Regulatory Analysis for Issuing a Guidance Document for the Review of Proposed Disposal Procedures and Transfers of Radioactive Material under 10 CFR 20.2002 and 10 CFR 40.13(a)

U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Division of Rulemaking, Environmental, and Financial Support

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ABBREVIATIONS AND ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ADR	alternative disposal request
AEC	Atomic Energy Commission, the predecessor agency to the NRC
ALARA	as low as is reasonably achievable
CFR	*Code of Federal Regulations*
EPA	U.S. Environmental Protection Agency
EPPAD	Environmental Protection and Performance Assessment Directorate (previous directorate)
EPRI	Electric Power Research Institute
FR	*Federal Register*
FSME	Office of Federal and State Materials and Environmental Management Programs (previous office)
LLW	low-level (radioactive) waste
mrem	millirem
NRC	U.S. Nuclear Regulatory Commission
NMSS	Office of Nuclear Material Safety and Safeguards
OMB	Office of Management and Budget
RAI	request for additional information
RCRA	Resource Conservation and Recovery Act
SOC	standard occupational code
VLLW	very low-level waste

1 INTRODUCTION

This document presents the regulatory analysis of the U.S. Nuclear Regulatory Commission's (NRC's) guidance document, "Review, Approval, and Documentation of Low-Activity Waste Disposals in Accordance with 10 CFR 20.2002 and 10 CFR 40.13(a)," which the agency previously issued in draft as EPPAD 3.5 in August 2009 (NRC, 2009) for interim use. This updated guidance provides additional information and detail for NRC use. It describes the steps that the NRC staff performs to review, document, and disposition (on a case-by-case basis) requests received from licensees, applicants, and other entities[1] for approval of alternative disposal requests (ADRs) for licensed material in accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 20.2002, "Methods for Obtaining Approval of Proposed Disposal Procedures," and 10 CFR 40.13, "Unimportant Quantities of Source Material." The guidance revision does not expand or reduce the scope of proposals for the release of solid material with volumetric contamination that would be considered acceptable.

1.1 Background

Radioactive waste is produced as a byproduct of using radioactive materials in nuclear reactors, fuel processing plants, hospitals, and research facilities. Radioactive waste is also generated while decommissioning and dismantling nuclear reactors and other nuclear facilities. These wastes must be safely managed and disposed of to protect people and the environment from the effects of ionizing radiation.

Radioactive waste is basically divided into "high-level waste"—mostly spent fuel from reactors—and "low-level waste" (LLW). LLW can range in radioactivity from just above background levels found in nature to much higher levels. The regulations in 10 CFR 20.1001, "Purpose," state, in part, that the purpose of 10 CFR Part 20, "Standards for Protection against Radiation," is "to control the receipt, possession, use, transfer, and disposal of licensed material." The disposal mechanisms within the scope of 10 CFR 20.2001, "General Requirements," include decay in storage, release into sanitary sewerage, incineration, release in effluents, and use of a land disposal facility licensed under Part 61.

The regulations in 10 CFR 20.2001 refer to several different disposal options, including 10 CFR 20.2002, a provision for "alternative disposal" authorizations. Provisions provided under 10 CFR 20.2002 allow for disposal methods that differ from those already defined in the regulations. To obtain a 10 CFR 20.2002 authorization, a licensee or applicant must demonstrate that doses are maintained as low as is reasonably achievable (ALARA)[2] and within the dose limits in 10 CFR Part 20. In practice, 10 CFR 20.2002 (formerly 10 CFR 20.304 and 10 CFR 20.302)[3] is most often applied to the burial of waste in hazardous or solid waste landfills

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[1] Agreement States may ask for assistance by the NRC to review these requests per the Technical Assistance Request (TAR) process.

[2] In 10 CFR 20.1003, "Definitions," the NRC defines "ALARA" as "making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest."

[3] The Atomic Energy Commission (AEC), the predecessor agency to the NRC, authorized licensee burial of certain quantities of radioactive waste in soil under 10 CFR 20.304, "Disposal by Burial in Soil" (Volume 22 of the

that are permitted under the Resource Conservation and Recovery Act (RCRA). However, it may also be used for other alternative disposals not already defined in the regulations, including certain disposal procedures not involving burial.

The term very low-level waste (VLLW), which is synonymous with the term "low-activity waste," does not have a statutory or regulatory definition, but generally means waste that contains some residual radioactivity that is a small fraction of the Class A limits contained in 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." Therefore, VLLW can usually be safely disposed of in hazardous or solid waste landfills without the need for the extensive controls specified in 10 CFR Part 61 to ensure the protection of public health and safety and the environment.[4] Although these materials could be disposed of in a LLW disposal facility licensed under 10 CFR Part 61, use of alternative disposal procedures under 10 CFR 20.2002 may reduce overall risk (e.g., risk associated with increased transportation distances and associated radiological and non-radiological impacts). The use of alternative disposal procedures may also preserve disposal capacity at LLW disposal facilities for higher risk waste streams, while maintaining adequate protection of public health and safety and the environment.

The NRC regulatory framework requires possessors of radioactive materials to hold a license authorizing such possession or to be exempted from licensing requirements (e.g., "specific exemptions," under 10 CFR 30.11(a), 10 CFR 40.14(a), and 10 CFR 70.17(a)). For offsite disposals, the NRC or the Agreement State issues an exemption from the requirement for a license for possession of the radioactive material by the offsite facility, in conjunction with the 10 CFR 20.2002 authorization. Onsite disposals by licensees within their own licensed area that are approved by the NRC under 10 CFR 20.2002 do not require an exemption since the licensee already has a license authorizing possession of the material. The NRC approvals of onsite 10 CFR 20.2002 disposal remain part of the license and must be addressed by licensees as part of facility decommissioning to ensure that when the license is terminated, the site meets the criteria in the license termination rule in 10 CFR Part 20, Subpart E, "Radiological Criteria for License Termination." The NRC addresses onsite disposal in greater detail in NUREG-1757, "Consolidated NMSS Decommissioning Guidance," Volume 1, "Decommissioning Process for Materials Licenses," Revision 2, issued September 2006 (NRC, 2006).

In 2007, because of developments in the national program for LLW disposal and changes in the regulatory environment, the NRC staff performed a strategic assessment of its LLW program. The staff documented the results of this assessment in SECY-07-0180, "Strategic Assessment of Low-Level Radioactive Waste Regulatory Program," dated October 17, 2007 (NRC, 2007). One high-priority task in this assessment was to address the challenge of the

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Federal Register (FR), page 548 (22 FR 548), January 29, 1957). The AEC's regulations did not require that licensees obtain the AEC's prior approval for these burials. Following the formation of the NRC, the NRC concluded that it was inappropriate to continue generic authorizations of burials pursuant to 10 CFR 20.304 without regard to factors such as the location of burial, concentrations of radioactive material, form of packaging, and notification of the NRC. As a result, on January 28, 1981, the NRC rescinded 10 CFR 20.304 (45 FR 71761, October 30, 1980). After January 1981, licensees were only authorized to dispose of radioactive material under 10 CFR 20.302, "Method for Obtaining Approval of Proposed Disposal Procedures," which required the NRC's prior approval. In 1991, the NRC revised this regulation, which is currently 10 CFR 20.2002 (56 FR 23360, May 21, 1991).

[4] SECY-06-0056, Enclosure 2, stated that "[a]lthough most of the radioactivity in LLW generated by NRC licensees is disposed in facilities licensed under Agreement State regulations compatible with and/or similar to Part 61, 10 CFR 20.2002 continues to be available for use by licensees for wastes that are a small fraction of the Class A limits contained in Part 61, for which the extensive controls in the Part 61 are not needed to ensure protection of the public health and safety and the environment."

alternative disposal of VLLW, in accordance with 10 CFR 20.2002, in nontraditional LLW facilities (i.e., RCRA facilities) and the regulatory review and approval needed for such disposal. In response to stakeholder input on the 2007 assessment, the NRC determined that the process for authorizing these disposals needed more clarity. The NRC committed to addressing these concerns by developing new regulatory guidance.

On August 31, 2009, the NRC issued interim staff procedure EPPAD 3.5. Although this guidance focused primarily on the provisions of 10 CFR 20.2002, it also provided guidance for 10 CFR 40.13(a) requests for the transfer of unimportant quantities of source material exempt from licensing. Before its issuance, the NRC had no single procedure covering safety and security reviews, the preparation of an environmental assessment, and coordination with internal and external stakeholders for ADRs. Accordingly, the NRC developed and issued this document to provide guidance for the staff's review of ADRs received from licensees, applicants, and other entities for the alternative disposal of licensed material. In addition, the NRC determined that it would finalize this guidance after it had been used for more ADRs.

In 2016, the NRC staff conducted a new assessment of the NRC's LLW program and published the results in SECY-16-0118, "Programmatic Assessment of Low-Level Radioactive Waste Regulatory Program," dated October 11, 2016 (NRC, 2016). It performed this assessment to identify and prioritize tasks that the NRC could undertake to ensure a stable, reliable, and adaptable regulatory framework for effective LLW management, while also considering future needs and changes that may occur in the nation's commercial LLW management system. One of the high-priority tasks included within this assessment was to address the challenge of alternative disposal of VLLW by finalizing the draft guidance document. In accordance with the programmatic assessment, the NRC published a draft version of the guidance document for public comment and then issue it as a final document. On October 19, 2017, the NRC requested public comment on the final draft version of EPPAD 3.5, Revision 0.1 (NRC 2017b).

1.2 Statement of the Problem and Objective

1.2.1 Problem Statement

The NRC published a draft version of EPPAD 3.5 in 2009 for interim use by the NRC's Office of Federal and State Materials and Environmental Management Programs (FSME) Division of Waste Management and Environmental Protection staff. Following the merger of FSME and the Office of Nuclear Material Safety and Safeguards (NMSS) in 2014, the guidance document no longer reflects the NRC organization responsible for performing the technical reviews of ADRs. Also, the guidance document does not clearly describe the NRC review and approval process for ADRs under 10 CFR 20.2002.

1.2.2 Objective

The objective of this regulatory analysis is to assess the benefits and costs of alternatives for consideration to ensure that updating the NRC guidance is the most cost-beneficial (i.e., cost-effective) alternative.

2 IDENTIFICATION AND ANALYSIS OF ALTERNATIVE APPROACHES

The NRC has identified three alternatives for consideration.

2.1 Alternative 1—Taking No Action

Under this alternative, the NRC would not change the current guidance and the NRC would not revise or issue new guidance to address this problem. This alternative is considered the "no-action" alternative and serves as the baseline against which the impacts of the other alternatives will be measured.

This alternative would pose no incremental burden on licensees, license applicants, or other entities. Under this alternative, the NRC would continue to consider approvals under 10 CFR 20.2002 on a case-by-case basis. However, the NRC staff would not be responsive to feedback provided on the current guidance document or to the public comments on the draft guidance (82 FR 48727, October 19, 2017). Because this "no-action" alternative would not make available the most current information, incorporate lessons learned from regulatory oversight, or clarify NRC processes and correct organizational responsibilities, this alternative would not achieve the NRC's objectives.

2.2 Alternative 2—Issue Revised Guidance

Under this alternative, the NRC would resolve the public comments received (82 FR 48727, October 19, 2017) and would finalize the updated ADR guidance. This revision would incorporate the latest information, references, language, and supporting guidance, as well as updates to the NRC organizational structure since the issuance of the initial draft for interim use in 2009. By doing so, the NRC would ensure that the guidance is current and accurately reflects both the NRC staff's organizational structure, as well as the agency's process for documenting, reviewing, and approving submitted ADRs.

This guidance is for NRC staff use when processing requests from licensees and applicants for ADRs for licensed material. This guidance may be used by Agreement State staff in similar reviews, as appropriate. The NRC expects applicants and licensees would incur voluntary costs associated with evaluating the clarifications to this program. The NRC expects that this alternative would benefit the users of this guidance because the document would clearly define the process for submitting, reviewing, and accepting ADRs. The NRC expects that the improved understanding of the end-to-end process would result in a higher likelihood that applicants or licensees would use the ADR process, a higher percentage of acceptable ADRs, a lower number of NRC-generated requests for additional information (RAIs), and higher quality interaction between the NRC and the applicants or licensees. In addition, the NRC expects that following the revised guidance would result in less expensive disposal for VLLW material.

Although this alternative may provide for some efficiency gains in the licensee's preparation and submittal and the NRC's review and approval of ADRs resulting from the improved understanding of the process, issuing this guidance does not result in any substantive changes to submittals or to the NRC review and approval process and does not expand or reduce the scope of proposals for the release of solid material with volumetric contamination that the NRC would consider acceptable for review.

2.3 Alternative 3—Withdraw EPPAD 3.5

Under this alternative, the NRC would withdraw EPPAD 3.5 without issuing this guidance. Doing so would eliminate existing guidance that the NRC staff uses to review, document, and approve an ADR under 10 CFR 20.2002 and 10 CFR 40.13(a), and would reduce licensees and applicant's understanding of the NRC internal process for documenting, reviewing, and

approving submitted ADRs. Although this alternative would be less costly than revising EPPAD 3.5, the effect would be the elimination of necessary guidance that provides useful information to the NRC staff, which ensures consistent and complete technical reviews and helps to ensure that an ADR submittal is complete. The availability of guidance describing the NRC's expectations helps licensees and applicants understand the information required in the ADR submittal, thereby reducing the likelihood of NRC-generated RAIs that cause processing delays. Because of these shortcomings, and because this alternative would not fully address the regulatory issues described above, the NRC did not evaluate this alternative further.

3 ESTIMATION AND EVALUATION OF BENEFITS AND COSTS

3.1 Affected Entities

Alternative 2 will affect the NRC, the Agreement States, and all licensees, applicants, and other entities involved with the receipt, possession, use, transfer, and disposal of VLLW. Under section 274 of the AEA, the NRC may enter into an agreement with a State for discontinuance of the NRC's regulatory authority over some materials licensees within the State. The State must first show that its regulatory program is compatible with the NRC's and adequate to protect public health and safety. The responsibilities for reviewing a specific ADR vary depending on the type of licensee requesting the action, whether the licensee is located in an Agreement State or Non-Agreement State, and the location of the proposed disposal site (Agreement State or Non-Agreement State). The NRC retains authority over, among other things, nuclear power plants and Federal research facilities regardless of the state in which they are located.

Applicants and licensees would benefit from the proposed publication of this guidance because it clarifies the review process for proposed disposal and transfers of radioactive material. Furthermore, applicants and licensees have the flexibility to choose to dispose of VLLW at RCRA facilities at a significantly lower unit cost than at 10 CFR Part 61 licensed facilities.

3.2 Analytical Methodology

This section describes the methodology used to analyze the benefits and costs associated with each alternative. The benefits include any desirable changes in affected attributes (e.g., monetary savings, improved safety, improved security), while the costs include any undesirable changes in affected attributes (e.g., monetary costs, increased exposures to radiation or physical hazards). The staff developed this regulatory analysis following the guidance in NUREG/BR-0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission" (NRC 2018). In addition, the methodology is in accordance with guidance from Office of Management and Budget (OMB) Circular A-4, "Regulatory Analysis" (OMB 2003).

In this regulatory analysis, the NRC staff identifies all attributes related to the regulatory action and analyzes them either quantitatively or qualitatively. For the quantified regulatory analysis, the NRC staff developed expected values for each benefit and cost. For each alternative, the NRC staff first determined the benefits and costs, and then discounted the consequences in future years to the current year of the regulatory action. Finally, the NRC staff summed the benefits and costs for each alternative and compared them.

This regulatory analysis measures the incremental costs of issuing this guidance relative to a baseline that reflects anticipated behavior if the NRC does not undertake any regulatory action (Alternative 1). As part of the regulatory baseline used in this analysis, the NRC staff assumes

full compliance with existing NRC regulations. This alternative is equivalent to the status quo and serves as a baseline to measure the other alternatives against.

After performing the quantitative regulatory analysis, the NRC staff addressed attributes that could only be evaluated qualitatively. The guidance could result in changes that would affect attributes that would be difficult to quantify but are nevertheless essential to consider. To estimate the costs associated with each alternative, the staff used a work breakdown approach to deconstruct the revision of the guidance into activities. For each activity, the NRC staff further subdivided the work across labor categories. The NRC staff estimated the required level of effort for each required activity and labor rates for personnel performing these activities to develop cost estimates.

The NRC staff gathered data from a number of sources to develop levels of effort and unit cost estimates. The NRC staff applied several cost estimation methods in this analysis. The staff used professional knowledge and judgment to estimate some of the costs and benefits. Additionally, it applied an engineering buildup method and extrapolation techniques to estimate costs and benefits.

To evaluate the effect of uncertainty in the analysis, the NRC staff employed a Monte Carlo simulation, which is an approach to uncertainty analysis in which input variables are expressed as distributions. The result is a distribution of values for the output variable of interest. With a Monte Carlo simulation, it is also possible to determine the input variables that have the greatest effect on the value of the output variable. Section 3.5 gives a detailed description of the Monte Carlo simulation methods and presents the results.

3.2.1 Identification of Affected Attributes

This section identifies the factors within the public and private sectors that the analyzed alternatives are expected to affect, using the list of potential attributes in NUREG/BR-0058. The basis for selecting these attributes is presented below.

Affected attributes include the following:

- Public Health (Routine)—This attribute accounts for changes in radiation exposures to members of the public that might result from the proposed regulatory action. The proposed publication of this guidance would clearly indicate that, on a case-by-case basis, licensees and applicants can propose alternative disposal procedures to dispose of NRC-licensed material without the need for the extensive controls for LLW found in 10 CFR Part 61. However, the proposed action may result in the ADR process becoming more routine, thereby resulting in the disposal of larger quantities of waste in hazardous or solid waste landfills that are permitted under RCRA instead of at 10 CFR Part 61 licensed LLW disposal facilities. This change could result in negligible to small increases in public exposure. Even with an increase in approvals the NRC staff expects the incremental dose increase from offsite burial disposals at a single disposal site to be minimal. For example, assuming doses of 5 millirem (mrem) per year for each disposal, an overly conservative dose based on previously approved § 20.2002 reviews, an increase from 5 to 10 annual disposals at a single burial site, a 200-percent increase, would increase the annual dose from 25 mrem per year to 50 mrem per year. This level is well within the dose constraints and limits established under 10 CFR Part 20, so that the effects would not endanger life or property or the common defense and security and are in the public interest. With respect to other types of disposal requests not involving

burial (e.g., reuse), which are rare and limited, the likelihood that the regulatory action would result in a significant increase in public exposure is expected to be low.

- Occupational Exposure (Routine)—This attribute accounts for radiological exposures to workers during normal facility operations. The proposed action also applies to onsite disposal of material, taking into consideration risks to workers and members of the public associated with the transport and disposal of the material on the licensed site. Specific issues related to the release of the material for unrestricted use or the exempting of the offsite disposal facility can be addressed at the time of decommissioning. Under Alternative 1, taking no action, the licensee would maintain records documenting the onsite disposal action for further review at the time of license termination in accordance with the screening criteria in NUREG-1757. As a result, the NRC expects no incremental change in the occupational exposure from routine operations from the proposed action.

- Industry Implementation—This attribute accounts for the projected net economic effect on the affected applicants or licensees related to reading and becoming familiar with the guidance before preparing an ADR submittal. The proposed action does not require applicants or licensees to change their submittals, although the NRC staff expects licensees would improve their understanding of the agency's ADR review and approval process and submit high-quality submittals with a lower likelihood of RAIs.

- Industry Operation—This attribute measures the projected net economic effect of routine and recurring activities and does not require applicants or licensees to make any changes to their disposal procedures, or planned location for transfer and disposal of radioactive material under 10 CFR 20.2002 and 10 CFR 40.13(a). Although this alternative may provide for some efficiency gains in the licensee's preparation and submittal and the NRC's review and approval of ADRs as a result of the improved understanding of the process, the publication of the guidance does not result in any substantive changes to licensees' submittals or to the NRC review and approval process. However, the NRC anticipates that with clarified guidance, licensees would use the 10 CFR 20.2002 process to take advantage of the significant cost savings in VLLW disposal costs at RCRA licensed sites.

- NRC Operations—This attribute measures the projected net economic effect on the NRC after implementation of the proposed regulatory action. Based on the analyzed alternative, the NRC anticipates that the higher quality ADR submittal would require incrementally less time to review and approve, in part because the staff expects that it would generate fewer RAIs to complete the review.

- Other Government—This attribute measures the projected net economic effect on other government entities after implementation of the proposed regulatory action. Based on the analyzed alternative, the NRC anticipates that the radiation control program directors and State liaison officers in the 38 Agreement States[5] would review the updated guidance for applicability to their facilities and consider taking actions as appropriate. These actions could entail attaching the revised guidance or making conforming

[5] Currently, 38 Agreement States (including Wyoming) regulate approximately 19,300 licensees for medical, academic, industrial, and general users of nuclear materials. In addition, Vermont has submitted a draft application to become an Agreement State (see NUREG-1350, Volume 31, "2019–2020 Information Digest" (NRC 2019)).

changes to their procedures and distributing the revised guidance to their licensees as appropriate. In addition, the proposed action may result in the ADR process becoming more routine, thereby resulting in the disposal of larger quantities of VLLW in hazardous or solid waste landfills that are permitted under RCRA instead of at 10 CFR Part 61 licensed LLW disposal facilities. The NRC did not identify any impacts to agreements between the NRC and Federal and State recognized Native American Indian tribes that would be affected by the implementation of the proposed regulatory action.

- Improvements in Knowledge—This attribute accounts for the potential value of new information. The proposed publication of this guidance would help licensees to gather, organize, and present information in their ADR submittals in a manner that provides a high-quality document that may result in less NRC review and approval time, in part because the staff would need to generate fewer RAIs. In addition, the proposed revision would describe the NRC review and approval process for the use of alternative disposal procedures under 10 CFR 20.2002 and may reduce overall risk.

- Regulatory Efficiency—This attribute accounts for the potential benefits of complete and accurate guidance that would result in enhanced regulatory efficiency through regulatory and compliance improvements. The NRC anticipates that the updated guidance, and the resulting improved understanding of the process, would provide for efficiency gains for licensees preparing ADR submittals and for the NRC's review and approval of ADRs.

- Other Considerations

  – Preserving the Disposal Capacity of 10 CFR Part 61 Facilities—The proposed publication of the guidance would clearly identify that VLLW can be safely disposed of without the need for the extensive controls in 10 CFR Part 61. This clarification may result in more licensees using this lower cost disposal procedure under 10 CFR 20.2002 to dispose of material in hazardous or solid waste landfills that are permitted under RCRA. This would preserve the disposal capacity at the four 10 CFR Part 61 licensed LLW disposal facilities for higher risk waste streams. All four 10 CFR Part 61 LLW disposal facilities are located in and licensed by Agreement States.

  – Reduced Nonradiological Transportation Risk—This attribute measures expected changes in accident consequences associated with the proposed action. The proposed publication of the guidance would clearly identify that VLLW can be safely disposed of without the need for the extensive controls in 10 CFR Part 61. This clarification may result in more licensees using this lower cost disposal procedure under 10 CFR 20.2002, which could reduce the overall transportation risk because of the decreased transportation distances to one of 3,779 hazardous or solid waste landfill facilities that are dispersed across all 50 States and are permitted under RCRA (EPA, 2017). Transportation to one of the RCRA sites for disposal of VLLW is, in most cases, closer than to any of the four licensed 10 CFR Part 61 facilities, located in South Carolina, Washington, Utah, and Texas (NRC, 2017a).

Attributes that are not affected are public health (accident), occupational health (accident), offsite property, onsite property, NRC implementation, improvements in knowledge, safeguards and security considerations, general public, and environmental considerations. The NRC does

not anticipate any NRC implementation costs because the costs to resolve public comments and revise and issue the guidance are considered sunk costs.

3.2.2 Time Horizon

The NRC assumes that it would issue the guidance (Alternative 2) in 2020. The applicability period for the impacted entities is estimated for a 10-year period (i.e., 2020 to 2029).

3.2.3 Base Year of Analysis

The NRC has quantified benefits and costs in 2020 dollars.

3.2.4 Cost/Benefit Inflators

The NRC estimated the analysis inputs from sources as referenced in Section 3.5, some of which are provided in prior-year dollars. To evaluate the costs and benefits consistently, these inputs are put into base-year dollars. The most common inflator is the consumer price index for all urban consumers (CPI-U) developed by the U.S. Department of Labor, Bureau of Labor Statistics (BLS). Using the CPI-U, the prior-year dollars are converted to 2020 dollars. The formula to determine the amount in 2020 dollars is as follows:

$$\frac{CPI - U_{2020}}{CPI - U_{Base\ Year}}\ x\ Value_{Base\ Year} = Value_{2020}$$

Table summarizes the values of CPI-U used in this regulatory analysis.

Table 1 CPI-U Inflator

Base Year	CPI-U Annual Average[a]
2017	245.13
2018	251.10
2019	256.12
2020	263.12

Source: Statistica 2019

3.2.5 Labor Rates

For regulatory analysis purposes, the staff developed labor rates that include only variable costs that are directly related to the implementation, operation, and maintenance of the proposed requirement. This approach is consistent with guidance in NUREG/CR-4627, "Generic Cost Estimates: Abstracts from Generic Studies for Use in Preparing Regulatory Impact Analyses," (NRC 1992), and general cost-benefit methodology. The NRC incremental labor rate is $131 per hour (2020 dollars).[6]

[6] The NRC labor rates presented here differ from those developed under the NRC's license fee recovery program (10 CFR Part 170, "Fees for Facilities, Materials, Import and Export Licenses, and Other Regulatory Services under the Atomic Energy Act of 1954, as Amended"). The NRC labor rates for fee recovery purposes are set for cost recovery of the services rendered and as such include nonincremental costs (e.g., overhead, administrative, and logistical support costs).

The NRC staff estimated licensee incremental labor rates based on data obtained from the Bureau of Labor Statistics National Wage Data for an "Industry Engineer—Safety" (Standard Occupational Code (SOC) 17-2111). Similarly, the NRC staff estimated Agreement State incremental labor rates based on the average of the wages for environmental engineers (SOC 17-2081), industrial engineers (SOC 17-2110), and health and safety engineers (SOC 17-2111). The NRC staff calculated the mean wages for each labor category and multiplied those values by a factor of two to account for pension, insurance, and other legally required benefits. The labor rates were then adjusted to 2020 dollars using the Consumer Price Index for All Urban Consumers inflator. Table presents the labor categories and labor rates used for this analysis.

Table 2 Incremental Labor Rates

Labor Category	Incremental Labor Rate (2020 dollars)			
	Mean	25th Percentile	50th Percentile	90th Percentile
Agreement State	$91.17	$72.46	$95.10	$125.99
Industry	$96.50	$69.58	$90.66	$147.83
NRC	$131.00			

3.2.6 Net Present Value Calculations

The present value calculations determine how much society would need to invest today to ensure that the designated dollar amount is available in a given year in the future. Using discount factors for the costs and benefits allows for future incremental costs and benefits to be valued equally when comparing alternatives. Based on OMB Circular No. A-4 (OMB 2003), present value calculations are presented using both 3-percent and 7-percent real discount rates, and the decision rationale is based on the 7-percent real discount rate.

3.2.7 Sign Conventions

This analysis uses a sign convention such that all favorable consequences for the alternative are positive and all adverse consequences for the alternative are negative. Negative values are shown using parentheses (e.g., negative $500 is displayed as ($500)).

3.2.8 Assumptions

The analysis employs the following assumptions and considerations to determine the costs associated with the implementation of the analyzed alternatives:

- Licensees would review the updated guidance in preparation for submitting an ADR.
- The NRC would receive an average of 1.6 ADRs each year, based on the most recent 4-year historical average. The NRC assumes that the Agreement States would receive approximately five ADRs per year.
- The NRC conservatively estimates that the improved guidance would result in a 25-percent reduction over the 10-year analysis period in the amount of time required for licensees to respond to RAIs and for the NRC and Agreement States to review these responses.

3.3 Evaluation of Alternative 1—Taking No Action

This regulatory analysis measures the incremental impacts of the alternative relative to a "baseline," which reflects anticipated behavior if the staff does not issue this guidance. By definition, the "no-action" alternative, the baseline for the principal analysis, does not result in any change in benefits or costs.

3.4 Evaluation of Alternative 2—Issue Guidance

This section presents the evaluation of this Alternative 2 by attribute.

3.4.1 Public Health (Routine)

The issuing of guidance would clearly identify that VLLW can be safely disposed of without the need for the extensive controls in 10 CFR Part 61. However, the proposed action may result in the ADR process becoming more routine, thereby resulting in the disposal of larger quantities of VLLW in hazardous or solid waste landfills that are permitted under RCRA instead of at 10 CFR Part 61 licensed LLW disposal facilities. This change could result in negligible to small increases in public exposure. The NRC expects the incremental dose increase as compared to the status quo would be small (e.g., less than 25 mrem per year), and the total exposure would remain within the dose constraints established under 10 CFR Part 20 so that the effects would not endanger life or property or the common defense and security and are in the public interest.

3.4.2 Occupational Health (Routine)

This attribute accounts for radiological exposures to workers during normal facility operations. The proposed action does not change any guidance regardless of whether the material is disposed of on the site or at an offsite disposal facility. In cases of onsite disposal, the licensee would maintain records documenting the expected regulatory residual activity concentrations at the time of license termination in accordance with the screening criteria in NUREG-1757. Regardless of whether the disposal occurs onsite or offsite, the NRC expects minimal changes in the occupational exposure from routine operations.

3.4.3 Industry Implementation

Following the issuance of the revised guidance document, the NRC anticipates that licensees would read the guidance immediately after the document is issued. Table shows these costs, using the NRC assumptions for the number of licensees and the time required to read the guidance document. The NRC estimates that licensees would spend an average of about 1 hour to read the revised guidance document.

Table 3 Industry Implementation

Activity	No. of Licensees	Hours	Labor Rate	Undiscounted	3% NPV	7% NPV
Read issued guidance	1,500	0.95	$94.57	($137,512)	($137,512)	($137,512)
			Total	($134,758)	($134,758)	($134,758)

* These costs are one-time costs and occur immediately after the document is issued.

3.4.4 Industry Operation

As a result of the licensees' increased understanding of the NRC's ADR review and acceptance process based on the improved guidance, the NRC anticipates that licensees will submit 13.2 ADRs annually, a 100-percent increase, following the publication of the revised guidance document to take advantage of the streamlined ADR process and the lower costs of disposal at RCRA sites. In addition, the NRC anticipates that the submitted ADRs will be more complete, thereby requiring fewer industry submittals to respond to RAIs and provide supplementary information or to clarify text in order for the NRC to approve the request and issue an exemption. The NRC conservatively estimates that the improved guidance would result in a 25-percent reduction in the amount of time required for licensees to respond to RAIs on their ADRs. Based on historical information, the NRC estimates that a licensee expends on average 1,262 hours to respond to RAIs and submits approximately 170 pages of supplemental information for a typical ADR. Based on averting this effort over a 10-year period, Table shows that the total present value of these averted costs is $3.2 million using a 7-percent discount rate, or $3.9 million using a 3-percent discount rate.

Table 4 Industry Operation: ADR-Related Costs

Activity	Years	No. of ADRs per Year	Hours	Labor Rate	Undiscounted	3% NPV	7% NPV
Prepare and submit additional ADRs	2020–2029	6.60	1,261.90	$96.50	($8,033,681)	($6,852,893)	($5,642,521)
Averted effort to respond to RAIs	2020–2029	13.19	270.68	$96.50	$3,446,474	$2,939,912	$2,420,659
				Total	($4,587,207)	($3,912,981)	($3,221,862)

Since 10 CFR 20.2002 was promulgated, the NRC has approved a number of 10 CFR 20.2002 ADRs. These ADRs have included a variety of disposal alternatives. However, with the updated guidance, the industry could pursue submitting an ADR for VLLW disposal in a nonhazardous municipal RCRA Subtitle D landfill. The 2012 technical report by the Electric Power Research Institute (EPRI) estimates that 70.5 million cubic feet of Class A waste generated by U.S. nuclear facilities from 2011 to 2059 could be reclassified as VLLW, with a VLLW stream between 2020 and 2029 of approximately 500,000 cubic feet per year. The EPRI report also estimates that disposing of VLLW in an RCRA landfill would cost $90 less per cubic foot than disposal at a licensed 10 CFR Part 61 facility. Assuming licensees submit six additional ADRs per year to dispose of 30,000 cubic feet of VLLW over a 10-year period, Table 5 Industry Operation: Averted VLLW Storage Costs shows that the total present value of these waste disposal savings is about $19 million using a 7-percent discount rate, or about $23 million using a 3-percent discount rate.

Table 5 Industry Operation: Averted VLLW Storage Costs

Activity	Years	VLLW per Year (ft^3)	RCRA Site Disposal Cost Savings ($ / ft3)	Undiscounted	3% NPV	7% NPV
Averted cost of disposing of VLLW at RCRA sites instead of at 10 CFR Part 61 licensed facilities	2020–2029	30,000	$90.00	$27,000,000	$23,031,548	$18,963,670
			Total	$27,000,000	$23,031,548	$18,963,670

The staff summarizes these operation costs and averted costs Table , which shows that issuing the revised guidance document would result in an estimated averted industry cost of about $19 million using a 7-percent discount rate or about $16 million using a 3-percent discount rate.

Table 6 Total Industry Operation Costs

Activity	Undiscounted	3% NPV	7% NPV
Prepare and submit additional ADRs	($8,030,000)	($6,850,000)	($5,640,000)
Averted effort to respond to RAIs	$3,450,000	$2,940,000	$2,420,000
Averted cost of disposing of VLLW at RCRA sites instead of at 10 CFR Part 61 licensed facilities	$27,000,000	$23,030,000	$18,960,000
Total	$22,420,000	$19,120,000	$15,740,000

3.4.5 NRC Operation

The NRC expects to receive incrementally more ADRs following the publication of the revised guidance document as licensees take advantage of the streamlined ADR process and the lower costs of disposal at RCRA sites. These costs will be offset by the anticipated less time and effort spent by the NRC staff to request additional information in order to complete the reviews. Based on historical information, the NRC estimates that agency licensees will on average submit 1.6 ADRs annually over the 10-year period covered by this analysis which includes any coordination among the regulatory authorities involved. Offsetting these costs is the 25-percent reduction in the amount of time required for the NRC to generate RAIs and to review the licensee's response, as explained in Section 3.4.4. Table shows that the NRC will bear costs over a 10-year period ranging from about ($120,000) using a 7-percent discount rate to about ($145,000) using a 3-percent discount rate.

Table 7 NRC Operation Costs

Activity	Years	No. of ADRs per Year	Hours	Labor Rate	Undiscounted	3% NPV	7% NPV
Review and approve additional ADRs	2020–2029	1.6	623.49	$131	($1,293,219)	($1,103,142)	($908,303)
Averted effort to respond to RAIs	2020–2029	3.17	270.68	$131	$1,122,873	$957,833	$788,659
				Total	($170,346)	($145,309)	($119,644)

3.4.6 Agreement State Implementation

The NRC anticipates that the radiation control program directors and State liaison officers of the 38 Agreement States would review the revised guidance for applicability to their facilities and consider actions as appropriate, including coordination with the NRC or a second Agreement State if multiple regulatory authorities are involved. The NRC expects that the Agreement State personnel would read the issued guidance for applicability and impact to their procedures, revise their procedures as appropriate to conform to the NRC guidance, and transmit the updated Agreement State procedure to the impacted licensees. Table estimates the costs for each action at a labor rate of $91.17.

Table 8 Agreement State Implementation

Activity	No. of Agreement States	Unit	Labor Rate	Undiscounted	3% NPV	7% NPV
Read issued guidance	38	1.9 hours	$91.17	($6,582)	($6,582)	($6,582)
Update procedures	38	153.3 hours	$91.17	($531,198)	($531,198)	($531,198)
Transmit procedure to licensees	38	$5,470		($207,860)	($207,860)	($207,860)
			Total	($745,640)	($745,640)	($745,640)

3.4.7 Agreement State Operation

Similar to NRC operation, the Agreement States are expected to receive incrementally more ADRs following the revised guidance document as licensees take advantage of the streamlined ADR process and the lower costs of disposal at RCRA sites. In addition, these costs will be offset by the decrease in time and effort that Agreement State reviewers are anticipated to spend requesting additional information in order to complete the reviews. Based on historical information, the NRC estimates Agreement States licensees will on average submit five ADRs annually over the 10-year period covered by this analysis. The NRC anticipates that Agreement States would receive approximately three ADRs more than the NRC because of the greater number of Agreement State licensees. Offsetting these costs is the 25-percent reduction in the amount of time required for the Agreement States to generate RAIs and to review the licensees' responses as explained in Section 3.4.4. Table shows that the Agreement States will bear costs over a 10-year period ranging from about ($237,000) using a 7-percent discount rate to about ($287,000) using a 3-percent discount rate.

Table 9 Agreement State Operation

Activity	Years	No. of ADRs per Year	Hours	Labor Rate	Undiscounted	3% NPV	7% NPV
Review and approve additional ADRs	2020–2029	4.5	623.5	$91.17	($2,557,863)	($2,181,909)	($1,796,536)
Averted effort to respond to RAIs	2020–2029	9.0	270.7	$91.17	$2,220,934	$1,894,502	$1,559,891
				Total	($336,929)	($287,407)	($236,645)

3.4.8 Improvements in Knowledge

The proposed revision to the guidance document would help licensees to gather, organize, and present information in their ADR submittals in a manner that provides a high-quality document that may result in less NRC review and approval time, in part because the staff would need to generate fewer RAIs and expend less time reviewing responses. Also, the proposed revision would describe the NRC review and approval process for the use of alternative disposal procedures under 10 CFR 20.2002 and may reduce overall risk.

3.4.9 Regulatory Efficiency

The NRC is formalizing an interim process that has been in place since 1999, and the revision would account for lessons learned, stakeholder comments, and organizational and process changes that have occurred over the past 10 years. The NRC anticipates that the updated guidance would result in greater clarity with regard to the reviews of proposed disposal procedures and transfers of radioactive material under 10 CFR 20.2002 and 10 CFR 40.13(a) and would result in more licensees opting for RCRA storage of their VLLW. The estimated benefits of the proposed action include fewer RAIs and related activities by licensees, the NRC, and the Agreement States and significantly lower VLLW disposal costs when RCRA storage is used instead of licensed 10 CFR Part 61 storage facilities.

3.4.10 Preserving the Disposal Capacity of 10 CFR Part 61 Facilities

The revision to the guidance document would clearly identify that VLLW can be safely disposed of without the need for the extensive controls in 10 CFR Part 61. This clarification may result in licensees using this lower cost disposal procedure under 10 CFR 20.2002 to dispose of material in hazardous or solid waste landfills that are permitted under RCRA. This would preserve the disposal capacity at the four 10 CFR Part 61 licensed LLW disposal facilities for higher risk waste streams. All four 10 CFR Part 61 LLW disposal facilities are located in and licensed by Agreement States.

3.4.11 Reduced Nonradiological Transportation Risk

The revision to the guidance document would clearly identify that VLLW can be safely disposed of without the need for the extensive controls in 10 CFR Part 61. This clarification may result in licensees using this lower cost disposal procedure under 10 CFR 20.2002, which could reduce the overall transportation risk as a result of the decreased transportation distances to one of 3,779 hazardous or solid waste landfill facilities that are dispersed across all 50 States and are permitted under RCRA (EPA, 2017). In most cases, licensees have a RCRA site for the disposal of VLLW closer than any of the four licensed 10 CFR Part 61 facilities, located in South Carolina, Washington, Utah, and Texas (NRC, 2017a).

3.5 Uncertainty Analysis

The NRC completed a Monte Carlo simulation uncertainty analysis for this regulatory analysis using the specialty software @Risk.[7] The Monte Carlo approach answers the question, “What distribution of net benefits and costs results from multiple draws of the probability distribution assigned to key variables?”

[7] Information about the @Risk software is available at http://www.palisade.com.

3.5.1 Uncertainty Analysis Assumptions

Because this regulatory analysis is based on estimates of values that are sensitive to licensee-specific cost drivers and licensee dissimilarities, the NRC provides the following analysis of the variables that have the greatest amount of uncertainty.

Monte Carlo simulations involve introducing uncertainty into the analysis by replacing the point estimates of the variables used to estimate base-case costs and benefits with probability distributions. By defining input variables as probability distributions instead of point estimates, the influence of uncertainty on the results of the analysis (i.e., the net benefits) can be effectively modeled. The probability distributions chosen to represent the different variables in the analysis were bounded by the range-referenced input and the NRC staff's professional judgment. When defining the probability distributions for use in a Monte Carlo simulation, summary statistics are needed to characterize the distributions. These summary statistics include the low estimate, best estimate, and high estimate for a triangular distribution. The NRC used the triangular distribution to reflect the relative spread and skewness of the distribution defined by the three estimates.

Table identifies the data elements, the distribution and summary statistic, and the mean value of the distribution that were used in the uncertainty analysis.

Table 10 Uncertainty Analysis Variables

Data Inputs	Mean Estimate	Distribution	Low Estimate	Best Estimate	High Estimate
General Data					
No. of Agreement States	38				
No. of Non-Agreement States	12				
No. of hours required to draft a page of technical text	10.0 hours per page	Triangular	2	8	20
No. of licensees involved with the receipt, transfer, and disposal of low-activity waste licensed material	1,500				
Industry labor rate multiplier	2				
Agreement State labor rate multiplier	2				
Guidance Familiarization					
Read revised guidance	1.0 hours	Triangular	0.32	0.63	1.9
No. of hours for Agreement States to make conforming changes to their procedures	153.3 hours	Triangular	40.00	120.00	300
Agreement States communicate new guidance to licensees	$5,470	Triangular	$3,647	$5,470	$7,293
Labor Rates					
Agreement State	$91.17/hour	Trigen[8]	$72.46	$95.10	$125.99
Industry	$96.50/hour	Trigen	$69.58	$90.66	$147.83
NRC	$131.00/hour				
Discount Rate					

[8] The Trigen distribution is a triangular distribution with three points that allows the analyst to specify the percentile of the bottom and top percentiles that defines the distribution. In this application, the bottom and top percentile values were specified at the 25th percentile and the 90th percentile, respectively.

Data Inputs	Mean Estimate	Distribution	Low Estimate	Best Estimate	High Estimate
Standard value	7%				
Sensitivity value	3%				
ADR Data					
Number of additional ADRs submitted annually to the NRC	1.6 per year	Triangular	0	1.75	3
Number of additional ADRs submitted annually to Agreement States	5.0 per year	Triangular	0	5.54	9.50
Number of additional ADRs submitted annually	6.6 per year				
Total ADRs submitted annually	13.2 per year				
Industry hours to prepare and submit an ADR	1,261.9 hours	Triangular	20	1,156	2,610
NRC/Agreement State hours to review and approve an ADR	623.5 hours	Triangular	0	769	1,102
RAI and Supplemental Submittals					
Number of supplemental submittals averted per ADR	2 per year	Triangular	0	1.57	4
Number of hours required to respond to RAIs with new guidance	270.7 hours	Triangular	0	180.76	631.28
Efficiency factor from improved guidance	25%	Triangular	15%	25%	35%
No. of RAI pages per typical ADR	5.8 pages per ADR	Triangular	2	5.33	10
No. of supplemental pages to respond to RAIs for a typical ADR	172.2 pages per ADR	Triangular	2	93.56	421
No. of hours to review an RAI response	270.7 hours	Triangular	0	180.76	631.28
Averted Disposal Costs					
Average VLLW waste from 2020 to 2029	500,000 ft^3 per year				
Incremental cost savings (VLLW versus 10 CFR Part 61 waste)	\$90 per ft^3				

3.5.2 Uncertainty Analysis Results

The NRC performed the Monte Carlo simulation by recalculating the results 10,000 times. For each iteration, the NRC chose the values identified in Table randomly from the probability distributions that define the input variables. The NRC recorded the values of the output variables for each iteration and used these resulting output variable values to define the resultant probability distribution.

For the analysis shown in each figure below, the NRC ran 10,000 simulations in which it changed the key variables to assess the resulting effect on costs and benefits. Figures 1, 2, 3, and 4 display the histograms of the incremental costs and benefits from the regulatory baseline (Alternative 1). The uncertainty analysis shows that there would be an increase in burden to the NRC and the Agreement States and a substantial decrease in burden to the applicants or

licensees. When these are combined, Figure 4 shows that there is a 98.8 percent likelihood that the net results from revising the guidance document is cost beneficial.

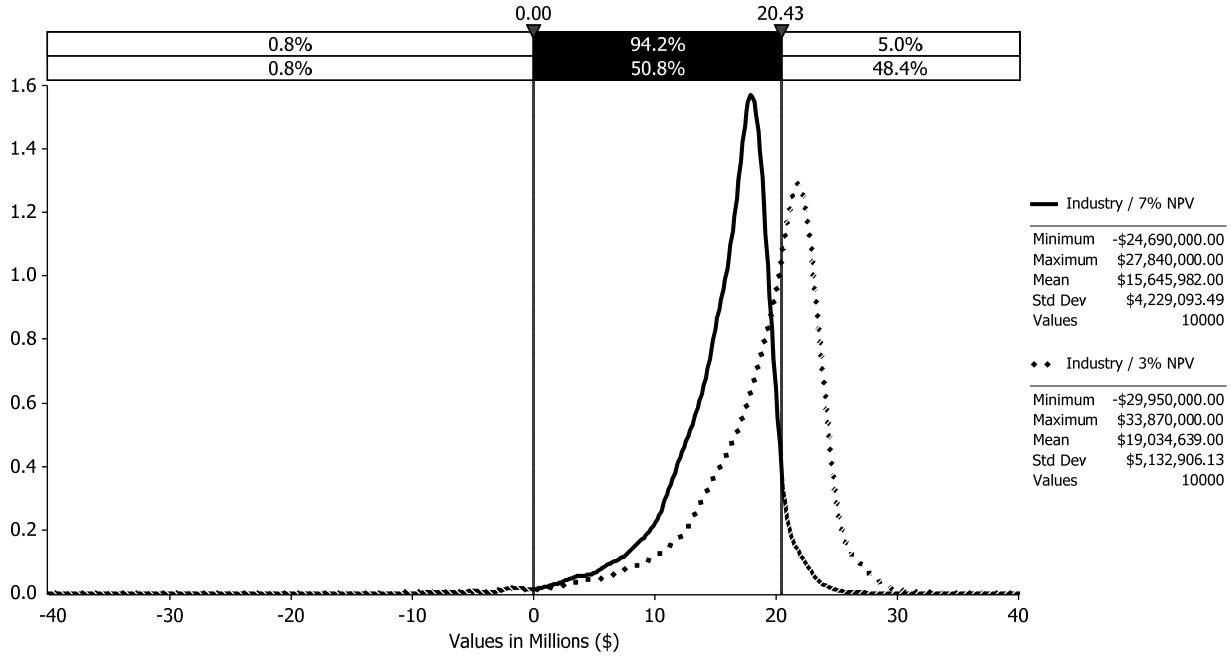

Figure 1 Total Industry Costs—Alternative 2

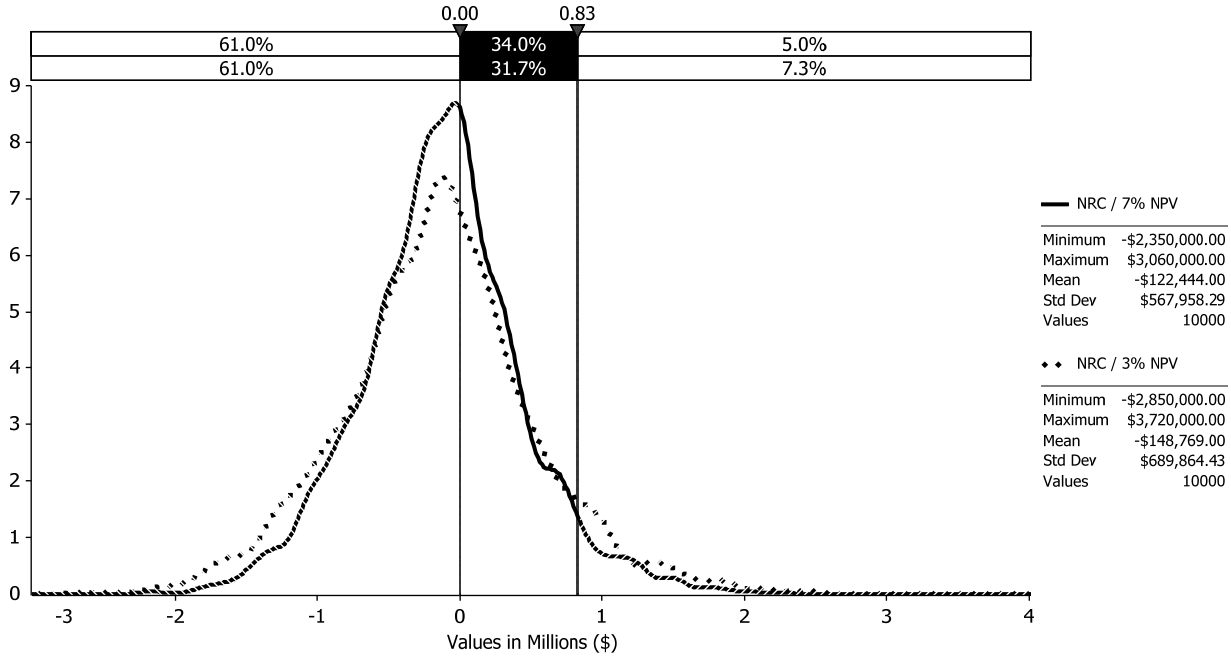

Figure 2 Total NRC Costs—Alternative 2

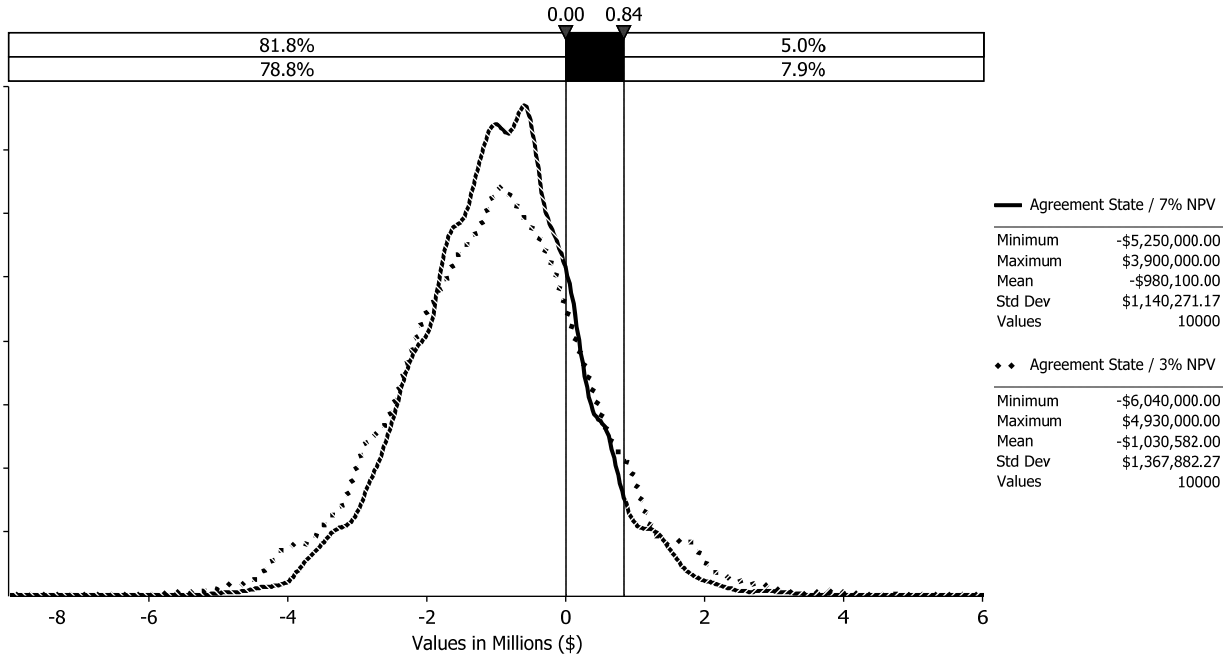

Figure 3 Total Agreement State Costs—Alternative 2

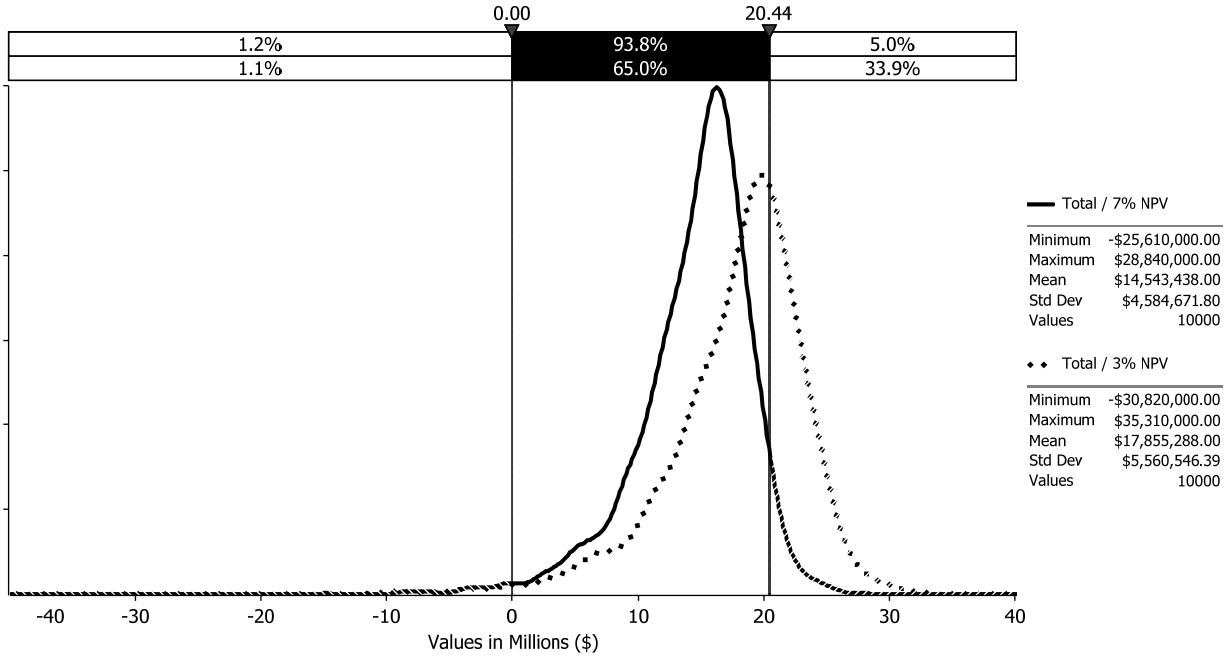

Figure 4 Total Costs—Alternative 2

Table presents descriptive statistics on the uncertainty analysis, including the 5-percent and 95-percent values.

Table 11 Uncertainty Results Descriptive Statistics—7-Percent Net Present Value

Uncertainty Result	Incremental Cost Benefit (million dollars)				
	Minimum	Mean	Maximum	5%	95%
Total Industry Cost	($25)	$16	$28	$7.4	$20
Total NRC Cost	($2.4)	($0.12)	$3.1	($1.1)	$0.83
Total Agreement State Cost	($5.3)	($0.98)	$3.9	($2.9)	$0.84
Total Cost	($26)	$15	$29	$5.9	$20

Note: The total cost is not the total of the above values because these are not normal distributions.

Examining the range of the resulting output distribution provided in Table makes it possible to confidently conclude that issuing the guidance has the potential to result in substantial incremental benefits. Table displays the key statistical results, including the 90-percent confidence interval in which the net benefits would fall between the 5- and 95-percentile values.

Figure 5 shows a tornado diagram that identifies the key variables whose uncertainty has the largest impact on total costs (and averted costs) for this analysis. This figure ranks the variables based on their contribution to cost uncertainty. Three variables drive the most uncertainty in the costs: (1) industry hours to prepare and submit an ADR, (2) the number of hours to review RAI responses, and (3) the anticipated number of industry hours to respond to RAIs following the issuance of the revised guidance document. The remaining key variables show diminishing variation.

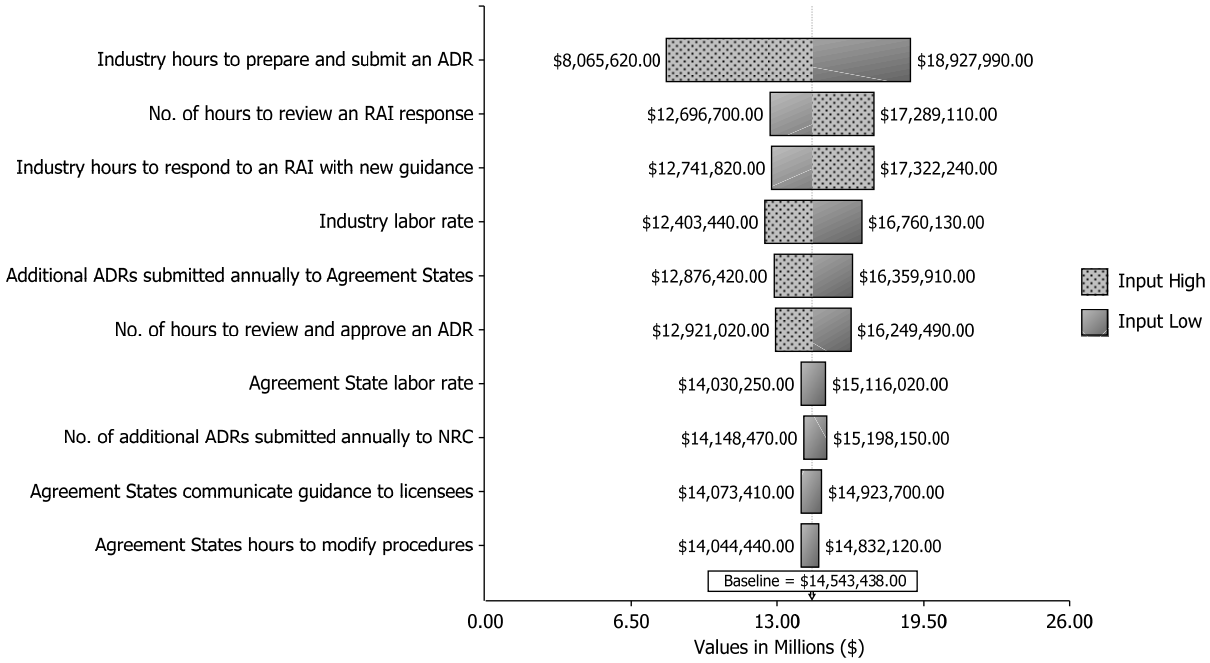

Figure 5 Tornado Diagram—Alternative 2—Inputs Ranked by Effect on Output Mean

The benefits of revising the guidance document have a mean value of $15 million at a 7-percent discount rate. The uncertainty analysis shows a 99-percent chance that the resulting impacts of the revision would be cost effective. This is the primary reason for concluding that the benefits of this regulatory action justify the cost.

3.6 Disaggregation

The NRC performed a screening review to determine whether any provisions would be unnecessary to achieve the regulatory objectives. The staff did not identify any unnecessary or unrelated provisions; therefore, it did not perform a disaggregation for this regulatory analysis.

4 PRESENTATION OF RESULTS

This regulatory analysis provides in Table both quantifiable and nonquantifiable costs and benefits that would result from issuing this guidance. Although quantifiable costs and benefits appear to be more tangible, the NRC urges decisionmakers not to discount costs and benefits that are nonquantifiable. Such benefits or costs can be just as important as, or even more important than, benefits or costs that can be quantified and monetized.

Table 12 Summary of Totals

Net Monetary Savings (or Costs)	**Nonmonetary Benefits/Costs**
Alternative 1—No Action $0	**Qualitative Benefits and Costs:** None
Alternative 2—Issue the Guidance Industry: $15.6 million using a 7% discount rate $19.0 million using a 3% discount rate NRC: ($0.12 million) using a 7% discount rate ($0.15 million) using a 3% discount rate Agreement State: ($0.98 million) using a 7% discount rate ($1.03 million) using a 3% discount rate Quantified Net Benefit (or Cost): $14.5 million using a 7% discount rate $17.9 million using a 3% discount rate	Provides regulatory certainty in the NRC's process for reviewing and approving ADRs and acceptable disposal procedures. **Qualitative Benefits:** • Improvements in regulatory guidance will enable applicants to more effectively prepare and the staff efficiently review ADR submittals reviewing review time and disposition time partially due to the need for fewer NRC-generated requests for additional information • Preserving the disposal capacity of 10 CFR Part 61 facilities by authorizing certain waste to be disposed of at RCRA facilities • Reduced transportation risk as alternative disposal facilities may be closer to the waste generator **Qualitative Costs:** • Small potential increase in public radiation exposure • No significant increase in occupational radiation exposure **Total Qualitative Net Benefit (or Cost):** • Positive qualitative net benefit
Alternative 3—Withdraw EPPAD 3.5 The NRC cost to issue an FRN to withdraw the EPPAD 3.5 and not issue the guidance would be minimal and was not quantified.	**Qualitative Costs:** • (Increased licensee operation costs) • (Increased NRC operation costs) • (Increased Agreement State operation costs) • (Decreased regulatory efficiency) **Qualitative Benefits:** • Small decrease in implementation costs

Net Monetary Savings (or Costs)	Nonmonetary Benefits/Costs
	Total Qualitative Benefit (or Cost): • (Negative qualitative net cost and inferior to Alternative 1 and Alternative 2)

5 DECISION RATIONALE

Table summarizes the quantified and qualified costs and benefits for the alternatives analyzed. The quantitative analysis used mean values for each input.

The analysis shows that licensees would incur substantial benefits from the proposed Alternative 2 primarily because the issuance of the guidance encourages licensees to use a regulatory process that would save millions of dollars over the 10-year analysis period in VLLW disposal costs. This savings justifies the small incremental costs to the NRC and the Agreements States in pursuing this alternative. Based solely on quantified costs and benefits, the regulatory analysis shows that publication of the guidance would result in a net benefit to industry that ranges from $15.6 million (7-percent discount rate) to $19.0 million (3-percent discount rate). The NRC's net cost ranges from ($0.12 million) (7-percent discount rate) to ($0.15 million) (3-percent discount rate). The Agreement States' net cost ranges from ($0.98 million) (7-percent discount rate) to ($1.03 million) (3-percent discount rate). Therefore, the total quantitative net averted costs of issuing the revised guidance would range from $14.5 million (7-percent discount rate) to $17.9 million (3-percent discount rate).

Based solely on quantified costs and benefits, the regulatory analysis shows that the issuing the revised guidance document is justified because the total quantified benefits of the proposed regulatory action would exceed the costs of the proposed action, for all discount rates up to 7 percent. Considering nonquantified costs and benefits, Table shows that issuing the revised guidance document is justified because the number and significance of the nonquantified benefits justify the nonquantified costs. Therefore, integrating both quantified and nonquantified costs and benefits indicates that the benefits of issuing the guidance justify the identified quantitative and qualitative impacts attributable to that revision. Specifically, the potential benefits from issuing the updated guidance document provide an adequate basis to conclude that Alternative 2 is the preferred alternative.

The staff recommends Alternative 2, as it provides the greatest cost benefit.

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SUBJECT: Regulatory Analysis for Issuing a Revised Guidance Document for the Reviews of Proposed Disposal Procedures and Transfers of Radioactive Material under 10 CFR 20.2002 and 10 CFR 40.13(a), dated April 1, 2020

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