An Evaluation of the 2007 Strategic Assessment of the U.S Nuclear Regulatory Commission's Low-Level Waste Regulatory Program – 14433

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ABSTRACT

In 2007, the U. S. Nuclear Regulatory Commission (NRC) published a Strategic Assessment of the NRC's Low-Level Radioactive Waste (LLRW) regulatory program [1]. In that assessment, the NRC staff proposed several initiatives to meet challenges in the LLRW program such as decreased disposal capacity and increased production of LLRW as new reactors and other nuclear facilities were expected to come online. As part of this update, the NRC staff will provide an overview of the completed tasks which resulted from the 2007 Low-Level Waste Strategic Assessment and the NRC staff's current thinking on the need to address the remaining tasks. The staff will seek stakeholder input on those tasks which should be considered in the next update of the Strategic Assessment to strengthen the NRC's ability to ensure safe and secure LLRW disposal, improve the effectiveness of its regulations, and assure regulatory stability and predictability while allowing flexibility in disposal options.

INTRODUCTION

The NRC has an established LLRW regulatory program which provides for a stable, reliable, and adaptable regulatory framework for effective LLRW management, while maintaining safety, security, and protection of the environment. A regulatory program consists of a regulatory framework, licensing of facilities and an inspection program. The NRC is principally focused on the regulatory framework for LLRW since Agreement States perform all of the licensing and inspection of LLRW. Agreement States use this regulatory framework as the basis for licensing and inspection.

In 2007, due to developments in the national program for LLRW disposal, as well as changes in the regulatory environment, the NRC's LLRW program faced new challenges and issues. New technical issues related to protection of public health and the environment and security emerged. These challenges and issues included (1) the desire of industry for greater flexibility and reliability in LLRW disposal options; (2) increased storage of Class B and Class C LLRW because of the potential closing of the Barnwell, South Carolina, disposal facility in 2008 to out-of-compact waste generators; (3) the potential need to dispose of large quantities of power plant decommissioning waste, as well as depleted uranium from enrichment facilities; (4) increased safety concerns; (5) the LLRW program required greater resources than were available; (6) increased security concerns related to storing LLRW in general and sealed radioactive sources in particular; and (7) new waste streams that may be generated (for example, by the next generation of nuclear reactors and the potential reemergence of nuclear fuel reprocessing in the United States).

Based on these challenges and issues, the NRC staff conducted a Strategic Assessment of the NRC's regulatory program for LLRW. Results were published in late 2007. The goal of the Strategic Assessment was to identify and prioritize staff activities that should continue to: (1) ensure safe and secure LLRW disposal; (2) improve the effectiveness, efficiency, and adaptability of the NRC's LLRW regulatory program; and (3) ensure regulatory stability and predictability, while allowing flexibility in disposal options. Therefore, the NRC staff undertook the effort to assess the current LLRW regulatory program to ensure that it remained positioned to achieve NRC objectives.

RESULTS OF THE 2007 STRATEGIC ASSESSMENT OF NRC'S LLRW REGULATORY PROGRAM

One key aspect of the Strategic Assessment process involved information gathering. In developing this Strategic Assessment, stakeholder input was solicited in a 2006 workshop organized and led by the Low-Level Waste Working Group of the Advisory Committee on Nuclear Waste and Materials (ACNW&M), in meetings with Nuclear Energy Institute (NEI) and Electric Power Research Institute (EPRI), in teleconferences with certain Agreement State regulators, and as a result of a *Federal Register* Notice requesting comments from the public on the staff's approach. Stakeholder concerns and opinions published in position papers prepared by national scientific and technical organizations were also considered.

Based on extensive stakeholder input, the NRC staff received a variety of activities to include in the Strategic Assessment and evaluated them based on the overall strategic objectives for ensuring safety, and security, and other factors. A list of 20 activities responsive to identified programmatic needs was developed. These activities were assigned priorities of high, medium, or low and ranged from narrowly focused activities such as updating LLRW storage guidance to broader activities such as suggesting legislative changes to Congress to improve the LLRW national program.

Seven tasks were designated as high priority, six tasks as medium priority, and eight tasks as low priority. Table 1 lists all the tasks as well as the priority.

TABLE I - LLRW program tasks and priority

Task number	Task Description	Priority
1	Review and update guidance on extended storage of LLRW for materials and fuel cycle licenses and review industry guidance for reactors.	High
2	Develop guidance on 10 CFR 20.2002 Alternate Disposal Requests.	High
3	Determine if disposal of large quantities of depleted uranium for uranium enrichment warranted changing the waste classification tables.	High
4	Update Branch Technical Position on Concentration Averaging and Encapsulation.	High
5	Develop internal procedures and guidance document for reviewing waste import and export applications submitted under 10 CFR Part 110.	High
6	Develop guidance on alternate waste classification (10 CFR 61.58).	High
7	Perform scoping study of the need to revise/expand byproduct material financial assurance to account for life-cycle.	High
8	Develop licensing criteria for greater than Class C disposal facility.	Medium
9	Consolidate LLRW guidance.	Medium
10	Coordinate with other agencies on consistency in regulating low activity waste disposal.	Medium
11	Develop guidance that summarizes disposition options for low-end materials and waste.	Medium
12	Identify new waste streams.	Medium
13	Develop information notice on waste minimization.	Medium
14	Evaluate potential changes to LLRW regulatory program as a result of severe curtailment of disposal capacity.	Low
15	Promulgate rule for disposal of low-activity waste.	Low
16	Identify and evaluate potential legislative changes.	Low
17	Implement major revisions to 10 CFR Part 61.	Low
18	Develop waste acceptance criteria for LLRW disposal in uranium mill tailings impoundments.	Low
19	Examine need for guidance on defining when radioactive material becomes LLRW.	Low
20	Develop and implement national waste tracking system.	Low

STATUS OF THE STRATEGIC ASSESSMENT OF NRC'S LLRW REGULATORY PROGRAM

Since 2007, the NRC staff has addressed several activities and adjusted the LLRW regulatory framework based on current LLRW program development. To date, the NRC staff has completed three of the seven high priority activities, (i.e., task #1: review and update guidance on extended storage of LLRW, task #2: develop guidance on 10 CFR 20.2002 Alternate Disposal Requests, and task #3: determine whether depleted uranium waste streams from enrichment plants warrants amending the waste classification tables) and work continues on two of the high priority activities (task #4: updating the Concentration Averaging Branch Technical Position and task #6: revising 10 CFR 61.58 regarding alternative waste classification requirements). The remaining two tasks have not been initiated (task #5: preparing a review procedure for import/export reviews and task #7: performing a scoping study of the need to revise/expand byproduct material financial assurance to account for life-cycle) due to resource limitations.

Completed Activities

One of the high priority activities of the Strategic Assessment was to review and update guidance on extended storage of LLRW for materials and fuel cycle licenses and review industry guidance for reactors. The uncertainty in the availability of access to LLRW disposal facilities for many licensees was identified as an issue facing the LLRW community. Specifically in 2008, it was anticipated that licensees and generators in 36 States would not be able to dispose of Class B and C LLRW based on the closure of the disposal facility in Barnwell, South Carolina to states outside of the Southeast compact. As a result, these LLRW licensees and generators would likely need to store, on a long-term basis, a portion of their LLRW. In 2008 and 2011, staff prepared Regulatory Issues Summaries (RISs) clarifying and updating positions on extended LLRW storage. In 2012, with the help of a stakeholder working group, the NRC staff affirmed the adequacy of the extended storage guidance and presented a significant amount of the storage guidance on the NRC webpage to assist licensees and generators in their efforts to safely store LLRW.

Another high priority activity was to address the challenge of alternative disposal of low activity waste per 10 CFR 20.2002 in non-traditional LLRW facilities such as Resource Conservation and Recovery Act (RCRA) facilities as well as the regulatory review and approval needed for such disposal. Based on stakeholder's input to the Strategic Assessment, it appeared that the NRC's process for authorizing these disposals was not entirely consistent in the past and needed to be clarified during the development of new regulatory guidance. In 2009, the NRC staff developed interim staff guidance to describe the process for reviewing, approving, and documenting the results of the staff's review of alternative disposal requests of low-activity wastes received from licensees and license applicants [2].

The NRC staff also completed the high priority activity to determine whether depleted uranium waste streams from enrichment plants warranted a change in the waste classification tables in 10 CFR 61.55. This activity was being pursued to address concerns of a new waste stream, depleted uranium, which arose from the construction of new, commercial, uranium enrichment facilities in the United States. A few commercial disposal sites licensed under Agreement State regulations compatible with10 CFR Part 61 expressed interest in accepting depleted uranium from these facilities in quantities greater than what was originally considered in the analysis during the development of 10 CFR Part 61.

In October 2008, a Commission paper was published documenting the NRC staff's assessment of the depleted uranium issue [3]. The NRC staff analyzed the impacts of near-surface disposal of large quantities of depleted uranium to determine if 10 CFR 61.55(a) needed to be changed to assure that large quantities of depleted uranium are disposed of in a manner that meets the performance objectives of 10 CFR Part 61. While the NRC staff concluded that large quantities of depleted uranium can be disposed of in a near-surface disposal facility under certain conditions and still meet the performance objectives of 10 CFR Part 61, the NRC staff proposed changing the existing regulations to incorporate those conditions. Among the revisions to the regulations is the incorporation of site-specific waste acceptance requirements in 10 CFR 61.58. This revised provision thus supersedes and replaces the previous high priority task of developing guidance for 10 CFR 61.58.

Current Ongoing Activities

Classification of LLRW is performed in accordance with the waste classification tables in 10 CFR 61.55. 10 CFR Part 61 allows the averaging of radionuclide concentrations in determining the waste classification. The Strategic Assessment identified, as a high priority, updating the Concentration Averaging and Encapsulation Branch Technical Position which was published in 1995 [4]. This document provided guidance on acceptable methods for the averaging of waste concentration. The NRC staff continues its efforts to revise and update the document clarifying in several areas the underlying basis in the Branch Technical Position and revising specific averaging guidance for licensees. The goal is to revise the guidance to be more risk-informed and performance-based and enable the safe disposal of additional LLRW.

Established almost 30 years ago, NRC's disposal regulations in 10 CFR Part 61 provide a strong foundation to the LLRW regulatory framework. Since promulgation, these regulations provide procedures and criteria that ensure the safe and secure disposal of LLRW. However, recent developments (e.g., disposal of depleted uranium in large quantities and anticipated new waste streams associated with medical isotope production) in the regulatory program suggest changes to 10 CFR Part 61 are necessary. Based on Commission direction, the activity to develop limited revisions to 10 CFR Part 61 has begun. The Commission has provided direction to revise 10 CFR Part 61 to include flexibility to enable licensees to use either site specific waste acceptance criteria based on a site's performance and intruder assessments or the waste classification tables and to make the regulations more risk-informed. In addition, this is a follow up to the Commission decision of a limited rulemaking to address disposal of depleted uranium in large quantities, as discussed above. The proposed draft rule was sent to the Commission in July 2013 and is undergoing review by the Commission.

PROPOSED REVISIONS TO THE STRATEGIC ASSESSMENT OF NRC'S LLRW REGULATORY PROGRAM

After 6 years, much progress has been made in completing several activities identified in the Strategic Assessment as described above. In addition, the national LLRW program continues to evolve. To set the direction for the NRC LLRW regulatory program for the next several years, the NRC is conducting a new Strategic Assessment of the NRC LLRW regulatory program. The objective of this assessment is to perform a critical review the 2007 Strategic Assessment to reassess the future high priority activities given the current LLRW landscape and to identify what changes, if any, should be made to the current LLRW program regulatory framework, as well as specific activities that NRC staff may undertake to facilitate such changes.

A review of the 2007 Strategic Assessment would be the first task in the Strategic Assessment update process and could reprioritize some of remaining activities. For example, one of the medium priority activities identified in the 2007 Strategic Assessment, i.e., develop licensing criteria for greater-than Class-C (GTCC) waste, if necessary, is an example of an activity that could become a future high priority action based on the current LLRW landscape on GTCC waste. As defined in 10 CFR Part 61, quantities of LLRW with radionuclide concentrations in excess of Class C limits must be disposed of by a more rigorous means than articulated in 10 CFR Part 61. There is currently no disposal option for GTCC waste. Under the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA), the U.S. Department of Energy (DOE) is responsible for disposal of GTCC. The DOE is in the latter stages of defining a preferred method of disposal in a topical environmental impact statement. Congress will make the final disposal decision informed by DOE's recommendation.

In 2011, the DOE published a Draft Environmental Impact Statement (EIS) which considered the potential environmental impacts associated with constructing and operating a new facility or facilities, or using an existing facility, for the disposal of GTCC waste [5]. Disposal within a geologic repository, intermediate depth borehole, enhanced near surface trench, and above grade vault were considered for this type of waste. The DOE, however, did not offer a preferred alternative in the draft EIS. A final EIS considering stakeholder comments and suggesting a preferred alternative should be completed in the first half of 2014. Under the Energy Policy Act of 2005, DOE will need to submit a report to Congress that provides a description of the disposal alternatives and all of the information required in the comprehensive report on ensuring the safe disposal of GTCC before a final decision on the disposal alternative is made. If the eventual Congressional decision results in a non-geologic repository for GTCC disposal, the NRC would need to develop licensing criteria for the facility. Necessarily, this would be a high priority activity.

In addition, the NRC could also elect to continue working on the remaining high priority activities from the 2007 Strategic Assessment which were put on hold as a result of resource constraints. This previous resource constraint could be resolved with the completion of the other high priority tasks from the 2007 Strategic Assessment. For example, the NRC staff could choose to complete the activity to perform a scoping study of the need to revise or expand byproduct material financial assurance for Category 3 and 4 sealed sources to account for a total life-cycle cost including disposition. The NRC decommissioning financial assurance regulation in 10 CFR 30.35 would need to be reviewed to assess adequacy and to determine whether regulatory changes are necessary to adjust front-end requirements to consider the ultimate costs of disposition of radioactive sources and other radioactive material. This activity could be informed by related recommendations of the Radiation Source Security multiagency task force which will be included in a report to the President and Congress in August 2014.

Similar to the 2007 Strategic Assessment, stakeholder inputs such as those on the prioritization of the above-mentioned activities will be an important piece of the Strategic Assessment process. The NRC staff will seek stakeholder input on those activities that should be considered in the next update of the Strategic Assessment to strengthen the Agency's ability to ensure safe and secure LLRW disposal, improve the effectiveness of its regulations, and assure regulatory stability and predictability while allowing flexibility in disposal options.

CONCLUSION

In late 2007, the NRC staff published a Strategic Assessment of the Agency's LLRW program with the objective of providing a stable, reliable, and adaptable regulatory framework for effective LLRW management, while maintaining safety, security, and protection of the environment,. The Strategic Assessment identified and prioritized those activities that could contribute to achieving the NRC's LLRW program objectives. Since 2007, the NRC staff has completed several high priority activities identified in the 2007 Strategic Assessment including updating guidance for LLRW storage, evaluating the disposal of depleted uranium and the measures needed to ensure its safe disposal, and developing a procedure for the review of low-activity waste disposal in RCRA facilities not licensed by the NRC. In addition, the NRC staff continues to work on the limited revisions to 10 CFR Part 61 and the 1995 Concentration Averaging and Encapsulation Branch Technical Position. The NRC staff will begin developing a new Strategic Assessment of the Agency's LLRW program. Similar to the 2007 Strategic Assessment process, the new assessment will establish the direction of the LLRW program and provide opportunities for stakeholder engagement.

REFERENCES

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