

## APPENDIX D

### CROSS-WALK OF NAS, ACNW&M, and GAO RECOMMENDATIONS WITH THE NRC STAFF'S LLW STRATEGIC ASSESSMENT

In this appendix, the U.S. Nuclear Regulatory Commission (NRC) staff analyzes recommendations contained in the following documents:

- National Research Council, "Improving the Regulation and Management of Low-Activity Radioactive Wastes," National Academy of Sciences, Washington, DC, March 2006. Recommendations NAS-1 through NAS-5.
- August 16, 2006, letter from Michael Ryan, Advisory Committee on Nuclear Waste (ACNW&M), to Chairman Dale Klein, NRC, summarizing the results of the May 2006 ACNW&M Low-Level Radioactive Waste (LLW) Working Group meeting. Recommendations ACNW&M 1 through ACNW&M 5.
- December 27, 2005, letter from Michael Ryan, ACNW&M, to Chairman Nils Diaz, NRC. Recommendations ACNW&M 6 through ACNW&M 11.
- GAO-07-221, "Approaches Used by Foreign Countries May Provide Useful Lessons for Managing U.S. Radioactive Waste," Government Accountability Office (GAO), Washington, DC, March 2007.

Recommendation	Staff Assessment	Strategic Assessment Activity and Ranking
<p><b>NAS-1.</b> The committee recommends that low-activity radioactive waste (LAW) regulators implement risk-informed regulation of LAW through integrated strategies developed by the regulatory agencies. Improving the system will require continued integration and coordination among regulatory agencies, including the NRC, U.S. Environmental Protection Agency, U.S. Department of Energy, U.S. Department of Defense, and other Federal and State agencies.</p>	<p>The staff agrees with this recommendation. It is consistent with agency goals for risk-informing the regulation of NRC activities. It also has significant stakeholder support and the potential for increasing disposal options available to waste generators as well as increasing public understanding of LAW regulation, which is currently based on origin, not risk.</p>	<p>Activity 11--Coordination with other agencies on LAW regulation, including use of the Interagency Steering Committee on Radiation Standards and National Materials Program for this coordination (Medium)</p>
<p><b>NAS-2.</b> The committee recommends that regulatory agencies adopt a risk-informed LAW system in incremental steps, relying mainly on their existing authorities under current statutes and using a four-tiered approach, specifically (1) changes to specific facility licenses or permits and individual licensing decisions, (2) regulatory guidance to advise on specific practices, (3) regulation changes, or, if necessary, (4) legislative changes.</p>	<p>The staff agrees with this recommendation. Similar to the first recommendation, it has widespread stakeholder support (with some exceptions from public interest groups) and is practical. A number of specific activities identified in this strategic assessment (SA) address this recommendation.</p>	<p>Activity 3--Rulemaking for LAW (Low)                      Activity 7--Internal procedure and external guidance for 10 CFR 20.2002 LAW requests (High)                      Activity 8--Legislative changes (Low)                      Activity 11--Coordination with other agencies (Medium)                      Activity 12--Guidance on existing LAW disposal options (Medium)</p>

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<p><b>NAS-3.</b> The committee recommends that government agencies continue to explore ways to improve their efforts to gather knowledge and opinions from stakeholders, particularly the affected and interested publics, when making LAW risk management decisions. Public stakeholders play a central role in a risk-informed decision process.</p>	<p>The staff agrees with this recommendation. In addition to identifying several proposed activities that address this recommendation, the NRC has already begun to implement improved transparency measures (including methods for obtaining public views) for 10 CFR 20.2002 LAW disposals. In addition, as part of the SA effort, the staff solicited stakeholder input.</p>	<p>Activity 3--Rulemaking for LAW (Low) Activity 7--Internal procedure and external guidance for LAW (High); staff to seek public input on guidance</p>
<p><b>NAS-4.</b> The committee recommends that Federal and State agencies continue to harmonize their regulations for managing and disposing of wastes regulated under the Atomic Energy Act of 1954 (AEA) and non-AEA wastes so that those wastes will be controlled consistently according to their radiological hazards rather than their origins.</p>	<p>The staff agrees with this recommendation. Legislation causes some of the differences, which could constrain agencies' ability to harmonize regulations.</p>	<p>Activity 3--LAW rulemaking (Low) Activity 8--Legislative changes (Low) Activity 11--Coordination with other agencies (Medium)</p>
<p><b>NAS-5.</b> The committee recommends continued collaboration among U.S. and international institutions that are responsible for controlling LAW. Greater consideration of international consensus standards as bases for U.S. regulations and practices is encouraged. The International Atomic Energy Agency (IAEA) waste classification system is based on the radiological properties of the waste rather than its origins.</p>	<p>The staff agrees with this recommendation. The staff has extensive involvement with IAEA (through the Waste Safety Standards Committee) and the Nuclear Energy Agency in their waste activities and thereby influences standards published by these organizations. If the agency initiated any LAW or LLW rulemakings, the staff would give strong consideration to international standards. The staff will also consider international standards and technical experience when updating or revising guidance.</p>	<p>Activity 3--LAW rulemaking (Low) Activity 5--Update of storage guidance (High) Activity 6--Licensing criteria for greater-than-Class-C (GTCC) waste (Medium) Activity 10--Major revisions to 10 CFR Part 61 (Low) Activity 14--Guidance for 10 CFR 61.58 implementation (High) Activity 16--Update of concentration averaging branch technical position (High) Activity 17Waste minimization information notice (Medium)</p>
<p><b>ACNW&amp;M-1.</b> The Committee believes that there is no need to revise the NRC's LLW regulations in 10 CFR Part 61 at this time.. The Committee recommends that the Commission develop license conditions and regulatory guidance to better implement the provisions of 10 CFR 20.2002 and 10 CFR 61.58, which give specific authority to implement such guidance.</p>	<p>The staff agrees with this recommendation. Although the staff evaluated major revisions to 10 CFR Part 61 as part of the LLW strategic assessment, such changes are ranked low in priority.</p>	<p>Activity 7--Internal procedure and external guidance for 10 CFR 20.2002 requests (High) Activity14--Guidance for 10 CFR 61.58 implementation (High)</p>

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<p><b>ACNW&amp;M-2.</b> The Committee recommends that the NRC develop guidance permitting the management and disposal of unique and emerging waste streams. Such guidance should consider waste types and forms, packaging, and disposal site conditions in a way that is risk-informed and performance based, consistent with the performance criteria in 10 CFR 61.41 to 10 CFR 61.44 and 10 CFR 61.58, as appropriate.</p>	<p>The staff agrees with this recommendation and has included two activities that address it. The first is to identify alternatives for the disposal of large quantities of depleted uranium (DU) from licensed enrichment facilities. The second is to identify new waste streams from, for example, Global Nuclear Energy Partnership facilities that might require new approaches for disposal.</p>	<p>Activity 4--Alternatives for disposal of large quantities of DU (High) Activity 13--Identification of new waste streams (Medium)</p>
<p><b>ACNW&amp;M-3.</b> The Committee recommends that the NRC should encourage a more risk-informed approach to LLW management that places greater emphasis on the radionuclide content of the waste rather than the waste source or origin.</p>	<p>The staff agrees with this recommendation and has proposed several activities that address it. The staff sees an opportunity to effect change in the near term by focusing on activities to further risk-inform current guidance. Other activities that will require either agreement from other agencies to implement (e.g., disposal of LLW in 11e.(2) cell) or legislative changes were ranked lower because they will likely take more time to implement and will have a lower likelihood of success.</p>	<p>Activity 3--LAW rulemaking (Low) Activity 4--Alternatives for large quantities of DU (High) Activity 6--Licensing criteria for GTCC waste (Medium) Activity 7--Internal procedure and external guidance for 10 CFR 20.2002 disposals (High) Activity 11--Coordination with other agencies (Medium) Activity 14--Guidance for 10 CFR 61.58 implementation (High) Activity No. 15, criteria for LLW disposal in mill tailings impoundments (Low)</p>
<p><b>ACNW&amp;M-4.</b> The Committee recommends examining how the NRC and the Agreement States are preparing to regulate potential increases in the storage of Class B and C LLW if and when Barnwell closes to out-of-compact waste in July 2008 and if no alternative options become available.</p>	<p>The staff agrees with this recommendation and has included it in the LLW SA.</p>	<p>Activity 1--Evaluation of changes to licensing and enforcement in the event of widespread storage (Low)</p>
<p><b>ACNW&amp;M-5.</b> The Committee recommends that, because legislation and other regulations reference and include the waste classification provisions in 10 CFR Part 61, it is important to identify and evaluate any unintended consequences from changes recommended in this letter. The Committee believes that the incremental changes and improvements suggested in this letter are unlikely to have such unintended consequences.</p>	<p>The staff agrees with this recommendation and included it in the LLW SA.</p>	<p>The staff has attempted to identify unintended consequences through its solicitation of public comments on the SA. In addition, in the evaluation of each specific LLW activity, the staff considered unintended consequences under the "Additional Considerations" column.</p>

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<p><b>ACNW&amp;M-6.</b> The 10 CFR Part 61 intruder scenarios are not risk-informed. They are based on bounding or extremely conservative assumptions and conditions. Furthermore, there is no guidance on performing an LLW human intrusion calculation. The assumptions used in the intruder scenario have a direct bearing on the Class A, B, and C concentration limits in 10 CFR 61.55. The provisions of 10 CFR 61.58 allow for alternative requirements for waste classification and characteristics. This section could serve as a basis for better risk-informing 10 CFR 61.55.</p>	<p>The staff agrees, in part, with this recommendation and has included it in the LLW SA. The staff agrees that guidance is needed on performing LLW human intrusion calculations. The staff also agrees that the assumptions and analysis for LLW human intrusion need to be updated using current knowledge, models, and other analytical tools.</p>	<p>Activity 14--Guidance for 10 CFR 61.58 implementation (High)</p>
<p><b>ACNW&amp;M-7.</b> The NRC has updated the provisions of 10 CFR Part 20 to incorporate recent recommendations of the International Commission on Radiological Protection (ICRP). However, 10 CFR 61.41 relies on older ICRP dosimetry models that are based on a different system of dose calculation. This inconsistency can cause confusion.</p>	<p>The staff agrees with this recommendation, and the NRC has endorsed the more recent dosimetry models. The February 22, 1999, <i>Federal Register</i> notice for the proposed 10 CFR Part 63 stated (on page 8644) that "As a matter of policy, NRC considers 0.25 mSv (25 mrem) TEDE as the appropriate dose limit within the range of potentials doses...of 0.25 mSv (whole body), 0.74 mSv (thyroid dose) and 0.25 mSv (to any other critical organ)." In addition, Section 3.3.7.1.2 of NUREG-1573 specifically endorses ICRP 30 (the basis for 10 CFR Part 20 standards) for LLW performance assessments to determine compliance with 10 CFR Part 61 performance objectives.</p>	<p>NRC guidance addresses the ACNW&amp;M recommendation. Activity No. 10, Major Revisions to Part 61 (currently Low), could codify the Commission guidance in the 10 CFR Part 63 proposed rulemaking notice, but in the meantime no action is needed.</p>
<p><b>ACNW&amp;M-8.</b> With one exception, the Subpart D siting criteria are qualitative. A more quantitative and risk-informed or performance-based approach to siting criteria might be helpful in developing new sites.</p>	<p>The staff agrees in general with this recommendation and would consider it as part of other revisions to 10 CFR Part 61 if they were undertaken.</p>	<p>Activity 10--Major revisions to 10 CFR Part 61 (Low)</p>
<p><b>ACNW&amp;M-9.</b> The 10 CFR Part 61 institutional controls and financial assurance measures have recently been considered in the proposed revision to decommissioning guidance. The updates may provide insights into the institutional control and financial assurance requirements for LLW sites.</p>	<p>The staff agrees in general with this recommendation and would consider it as part of other revisions to 10 CFR Part 61 if they were undertaken.</p>	<p>Activity 10--Major revisions to 10 CFR Part 61 (Low)</p>

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<p><b>ACNW&amp;M-10.</b> Collection of environmental monitoring data is required during the operational and institutional control periods. These data could be used to increase confidence in long-term predictions of performance of LLW facilities.</p>	<p>The staff agrees with this recommendation. Although not identified as a specific task in the SA, this issue could be addressed in any major revisions to 10 CFR Part 61 and/or in updating and consolidating LLW guidance into one document. At this time, however, the Agreement States perform all licensing and must ensure that long-term performance of sites is adequate. There is no prohibition on considering these data in such predictions.</p>	<p>Activity 5--Update to, and consolidation of, LLW guidance (Medium) Activity 10--Major revisions to 10 CFR Part 61 (Low)</p>
<p><b>ACNW&amp;M-11.</b> The provisions of 10 CFR Part 61 did not explicitly include credit for engineered barriers for waste form, waste packaging, disposal site design, and cover design. It would be an improvement to consider appropriate credit for the contribution of these engineered features to system performance.</p>	<p>The staff agrees with this recommendation, although the priority is low. NUREG-1573 has an extensive discussion of the role of engineered barriers in the performance of LLW disposal facilities and provides staff positions on taking credit for engineered barriers in performance assessments. Agreement States regulate all of the LLW disposal sites in the United States, and, in part for that reason, this task is ranked as low priority.</p>	<p>Activity 10--Major revisions to 10 CFR Part 61 (Low)</p>

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<p><b>GAO-1.</b> To improve the management of LLW in the United States and to address a potential shortfall of disposal availability for higher activity LLW in 2008 as well as other management concerns, GAO recommends that the Chairman of the NRC and the Secretary of Energy evaluate and report to Congress within 1 year on the usefulness to the United States of the following:</p> <p>(1) adopting the LLW management approaches used in the countries discussed in the report as well as the steps and any authorities necessary for their implementation, if deemed appropriate. These approaches include the following:</p> <ul style="list-style-type: none"> <li>(a) national database of LLW</li> <li>(b) timely removal of higher activity LLW</li> <li>(c) alternative disposal options for LAW</li> <li>(d) improved financial assurance</li> </ul> <p>(2) developing a U.S. radioactive waste management plan and the potential costs, steps, and any authorities necessary to develop such a plan, if deemed appropriate</p>	<p>Activities evaluated in this assessment (see next column) include most of the specific approaches identified by GAO for investigation, and all will be evaluated if the NRC and DOE are required to issue a report to Congress. The staff has specifically evaluated in this assessment (a) the usefulness of a national database, (b) alternative options for disposal of LAW, and (c) improved financial assurance. The staff does not evaluate here the timely removal of LLW and centralized storage of LLW because there is currently no basis for either, in the staff's view. With respect to the second recommendation, the staff (in its February 21, 2007, comments on the draft report) did not agree with the recommendation for a national waste management plan and has no plans at this time for additional evaluation. However, if the NRC and DOE are required to submit a report to Congress, as recommended by GAO, additional evaluation will be required.</p>	<p>Activity 19--Scoping study for financial assurance (High)  Activity 20--National LLW database (Low )  Activity 7--10 CFR 20.2002 procedure development (High)</p>