyses that support the licensee's demonstration that the land disposal facility will be constructed and operated safely. The safety case, which is a component of the application, provides a summary of the safety basis that the disposal site will be capable of isolating waste and limiting releases to the environment; describes the strength and reliability of the technical analyses; and includes consideration of defense-in-depth protections and safety relevant aspects of the site, the facility design, and the managerial, engineering, regulatory, and institutional controls.

Significant quantities of long-lived radionuclides means an amount (volume or mass) and concentration accepted for disposal after **[30 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE *FEDERAL REGISTER*]** that could, if released, result in the performance objectives of subpart C of this part not being met.

* * * * *

Site stability assessment is an assessment used to demonstrate compliance with § 61.44 by providing reasonable assurance that long-term stability of the disposal site can be ensured and that maintenance following site closure will not be needed. Long-term stability of the disposal site includes the ability of the site to maintain structural

stability from within the disposal units and to maintain stability of the surface of the site. A site stability assessment is tailored to the types of waste disposed, thereby influencing the areal extent of the assessment.

Stability means the capability of the disposal site (e.g., wasteform, disposal containers, and disposal units) to maintain its shape and properties to an extent that will not prohibit the demonstration that the disposal site will meet the performance objectives in §§ 61.41 and 61.42 of this part and will, to the extent practical, eliminate the need for active maintenance after site closure and for maintenance in any form after license termination.

State means any State, the District of Columbia, Puerto Rico, and any territory or possession of the United States.

* * * * *

Technical analyses means the analyses described in § 61.13 and includes the performance assessment, the intruder assessment, the operational safety assessment, and the site stability assessment, in addition to, under certain circumstances, the performance period analyses, needed to demonstrate compliance with the performance objectives of subpart C of this part.

Tribal Governing Body means a “Tribal organization” as that term is defined by the Indian Self-Determination and Education Assistance Act (25 U.S.C. § 5304).

Waste means those low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level radioactive waste means radioactive waste not classified as high-level radioactive waste, spent nuclear fuel, or byproduct material as defined in paragraphs (2), (3), and (4) of the definition of *Byproduct material* set forth in § 20.1003 of this chapter. Low-level waste also includes radioactive material resulting

from the production of medical isotopes that has been permanently removed from a reactor or subcritical assembly for which there is no further use and the disposal of which can meet the requirements of this part.

Waste acceptance criteria means the requirements developed through technical analyses or other methods to ensure that waste disposed in a facility will meet the established performance objectives set forth in this part.

§ 61.4 [Amended]

8. In § 61.4, remove the word “practicable” and add, in its place, the word “practical”; remove the term “CD ROM” and add, in its place, the phrase “digital media”.

9. In § 61.7, revise paragraph (a); redesignate paragraphs (b) and (c) as paragraphs (c) and (d) and revise; and add new paragraph (b) to read as follows:

§ 61.7 Concepts.

(a) *The disposal facility.* The regulations in this part apply to land disposal of radioactive waste and does not include sea or extraterrestrial disposal. These regulations establish requirements, performance objectives, and specific technical requirements applicable to the near-surface disposal of radioactive waste, a category of land disposal, which involves disposal in the uppermost portion of the earth (i.e., approximately 30 meters below the earth’s surface). Near-surface disposal includes disposal in engineered facilities which may be built totally or partially above-grade provided that such facilities have protective covers. Near-surface disposal does not include disposal facilities which are partially or fully above-grade with no protective cover, which is referred to as “above-ground disposal.” Above-ground disposal is not

authorized by these regulations. Burial deeper than 30 meters below the earth's surface in a land disposal facility may still be considered near-surface disposal if the methods used are similar. Alternative methods of disposal may be approved on a case-by-case basis as needed under § 61.6 of this part.

(b) Performance objectives.

(1) An applicant must demonstrate that its proposed land disposal facility will meet the following four performance objectives: protection of the general population from releases of radioactivity, protection of individuals from inadvertent intrusion, protection of individuals during operations, and stability of the site after closure. These four performance objectives are further described in subpart C of this part. Achieving these objectives depends upon many factors including, but not limited to, the design of the land disposal facility, operational procedures, the type and quantity of radioactive waste intended for disposal at the facility, and site characteristics, including those of the surrounding environment. The application must include technical analyses that show how the proposed land disposal facility and the receipt, storage, and disposal of waste by the applicant will meet the four subpart C performance objectives. After the application has been evaluated and approved, and the facility license issued, the licensee must continue to demonstrate compliance with these performance objectives through measures such as monitoring, radiological dose calculations, and updating the initial technical analyses included in the application, as appropriate, until the site is closed and transferred to the Federal or a State government.

(2) The technical analyses that must be included with the application include the performance assessment, the intruder assessment, the operational safety assessment, and the site stability assessment and, if necessary, performance period analyses. The technical analyses evaluate the impact of the engineering design,

operational practices, natural characteristics of the site, and radioactive waste acceptable for disposal, on the ability of the land disposal facility to protect both occupational workers and the general population from potential releases of radioactivity during facility operations and to protect the general population and inadvertent intruders from potential releases of radioactivity during the compliance period.

(3) Protection of inadvertent intruders from harmful exposure to radiation involves three principal controls: institutional controls to provide reasonable assurance that occupation or improper use of the site does not occur; designating the type and quantity of waste that could present an unacceptable dose to an inadvertent intruder; and disposing of this waste in a disposal unit that includes necessary controls (e.g., depth of disposal, engineered barriers) to prevent the inadvertent intruder from receiving a harmful dose of radiation.

(c) Waste classification and near-surface disposal.

(1) A cornerstone of the disposal system is stability of the disposal site and stability of the waste. Site stability helps ensure that potential releases of radionuclides, such as due to water infiltration, are minimized. Assessment of the stability of a disposal site for the disposal of long-lived radionuclides may require an evaluation of processes (e.g., erosion, subsidence) that are unlikely to affect the ability of the disposal site to sufficiently contain short-lived waste. For long-lived radionuclides and certain radionuclides prone to migration, a maximum disposal site inventory, based on the characteristics of the disposal site, may be established to limit potential exposure and to mitigate the uncertainties in the assessment of long-term stability of the disposal site. Some waste, depending on its radiological characteristics, may not be suitable for near-surface disposal if uncertainties cannot be adequately addressed with engineering controls and defense-in-depth protections. Defense-in-depth protections for disposal are

provided through the diversity and capabilities of the components and attributes of the disposal site (e.g., wasteform, container, engineered features, depth of the disposal unit below the land surface, hydrologic and geochemical characteristics).

(2) Different classes of waste (A, B, C, and Greater-Than-Class C (GTCC)) have been developed with corresponding requirements for each class of waste. Class A waste is the least hazardous and GTCC waste is the most hazardous. Wastes may be stable or unstable, but only certain types of Class A wastes may be disposed without stabilization. Some unstable Class A wastes (e.g., biodegradable waste), depending on the radiological composition of the constituent radionuclides, require stabilization before they can be safely disposed in the near-surface. Some unstable Class A waste may be disposed of safely without stabilization; however, licensees must ensure that any interaction between unstable Class A wastes and other wastes will not result in the failure to meet the performance objectives in subpart C of this part (i.e., through segregation of unstable Class A waste). Stable Class A waste may be disposed of with other classes of waste. Class B, Class C, or GTCC waste must be stable for proper disposal.

(3) The proposed disposal site may be privately owned if the applicant commits to conveying the land in fee simple to a State or Federal agency before the transfer of the license under § 61.30; otherwise, the proposed disposal site must be located on State or Federal lands (the licensee would obtain a long-term lease). Following the cessation of operations and prior to transfer of the site, as provided in paragraph (d)(4) of this section, sufficient institutional controls must be established. The licensee must consult with the Federal or State agency that has authority to administer the closed land disposal facility prior to the establishment of such institutional controls.

Upon transfer of the license, the government landowner will be responsible for implementing and otherwise enforcing the institutional controls.

(4) Generally, technical analyses may not rely on the effectiveness of institutional controls for more than 100 years following transfer of control of the disposal site to the government landowner. Limiting reliance upon institutional controls to no more than 100 years permits the disposal of most types of Class A waste and all Class B waste without special provisions for inadvertent intruder protection. Such wastes contain types and quantities of radioisotopes that generally will decay during the 100-year period and therefore will not pose an unacceptable hazard to an inadvertent intruder who may occupy the site after the 100-year period.

(5) Waste that will not decay to levels which will not pose an unacceptable hazard to an intruder within 100 years is designated as Class C waste. Additionally, certain Class A waste, classified under § 61.55(a)(6), that will also not decay to levels which will not pose an unacceptable hazard to an intruder within the 100-year period. Therefore, both § 61.55(a)(6) Class A and Class C waste must be stable and be disposed at a sufficient depth or with an intruder barrier as specified in § 61.52(a)(2) so that there is reasonable assurance the inadvertent intruder will be protected. Where site conditions prevent deeper disposal, intruder barriers such as concrete covers may be used. The service life of these intruder barriers should be at least 500 years. A maximum concentration of radionuclides is specified in tables 1 and 2 of § 61.55 of this part such that at the end of the 500-year period, the remaining radioactivity for Class A, B, and C waste will be at concentrations that does not pose an unacceptable hazard to an inadvertent intruder or public health and safety.

(6) Greater-Than-Class C waste has higher concentrations of radionuclides than Class C waste and will require additional protections and analyses. Whereas

protection of an inadvertent intruder from the disposal of Class C waste will be provided by a sufficient burial depth or an intruder barrier, protection of an inadvertent intruder from Greater-Than-Class C waste will require both a sufficient burial depth and an intruder barrier.

(7) Regardless of the classification, some waste (e.g., depleted uranium) may need enhanced waste-specific controls or limitations at a particular land disposal facility because the waste may be more difficult to contain. One of the purposes of both the performance assessment and the inadvertent intruder assessment is to identify, as appropriate, these waste-specific enhanced controls and limitations. The types of enhanced controls or limitations could include additional limits on waste concentration or total activity, more robust intruder barriers, deeper burial depth, and enhanced stability controls. These enhanced controls or limitations could mitigate the uncertainty associated with changes to the natural environment and the disposal site performance over the compliance period. Waste with significant quantities of long-lived radionuclides may need special processing, design, or site conditions for disposal. Demonstrating protection of both the general population and inadvertent intruders from radiological exposure from the disposed waste requires an evaluation of long-term impacts in the technical analyses.

(d) *The licensing process.*

(1) Prior to the issuance of the license, the potential applicant engages in a process of disposal site selection by selecting a region of interest, examining possible disposal sites within the area of interest, and narrowing the choice to the proposed site. Through a detailed investigation of the proposed disposal site characteristics, the potential applicant obtains data on which to base a determination of the disposal site's suitability. The potential applicant uses these data to develop a safety case, which is a

component of the application, that describes the safety relevant aspects of the site, the facility design, and the management and regulatory controls. A safety case must demonstrate that the land disposal facility will be constructed and operated safely and provide a summary of the safety basis that the disposal site will meet the performance objectives in subpart C of this part.

(2) The Commission will review and evaluate the application and may seek participation by affected State governments or Indian Tribes in the application review process.

(3) During the operational phase, and any period of license renewal, the licensee must carry out disposal activities in accordance with the requirements of this regulation and the conditions of the license. At the cessation of disposal operations, the licensee must apply for an amendment to the license to permit site closure. After final review of the licensee's site closure and stabilization plan, the Commission may approve the final activities necessary to prepare the disposal site so that ongoing active maintenance of the site after site closure is not required during the period of institutional control.

(4) During the period when the disposal site closure and stabilization activities are being carried out, the licensee is in a disposal site closure phase. Following the closure of the site, the licensee must remain in active control of the disposal site for purposes of postclosure observation and maintenance to ensure that the disposal site remains stable and ready for the implementation of institutional controls. Although 5 years is a suggested time period, the postclosure observation and maintenance period is intended to continue for the length of time found necessary to provide reasonable assurance that the performance objectives in §§ 61.41, 61.42, and 61.44 of this part are met and to ensure that the disposal site closure and stabilization activities have not

resulted in unintended instability at the disposal site. The Commission may approve shorter or require longer periods if conditions warrant. At the end of this period, the licensee applies for a license transfer to the disposal site owner.

(5) After the licensee fulfills the requirements of § 61.30, the Commission will transfer the license to the State or Federal agency that is administering the site on behalf of the government landowner. If the U.S. Department of Energy is the Federal agency administering the land on behalf of the Federal Government, the license will be terminated because the Commission lacks regulatory authority over the Department for this activity. Under the conditions of the transferred license, the State or Federal agency licensee will carry out a program of monitoring to ensure continued disposal site performance and physical surveillance to restrict access to the site, as well as to conduct minor custodial activities. During this period, productive uses of the land might be permitted if those uses do not affect the stability of the site and its ability to meet the performance objectives. At the end of the prescribed period of institutional controls, the license will be terminated by the Commission after the State or Federal agency licensee fulfilled requirements found in § 61.31.

§ 61.8 [Amended]

10. In § 61.8(b), add sections "61.41, 61.42," in numerical order.

§ 61.9 [Amended]

11. In § 61.9:

a. Remove the phrase "his or her", wherever it may appear, and add, in its place, the word "the";

b. Remove the phrase "he or she has" and add, in its place, the phrase "they have" in paragraph (b); and

c. Remove the phrase "him or her" and add, in its place the phrase "the employee" in paragraph (d).

12. Revise § 61.10 to read as follows:

§ 61.10 Content of application.

(a)(1) An application to receive from others, possess and dispose of wastes containing or contaminated with source, byproduct or special nuclear material by land disposal must consist of general information, specific technical information, technical analyses, institutional information, and financial information as set forth in §§ 61.11 through 61.16.

(2) An environmental report prepared in accordance with subpart A of part 51 of this chapter must accompany the application.

(b) The application must include the safety case, which demonstrates that the land disposal facility will be constructed and operated safely and provides a summary of the safety basis that the disposal site will meet the performance objectives in subpart C of this part and describes 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.

13. In § 61.12, revise the introductory text, paragraphs (a) through (f) and paragraphs (h) through (l) to read as follows:

§ 61.12 Specific technical information.

The application must include the following specific technical information to demonstrate that the performance objectives of subpart C of this part and the applicable technical requirements of subpart D of this part will be met:

(a) A description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities. The description must include geologic, geotechnical, geochemical, geomorphological, hydrologic, meteorologic, climatologic, and biotic features, events, and processes of the disposal site and vicinity.

(b) A description of the design features of the land disposal facility, including the disposal units. For near-surface disposal, the description must include those design features related to surface cover runoff and infiltration; evapotranspiration from the soil and vegetation overlying the cover material; infiltration reaching the waste; integrity of covers for disposal units; structural stability of backfill, wastes, and covers; disposal site drainage; disposal site closure and stabilization; long-term disposal site maintenance; inadvertent intrusion; intruder barriers; occupational exposures; disposal site monitoring; and adequacy of the size of the buffer zone for monitoring and potential mitigative measures.

(c) A description of the principal design criteria and their relationship to the performance objectives of subpart C to this part.

(d) A description of the design basis natural events or phenomena and their relationships to the principal design criteria. These phenomena could include earthquakes, fires, and exceptional rain events.

(e) A description of codes and standards that the applicant has applied to the design and that will apply to construction of the land disposal facility.

(f) A description of the proposed construction and operation of the land disposal facility. At a minimum, the application must describe the methods of construction of disposal units; waste emplacement; the procedures for and areas of waste segregation; onsite traffic systems; drainage systems; survey control program; methods and areas of waste storage; and methods to control surface water and groundwater access to the wastes. The application must also describe the methods to be employed in the handling and disposal of wastes containing chelating agents or other non-radiological substances that might affect meeting the performance objectives in subpart C of this part.

* * * * *

(h) An identification of the known natural resources in the vicinity of the disposal site, the exploitation of which could result in inadvertent intrusion into the wastes after removal of active institutional control.

(i)(1) A description of the kind, amount, classification, characteristics, and specifications of the waste proposed to be received, possessed, and disposed at the land disposal facility, including the proposed wastefrom, disposal containers, and the facility's proposed waste acceptance criteria.

(2) A description of the procedures for waste acceptance in accordance with § 61.58(a) through (c).

(j) A description of the quality assurance program developed by the applicant for:

(1) the identification and selection of the disposal site, including any natural features relied upon to enhance the performance of the disposal site;

(2) the development of technical analyses;

(3) the design and construction of the land disposal facility;

(4) the operation of the land disposal facility, including the receipt, handling, and emplacement of waste; and

(5) the site closure of the land disposal facility.

(k) A description of the radiation safety program to ensure compliance with the performance objective in § 61.41 of this part, including the control of radioactive effluents, and the occupational and public radiation protection requirements of part 20 of this chapter. The radiation safety program must address both routine operations and accidents and include procedures for dosimetry and preventing and controlling the radioactive contamination of personnel, buildings, vehicles, and equipment.

(l) A description of the environmental monitoring program that provides data for an evaluation of the disposal site performance including potential health and environmental impacts and the plan for taking corrective measures commensurate with detected radionuclide migration.

* * * * *

14. In § 61.13, revise the introductory text and paragraphs (a) through (d) and add paragraphs (e) and (f) to read as follows:

§ 61.13 Technical analyses.

This section describes the technical analyses that must be submitted as part of the application under § 61.10. The specific technical information must include the following analyses needed to demonstrate that the performance objectives of subpart C of this part will be met:

(a) *Performance assessment.* A performance assessment that demonstrates that there is reasonable assurance that the exposure to humans from radioactivity released from the disposal site will meet the protection of the general population performance objective set forth in § 61.41(a) for the duration of the compliance period. The performance assessment must:

(1) Identify the natural characteristics of the disposal site (e.g., geomorphology, meteorology, hydrology, hydrogeology, geochemistry, and biology); the characteristics of the engineered barrier; and the interactions between the disposal site and engineered barriers characteristics that might affect performance of the disposal site. Identify radionuclide transport characteristics of the waste (i.e., the ease with which radionuclides can escape containment). A performance assessment must further identify and examine the effects of the eventual degradation, deterioration, or alteration of the engineered barriers (including the wastefrom and container) together with the disposal site characteristics to evaluate the ability of the disposal site to limit waste releases and to provide an estimate of the annual dose to a member of the public for comparison with the appropriate subpart C performance objective.

(2) Consider features, events, and processes that might affect demonstrating compliance with § 61.41. The features, events, and processes considered must represent a range of phenomena, including those that may have beneficial effects, adverse effects, or both beneficial and adverse effects on performance, and must consider the specific technical information required in §§ 61.12(a) through (i). A technical basis for either the inclusion or exclusion of specific features, events, or processes must be provided.

(3) Consider the probability of disruptive features, events, or processes when estimating the consequences for comparison with the dose limits set forth in § 61.41(a).

(4) Provide model support for the models used in the performance assessment.

(5) Evaluate contaminant transport pathways and processes in environmental media (e.g., air, soil, groundwater, surface water) including but not limited to advection, diffusion, plant uptake, and exhumation by burrowing animals.

(6) Account for uncertainties and variability in the projected performance of the disposal site and surrounding environment, including the demographics and behaviors of human receptors.

(7) Identify 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.

(b) *Inadvertent intruder assessment.* An inadvertent intruder assessment that demonstrates there is reasonable assurance that any inadvertent intruder will not be exposed to a dose that exceeds the limits in the performance objective set forth in § 61.42(a) for the duration of the compliance period. The inadvertent intruder assessment must:

(1) Assume that an inadvertent intruder occupies the disposal site and engages in agricultural and residential activities and other reasonably foreseeable pursuits that are consistent with the activities occurring in and around the site at the time of development of the inadvertent intruder assessment.

(2) Identify barriers to inadvertent intrusion that inhibit contact with the waste or limit dose exposure from the waste and provide a basis for their degree of effectiveness and the time period over which barriers are effective.

(3) Account for uncertainties and variability in the projected performance of the disposal site and surrounding environment.

(c) *Operational safety assessment.* An operational safety assessment of the protection of individuals during operations. The assessment must include analyses of expected exposures due to routine operations and likely accidents during handling, storage, and disposal of waste. The assessment must provide reasonable assurance that exposures will be controlled to meet the requirements of part 20 of this chapter,

thereby meeting the performance objective set forth in § 61.43. These analyses can be qualitative and credit administrative controls and procedures. Operational safety assessments involving Greater-Than-Class C waste must also include quantitative analyses of expected exposures due to unlikely accidents (including fire, handling events, and other credible accidents), the identification of safety features to prevent and mitigate accidents.

(d) *Site stability assessment.* An assessment of the stability of the disposal site and the need for ongoing active maintenance after site closure. The assessment must be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The assessment must provide reasonable assurance that long-term stability of the disposal site can be ensured and that there will not be a need for ongoing active maintenance following site closure, thereby meeting the performance objective set forth in § 61.44.

(e) *Performance period analyses.* Analyses of how the disposal site limits the potential long-term radiological impacts during the performance period. The performance period analyses must be consistent with available data and current scientific understanding. The analyses must identify and describe disposal site design features and natural characteristics relied on to demonstrate compliance with the applicable performance objectives set forth in §§ 61.41(b) and 61.42(b). In addition, the analyses must evaluate those processes likely to occur during the performance period, including degradation, deterioration, and alteration processes that affect performance.

(f) *Technical analyses pursuant to criteria in § 61.1(b).* For licensees who meet the regulations in § 61.1(b), the specific technical information must include the following

analyses needed to demonstrate that the performance objectives of subpart C of this part will be met:

(1) Pathways analyzed in demonstrating protection of the general population from releases of radioactivity must include air, soil, groundwater, surface water, plant uptake, and exhumation by burrowing animals. The analyses must clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolating and segregating the wastes. The analyses must clearly demonstrate that there is reasonable assurance that the exposure to humans from the release of radioactivity will not exceed the limits set forth in § 61.41(c).

(2) Analyses of the protection of individuals from inadvertent intrusion must include demonstration that there is reasonable assurance the waste classification and segregation requirements will be met and that adequate barriers to inadvertent intrusion will be provided.

(3) Analyses of the protection of individuals during operations must include assessments of expected exposures due to routine operations and likely accidents during handling, storage, and disposal of waste. The analyses must provide reasonable assurance that exposures will be controlled to meet the requirements of part 20 of this chapter.

(4) Analyses of the long-term stability of the disposal site and the need for ongoing active maintenance after closure must be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses must provide reasonable assurance that there will not be a need for ongoing active maintenance of the disposal site following closure.

§ 61.14 [Amended]

15. In § 61.14(a) remove the comma after the word “met”.

16. In § 61.16, revise paragraphs (a) and (b) to read as follows:

§ 61.16 Other information.

* * * * *

(a) *Physical security measures, if appropriate.* Any application to receive and possess special nuclear material in quantities subject to the requirements of part 73 of this chapter must demonstrate how the physical security requirements of part 73 will be met. In determining whether receipt and possession will be subject to the physical protection requirements of part 73, the applicant is not required to consider the quantity of special nuclear material that has been disposed of.

(b) *Safety information concerning criticality, if appropriate.*

(1) Any application to receive and possess special nuclear material in quantities that would be subject to the requirements of § 70.24, “Criticality accident requirements,” of this chapter must demonstrate how the requirements of that section will be met, unless the applicant requests an exemption pursuant to § 70.24(d) of this chapter. In determining whether receipt and possession would be subject to the requirements of § 70.24 of this chapter, the applicant is not required to consider the quantity of special nuclear material that has been disposed or radioactive waste containing fissile material that meets the exemption requirements specified in § 71.15(c) of this chapter.

(2) Any application to receive and possess special nuclear material must describe proposed procedures for avoiding accidental criticality, which address both storage of special nuclear material prior to disposal and waste emplacement for

disposal. The procedure is not required to address radioactive waste containing fissile material that meets the exemption requirements specified in § 71.15(c) of this chapter.

(3) Any application to dispose of Greater-Than-Class C radioactive waste containing special nuclear material in quantities that exceed the limits set forth in § 70.24, “Criticality accident requirements,” of this chapter must identify the disposal unit and facility design features that limit reconcentration of fissile material following disposal to ensure that the performance objectives of subpart C of this part will be met during the compliance period.

17. In § 61.23, revise paragraphs (b) through (f) and (j); and add paragraph (m) to read as follows:

§ 61.23 Standards for issuance of a license.

* * * * *

(b) The applicant’s proposed disposal site, disposal site design, waste acceptance criteria, land disposal facility operations (including equipment, facilities, and procedures), disposal site closure, and postclosure institutional controls are adequate to protect the public health and safety because they provide reasonable assurance that the general population will be protected from releases of radioactivity as specified in the performance objective in § 61.41.

(c) The applicant’s proposed disposal site, disposal site design, waste acceptance criteria, land disposal facility operations (including equipment, facilities, and procedures), disposal site closure, and postclosure institutional controls are adequate to protect the public health and safety because they provide reasonable assurance that inadvertent intruders are protected in accordance with the performance objective in § 61.42.

(d) The applicant's proposed waste acceptance criteria and land disposal facility operations (including equipment, facilities, and procedures) are adequate to protect the public health and safety because they provide reasonable assurance that the standards for radiation protection set out in part 20 of this chapter will be met.

(e) The applicant's proposed disposal site, disposal site design, waste acceptance criteria, land disposal facility operations, disposal site closure, and postclosure institutional controls are adequate to protect the public health and safety because they provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practical the need for ongoing active maintenance of the disposal site following closure.

(f) The application provides reasonable assurance that the applicable technical requirements of subpart D of this part will be met.

* * * * *

(j) The applicant's criticality safety procedures are adequate to protect the public health and safety and provide reasonable assurance that the requirements of § 70.24 of this chapter will be met, insofar as they are applicable to special nuclear material to be possessed before disposal under the license. If the requirements of § 70.24 are applicable, the applicant's facility design must identify, as necessary, the disposal unit and facility design considerations that limit reconcentration of fissile material to prevent a potential criticality event following disposal.

* * * * *

(m) The applicant's safety case is adequate to support the licensing decision.

18. In § 61.24, revise paragraph (i), in paragraph (j) remove the phrase "of this part", and add paragraph (l) to read as follows:

§ 61.24 Conditions of licenses.

* * * * *

(i) Any licensee who receives and possesses special nuclear material under this part in quantities that would be subject to the requirements of § 70.24 of this chapter must comply with the requirements of that section. The licensee must consider the quantity of special nuclear material as specified under § 61.16(b) for preventing criticality during storage of special nuclear material prior to disposal and waste emplacement for disposal, and the licensee has, as necessary, implemented design considerations that limit reconcentration of fissile material as a means to prevent a potential criticality event following disposal.

* * * * *

(l) The licensee must not operate the land disposal facility in a manner that would be inconsistent with the technical analyses.

(1) The licensee must evaluate whether updates to the technical analyses are warranted:

- (i) at a minimum of every 5 years;
- (ii) if significant changes have occurred at the site; or
- (iii) before receiving new waste streams not analyzed in the most recent

approved technical analyses.

(2) The evaluations specified in paragraph (l)(1) of this section must be retained as records in accordance with § 61.80.

19. In § 61.25, wherever it may appear remove the word “which” and add in its place the word, “that”; revise paragraphs (a)(3) and (b); redesignate paragraph (c) as paragraph (d) and add new paragraph (c) to read as follows:

§ 61.25 Changes.

* * * * *

(a) * * *

(3) Those features and procedures that may not be changed without 60 days prior notice to the Commission. Features and procedures falling in paragraph (a)(3) of this section may not be changed without prior Commission approval if the Commission so orders, after having received the required notice.

(b) Amendments authorizing waste acceptance criteria changes, site closure, license transfer, or license termination will be included in the license restriction described in paragraph (a)(1) of this section.

(c) Changes to the technical analyses that do not involve waste acceptance criteria changes will be included in the license restriction described in paragraph (a)(2) of this section.

* * * * *

§ 61.27 [Amended]

20. In § 61.27(a), in the second sentence, remove the word “must” and add, in its place, the word “does”.

21. In § 61.28, revise paragraph (a) introductory text, redesignate paragraph (a)(3) as paragraph (a)(4) and revise, add new paragraph (a)(3) and paragraph (a)(5); and remove the word “must” and add, in its place, the word “will” in paragraph (c).

The additions and revisions read as follows:

§ 61.28 Contents of application for closure.

(a) Prior to closure of the disposal site, or as otherwise directed by the Commission, the licensee must submit an application to amend the license for site closure. This site closure application must include a final revision of the safety case and a final disposal site closure plan, which updates and revises, as appropriate, the disposal site closure plan that was submitted with the license application in accordance with § 61.12(g). The final disposal site closure plan must include each of the following:

* * * * *

(3) Any revisions to the technical analyses necessary to support site closure; such revisions must consider the waste disposed during operations and reflect significant changes to the human activities occurring in and around the site.

(4) Any plan or proposed revision of a previously submitted plan for:

* * * * *

(5) The total volume and mass of waste that was disposed as well as the total radioactivity in curies of each radionuclide that was disposed.

* * * * *

§ 61.29 Postclosure observation and maintenance.

22. In § 61.29, revise the section heading as set out above; and in paragraph (a) add “(c)” after “§ 61.28”.

§ 61.30 [Amended]

23. In § 61.30(a) introductory text remove the phrase “The license shall be transferred when” and add, in its place, the phrase “The license amendment request will be approved and the license transferred if”.

§ 61.32 [Amended]

24. In § 61.32(c), remove the word “Shall” and add, in its place, the phrase “Applicants and licensees specified in paragraph (a) of this section must”.

25. Revise § 61.41 to read as follows:

§ 61.41 Protection of the general population from releases of radioactivity.

(a) Concentrations of radioactive material that may be released from the disposal site to groundwater, surface water, air, soil, plants, or animals must not result in an annual dose exceeding a dose equivalent of 0.25 milliSievert (25 millirems) to any member of the public within the compliance period. Reasonable effort should be made to maintain releases of radioactivity from the disposal site as low as is reasonably achievable during the compliance period. Compliance with this paragraph must be demonstrated in the performance assessment as required by § 61.13(a).

(b) Releases of radioactivity from the disposal site must be reduced to the extent reasonably achievable during the performance period. Compliance with this paragraph must be demonstrated through performance period analyses as required by § 61.16(e).

(c) For licensees who meet the criteria in § 61.1(b)(1) of this part and choose to comply with the requirements in § 61.1(b)(2) of this part, concentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

26. Revise § 61.42 to read as follows:

§ 61.42 Protection of individuals from inadvertent intrusion.

(a) Design, operation, and closure of the land disposal facility must ensure protection of an inadvertent intruder into the disposal site who occupies the site or contacts the waste at any time after active institutional controls over the disposal site are removed. The annual dose must not exceed 5 milliSieverts (500 millirems) to any inadvertent intruder within the compliance period. Compliance with this paragraph must be demonstrated through the inadvertent intruder assessment as required by § 61.13(b).

(b) Exposures to an inadvertent intruder must be reduced to the extent reasonably achievable during the performance period. Compliance with this paragraph must be demonstrated through the performance period analyses as required by § 61.13(e).

(c) For licensees who meet the criteria in § 61.1(b)(1) of this part and choose to comply with the requirements in § 61.1(b)(2) of this part, 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 disposal site are removed.

27. Revise § 61.43 to read as follows:

§ 61.43 Protection of individuals during operations.

Operations at the land disposal facility must be conducted in compliance with the standards for radiation protection set out in part 20 of this chapter, except that the annual dose to a member of the public from releases of radioactivity from the land disposal facility must not exceed an annual dose equivalent of 0.25 milliSievert (25 millirems). Every reasonable effort must be made to maintain radiation exposures as low

as is reasonably achievable. Compliance with this section must be demonstrated through the operational safety assessment as required by § 61.13(c).

28. Revise § 61.44 to read as follows:

§ 61.44 Stability of the disposal site after closure.

The land disposal facility must be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site. During the institutional control period, eliminate to the extent practical the need for ongoing active maintenance of the disposal site following site closure so that only surveillance, monitoring, or minor custodial care are required. Compliance with this section must be demonstrated through the site stability assessment as required by § 61.13(d).

29. Revise § 61.50(a) to read as follows:

§ 61.50 Disposal site suitability requirements for land disposal.

(a) *Disposal site suitability for near-surface disposal.* The purpose of this section is to specify the minimum characteristics a disposal site must possess to be acceptable for the disposal of waste in the near surface. The primary emphasis of disposal site suitability requirements is to avoid sites with disruptive processes and events and to foster favorable conditions that will provide reasonable assurance that the performance objectives of subpart C of this part will be met, rather than short-term benefits to site operation. The disposal site must meet the following minimum requirements:

(1) The disposal site must be capable of being characterized, modeled, analyzed, and monitored to the extent that the long-term performance objectives of subpart C of this part can be met.

(2) For at least 500 years following closure of the land disposal facility, the disposal site cannot have any of the following characteristics:

(i) Poor drainage, flooding or frequent ponding, located in a 100-year flood plain, as defined in Executive Order 11988, "Floodplain Management," or located in a wetland, as defined in Executive Order 11990, "Protection of Wetlands."

(ii) Uncontrolled runoff from upstream drainage areas, which could erode or inundate disposal units.

(iii) A water table too close to the land surface. The unsaturated zone must be thick enough so that waste is not disposed within a saturated zone nor a zone of water table fluctuation, perennial or otherwise.

(iv) Groundwater from below discharging to the land surface within the disposal site at any time.

(3) If any of the characteristics in paragraphs (2)(i) through (iv) of this section are present after the first 500 years following closure of the land disposal facility, the performance objectives of subpart C of this part must still be met.

(4) The projected population growth and future developments in the vicinity of the land disposal facility are not likely to affect the ability of the land disposal facility to meet the performance objectives of subpart C of this part or to preclude defensible modeling due to large uncertainties.

(5) The land disposal facility must not be located in, or in the immediate vicinity of, an area:

(i) having known natural resources which, if exploited, would result in the failure of the disposal site to meet the performance objectives of subpart C of this part;

(ii) where tectonic processes such as faulting, folding, seismic activity, or volcanism may occur with such frequency and extent to significantly affect the ability of

the disposal site to meet the performance objectives of subpart C of this part, or to preclude defensible modeling results due to large uncertainties;

(iii) where surface geologic processes such as mass wasting, erosion, slumping, landslides, or weathering occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of subpart C of this part, or to preclude defensible modeling results due to large uncertainties; and

(iv) where nearby facilities or activities could significantly affect the ability of the disposal site to meet the performance objectives of subpart C of this part or significantly mask the environmental monitoring program.

* * * * *

30. In § 61.51, revise paragraphs (a)(1), (4), and (6) to read as follows:

§ 61.51 Disposal site design for land disposal.

(a) * * *

(1) Site design features must be directed toward long-term isolation of the waste and must avoid the need to continue active maintenance after site closure.

* * * * *

(4) Covers must be designed, to the extent practical, to minimize water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.

* * * * *

(6) The disposal site must be designed, to the extent practical, to minimize the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal.

* * * * *

31. In § 61.52, revise paragraph (a)(1), redesignate paragraphs (a)(3) through (a)(11) as paragraphs (a)(5) through (a)(13) and revise redesignated paragraphs (a)(5), (10), and (13); and add new paragraphs (a)(3) and (4), and add paragraphs (a)(14) through (18) to read as follows:

§ 61.52 Land disposal facility operation and disposal site closure.

(a) * * *

(1) Wastes designated as Class A pursuant to § 61.55, must be segregated from other wastes by placing the Class A waste in disposal units that are sufficiently separated from disposal units containing other waste classes and GTCC such that any interaction between Class A wastes and other wastes will not result in the failure to meet the performance objectives in subpart C of this part. This segregation is not necessary for Class A wastes if they meet the stability requirements in § 61.56(b).

* * * * *

(3) Wastes designated as Greater-Than-Class C pursuant to § 61.55 and with concentrations of alpha-emitting transuranic radionuclides with half-lives greater than 5 years that are equal to or less than 10,000 nanocuries per gram may be disposed in the near-surface provided that the top of the waste is a minimum of 5 meters below the land surface and must be disposed with intruder barriers that are designed to protect against an inadvertent intrusion for a least 500 years.

(4) Wastes designated as Greater-Than-Class C pursuant to § 61.55 and with concentrations of alpha-emitting transuranic radionuclides with half-lives greater than 5 years that exceed 10,000 nanocuries per gram must be disposed in accordance with § 61.55(a)(2)(v).

(5) All wastes meeting the criteria of paragraphs (a)(1) through (3) of this section must be disposed of in accordance with the requirements of paragraphs (a)(6) through (17) of this section.

* * * * *

(10) A buffer zone of land must be maintained between any buried waste and the disposal site boundary and beneath the disposed waste. The buffer zone must be of adequate dimensions to allow a licensee to carry out environmental monitoring activities specified in § 61.53(d) and take mitigative measures if needed.

* * * * *

(13) Only wastes containing or contaminated with radioactive materials must be disposed of at the disposal site.

(14) Waste accepted for disposal at a land disposal facility must meet that facility's waste acceptance criteria.

(15) Waste must be disposed consistent with the description provided in § 61.12(f) of this part and the licensee must not operate the land disposal facility in a manner that would be inconsistent with the technical analyses.

(16) Greater-Than-Class C waste must be disposed so as to not produce thermal effects that would significantly degrade the performance of the disposal site.

(17) Greater-Than-Class C waste must be disposed in a manner that limits the potential for a criticality event.

(18) Significant quantities of uranium must be disposed so that the top of the waste is a minimum of 5 meters below the land surface.

* * * * *

32. In § 61.53, revise paragraphs (a) and (b); and in paragraph (d) remove the phrase “licensee responsible” and add, in its place, the phrase “licensee, in accordance with § 61.29 of this part, is responsible”.

The revisions read as follows:

§ 61.53 Environmental monitoring.

(a) At the time a license application is submitted, the applicant must have conducted a preoperational monitoring program to provide environmental data on the disposal site characteristics. The applicant must obtain information and data concerning the ecology, meteorology, climate, hydrology, geology, geomorphology, geochemistry, and seismology of the disposal site. For those characteristics that are subject to seasonal variation, data must cover at least a 12-month period.

(b) At the time a license application is submitted, the applicant must have plans for taking corrective measures during the lifespan of the facility if migration of radionuclides would indicate that the performance objectives of subpart C may not be met.

* * * * *

33. In § 61.55, remove the word “waste form” wherever it may appear and add in its place the word, “wasteform”; revise paragraph (a); add and reserve paragraph (b) to read as follows:

§ 61.55 Waste classification.

(a) * * *

(2) * * *

(i) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the

minimum requirements set forth in § 61.56(a). If Class A waste also meets the stability requirements set forth in § 61.56(b), it is not necessary to segregate the waste for disposal. Class A waste that does not meet the stability requirements of § 61.56(b) must be segregated from other waste.

(ii) Class B waste is waste that must meet more rigorous requirements on wasteform to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in §§ 61.56(a) and (b). Class B wasteforms or containers, to the extent practical, must be designed to be stable (i.e., maintain gross physical properties and identity) over 300 years.

(iii) Class C waste is waste that not only must meet more rigorous requirements on wasteform to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in §§ 61.56(a) and (b). Class C wasteforms or containers, to the extent practical, must be designed to be stable (i.e., maintain gross physical properties and identity) over 300 years.

(iv) Greater-Than-Class C waste is waste that not only must meet the requirements for Class C waste but also the additional requirements set forth in § 61.56(c).

(v) Waste that is not generally acceptable for near-surface disposal includes Greater-Than-Class C waste with concentrations of alpha-emitting transuranic radionuclides with half-lives greater than 5 years exceeding 10,000 nanocuries per gram. Such waste must be disposed of in a geologic repository as defined in part 60 or 63 of this chapter unless proposals for disposal of such waste (e.g., specialized design

and disposal methods) in a disposal site licensed pursuant to this part are approved by the Commission.

(3) *Classification determined by long-lived radionuclides.* If radioactive waste contains only radionuclides listed in Table 1, classification is determined as follows:

* * * * *

(iii) If the concentration exceeds the value in Table 1, the waste is Greater-Than-Class C.

(iv) For wastes containing mixtures of radionuclides listed in Table 1, the total concentration is determined by the sum of fractions rule described in paragraph (a)(7) of this section.

* * * * *

(4) *Classification determined by short-lived radionuclides.* If radioactive waste does not contain any of the radionuclides listed in Table 1, classification is determined based on the concentrations shown in Table 2. However, as specified in paragraph (a)(6) of this section, if radioactive waste does not contain any nuclides listed in either Table 1 or 2, it is Class A.

* * * * *

(iv) If the concentration exceeds the value in Column 3, the waste is Greater-Than-Class C.

(v) For wastes containing mixtures of the nuclides listed in Table 2, the total concentration is determined by the sum of fractions rule described in paragraph (a)(7) of this section.

Table 2

Radionuclide	Concentration, curies per cubic meter		
	Col. 1	Col. 2	Col. 3
Total of all nuclides with less than 5-year half-life	700	(¹)	(¹)
H-3	40	(¹)	(¹)
Co-60	700	(¹)	(¹)
Ni-63	3.5	70	700
Ni-63 in activated metal	35	700	7000
Sr-90	0.04	150	7000
Cs-137	1	44	4600

¹ There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes are Class B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C or Greater-Than-Class C independent of these nuclides.

(5) *Classification determined by both long- and short-lived radionuclides.* If radioactive waste contains a mixture of radionuclides, some of which are listed in Table 1, and some of which are listed in Table 2, classification is determined as follows:

(i) If the concentration of a nuclide listed in Table 1 does not exceed 0.1 times the value listed in Table 1, the class is determined by the concentration of nuclides listed in Table 2.

(ii) If the concentration of a nuclide listed in Table 1 exceeds 0.1 times the value listed in Table 1 but does not exceed the value in Table 1, the waste is Class C, provided the concentration of nuclides listed in Table 2 does not exceed the value shown in Column 3 of Table 2.

(iii) If the concentration of a nuclide listed in Table 1 exceeds the value in Table 1 or the value provided in Column 3 of Table 2, the waste is Greater-Than-Class C.

(6) *Classification of wastes with radionuclides other than those listed in Tables 1 and 2 of this section.* If radioactive waste does not contain any nuclides listed in either Table 1 or 2 of this section, it is Class A.

* * * * *

(b) [Reserved]

34. In § 61.56:

a. In paragraph (a) introductory text, remove the phrase “are minimum requirements for all classes of waste” and, add in its place, the phrase “apply for all waste”; revise paragraph (a)(3); and in paragraph (a)(8) remove the word “practicable” and add, in its place, the word “practical”;

b. In paragraph (b) introductory text remove the word “since” and add, in its place, the word “because”; in paragraph (b)(1) remove the phrase “waste form”, wherever it may appear, and add, in its place, the word “wasteform”; in paragraph (b)(2) remove the phrase “in no case shall the liquid” and add, in its place, the phrase “the liquid must not”; in paragraph (b)(3) remove the word “practicable” and add, in its place, the word “practical”; and

c. Add paragraph (c).

The additions and revisions read as follows:

§ 61.56 Waste characteristics.

(a)* * *

(3) Solid waste containing liquid must contain as little free standing and noncorrosive liquid as is reasonably achievable, but the liquid must not exceed 1% of the volume.

* * * * *

(c) The following requirements are additional requirements for the near-surface disposal of Greater-Than-Class C waste.

(1) Waste must not generate heat in amounts that impact the release of radioactive material from the disposal site or the long-term stability of the disposal site.

(2) Waste must not contain quantities and concentrations of fissionable radionuclides that could result in criticality.

(3) Waste must not emit radiation at levels that could lead to degradation of the disposal environment conditions, such as through radiolysis.

(4) Waste must not be dispersible.

35. Revise § 61.57 to read as follows:

§ 61.57 Labeling.

Each package of waste must be clearly labeled to indicate the waste class in accordance with § 61.55 when shipped for disposal in a land disposal facility. Each package of waste also must be clearly labeled to identify any additional information required by the land disposal facility's criteria for waste acceptance developed in accordance with § 61.58.

36. Revise § 61.58 to read as follows:

§ 61.58 Waste acceptance.

(a) *Waste acceptance criteria.* Each licensee must implement waste acceptance criteria approved by the Commission, that provide reasonable assurance of compliance with the performance objectives of subpart C of this part. Waste acceptance criteria may be either generic or site specific.

(1) *Generic waste acceptance criteria.* Licensees may implement the generic waste acceptance criteria set forth in §§ 61.55 and 61.56.

(2) *Site-specific waste acceptance criteria.* Licensees may implement site-specific waste acceptance criteria that have been approved by the Commission. Site-specific waste acceptance criteria must provide safety equivalent to the requirements in § 61.56. Site-specific waste acceptance criteria must specify the following:

(i) Allowable activities and concentrations of specific radionuclides. The allowable activities and concentrations for each specific radionuclide that the licensee intends to accept for disposal, developed from the technical analyses.

(ii) Acceptable wasteform characteristics and waste container specifications. The wasteform characteristics of the waste to be accepted for disposal and the specifications for all waste containers that will be deployed during operations at the facility.

(iii) Restrictions or prohibitions on waste, materials, or containers that might affect the facility's ability to meet the performance objectives in subpart C of this part.

(b) *Waste characterization.* Each licensee must implement methods for characterizing the waste to be accepted for disposal that have been approved by the Commission. The methods must identify the characterization parameters and acceptable uncertainty in the characterization data. The following information is required to characterize waste:

- (1) Physical and chemical characteristics of the waste;
- (2) Waste volume, including any stabilization or absorbent media;
- (3) Weight of the container and contents;
- (4) Radionuclide identities, activities, and concentrations;
- (5) Characterization date;
- (6) Generating source; and

(7) Any other information needed to characterize the waste to demonstrate that the waste acceptance criteria set forth in § 61.58(a) are met.

(c) *Waste certification program.* Each licensee must implement a program approved by the Commission to certify that waste, prior to shipment to the land disposal facility, meets the waste acceptance criteria developed for the facility in accordance with paragraph (a) of this section. The certification program must:

(1) Provide procedures for designating authority to certify and receive waste for disposal at the facility.

(2) Provide procedures for certifying that the waste to be received at the facility meets the waste acceptance criteria.

(3) Specify documentation required for waste acceptance including waste characterization, shipment information (including the information described in appendix G to part 20 of this chapter), and certification.

(4) Identify records, reports, tests, and inspections that are necessary to comply with the requirements in § 61.80 of this part.

(5) Provide approaches for managing waste that has been certified as meeting the waste acceptance criteria in a manner that maintains its certification status.

(d) The approved waste acceptance criteria will be incorporated into the facility license.

(e) Each licensee must annually review the implementation of the waste acceptance criteria, waste characterization methods, and certification program. The review must be documented and maintained in accordance with § 61.80 of this part.

§ 61.59 [Amended]

37. In § 61.59(b), remove the phrase “the Commission, but” and add, in its place, “the Commission. For technical analyses,”.

§ 61.62 [Amended]

38. In § 61.62(a) remove the word “practicable” and add, in its place, the word “practical”.

39. In § 61.80:

a. In paragraph (e), remove the phrase “the facility is located,” and add, in its place, the phrase “the land disposal facility is located,”;

b. In paragraph (i)(1), remove the reference and phrase “§ 60.4 of this chapter” and add, in its place, the reference “§ 61.4”;

c. In paragraph (i)(2)(iv), remove the phrase “, by waste class,”;

d. Redesignate the last sentence of paragraph (i)(2) as paragraph (i)(3);

e. In paragraph (l)(1)(i), remove the phrase “That required in 10 CFR part 20, appendix G,” and add, in its place, the phrase “That information required in appendix G to part 20 of this chapter”; and

f. Add paragraphs (m) and (n) to read as follows:

§ 61.80 Maintenance of records, reports, and transfers.

* * * * *

(m) Each licensee must maintain waste acceptance records including:

(1) Records for waste acceptance including the waste acceptance criteria, characterization methods, and certification program.

(2) Audits and other reviews of program content and implementation. The licensee must retain records of audits and other reviews for 3 years after the record is made.

(n) Each licensee must maintain records of evaluations on whether updates to the technical analyses are warranted, pursuant to § 61.24(l)(1).

§ 61.81 [Amended]

40. In § 61.81, add and reserve paragraph (b).

PART 73 – PHYSICAL PROTECTION OF PLANTS AND MATERIALS

41. The authority citation for part 73 continues to read as follows:

Authority: Atomic Energy Act of 1954, secs. 53, 147, 149, 161, 170D, 170E, 170H, 170I, 223, 229, 234, 1701 (42 U.S.C. 2073, 2167, 2169, 2201, 2210d, 2210e, 2210h, 2210i, 2273, 2278a, 2282, 2297f); Energy Reorganization Act of 1974, secs. 201, 202 (42 U.S.C. 5841, 5842); Nuclear Waste Policy Act of 1982, secs. 135, 141 (42 U.S.C. 10155, 10161); 44 U.S.C. 3504 note.

Section 73.37(b)(2) also issued under Sec. 301, Public Law 96–295, 94 Stat. 789 (42 U.S.C. 5841 note).

42. In § 73.67, in paragraph (b)(1)(iii), remove “.” and add in its place “, or”; and add paragraph (b)(1)(iv) to read as follows:

§ 73.67 Licensee fixed site and in-transit requirements for the physical protection of special nuclear material of moderate and low strategic significance.

* * * * *

(b)* * *

(1)* * *

(iv) Radioactive waste under 10 CFR part 61 or Agreement State equivalent containing special nuclear material which is (a) in quantities of low strategic significance

prior to disposal, (b) not readily separable from the other radioactive waste material, and (c) is in a concentration of special nuclear material that is no more than 0.01% of the mass of the other waste material.

* * * * *

PART 150 – EXEMPTIONS AND CONTINUED REGULATORY AUTHORITY IN AGREEMENT STATES AND IN OFFSHORE WATERS UNDER SECTION 274

43. The authority citation for part 150 continues to read as follows:

Authority: Atomic Energy Act of 1954, secs. 11, 53, 81, 83, 84, 122, 161, 181, 223, 234, 274 (42 U.S.C. 2014, 2201, 2231, 2273, 2282, 2021); Energy Reorganization Act of 1974, sec. 201 (42 U.S.C. 5841); Nuclear Waste Policy Act of 1982, secs. 135, 141 (42 U.S.C. 10155, 10161); 44 U.S.C. 3504 note.

Sections 150.3, 150.15, 150.15a, 150.31, 150.32 also issued under Atomic Energy Act secs. 11e(2), 81, 83, 84 (42 U.S.C. 2014e(2), 2111, 2113, 2114).

Section 150.14 also issued under Atomic Energy Act sec. 53 (42 U.S.C. 2073).

Section 150.15 also issued under Nuclear Waste Policy Act sec. 135 (42 U.S.C. 10155, 10161).

Section 150.17a also issued under Atomic Energy Act sec. 122 (42 U.S.C. 2152).

Section 150.30 also issued under Atomic Energy Act sec. 234 (42 U.S.C. 2282).

§ 150.11 [Amended]

44. In § 150.11, remove the word “shall” wherever it appears and add in its place the word “must” and in paragraph (b), remove the word “he” and add in its place the phrase “the person”.

§ 150.14 [Amended]

45. In § 150.14, redesignate the section as paragraph (a), remove the word “shall” and add in its place the word “must”, and add and reserve paragraph (b).

§ 150.15 [Amended]

46. In § 150.15:

a. Remove the phrase “Greater than Class C waste” and add, in its place, the phrase “Greater-Than-Class C waste”, wherever it may appear;

b. In paragraph (a) introductory text, remove the word “agreement” and add, in its place, the word “Agreement”;

c. In paragraph (a)(4), remove the phrase “contaminated equipment” and add, in its place, the phrase “contaminated equipment or to waste incidental to reprocessing that has been evaluated and approved as material to be disposed at a near-surface land disposal facility”;

d. Redesignate paragraphs (a)(8) and (9) as paragraphs (a)(7)(iv) and (a)(8);
and

e. Remove the word “shall” in paragraph (b).

Dated: <Month XX, 20XX>.

For the Nuclear Regulatory Commission.

Carrie M. Safford,
Secretary of the Commission.