

U.S. Nuclear Regulatory Comments Regarding  
Blue Ribbon Commission July 2011 Draft Report to the Secretary of Energy

**1) Recommendations for More Complete or Direct Sources of NRC Information**

Note: insertions in italicized text, deletions in strike-out.

**Page 24, Section 3.4.3., ¶2.** The Commission issued CLI-11-07 on September 9, 2011. This order stated that “the Commission finds itself evenly divided on whether to take the affirmative action of overturning or upholding the Board’s decision” and directed the “Board to, by the close of the current fiscal year, complete all necessary and appropriate case management activities, including disposal of all matters currently pending before it and comprehensively documenting the full history of the adjudicatory proceeding.” Suggest revising the following text to accurately reflect status of the proceeding:

“Within a year, however, the new Administration declared its intent to suspend further work on Yucca Mountain and later moved to withdraw the application for a construction license ~~before~~ to the NRC. *In September 2011, the NRC Commission issued a decision directing the NRC Atomic Safety and Licensing Board to complete all necessary and appropriate case management activities by the close of the fiscal year. At this point, the NRC adjudication has been suspended and other matters are pending before federal court. ~~Key decisions by the courts and the NRC still pending, the future of the Yucca Mountain project remains uncertain.~~*”

**Page 51, ¶3.** There is publicly available information relating to EA-02-026, which was published in the *Federal Register*. Recommend adding information that references this information:

In February 2002, the NRC issued specific orders (67 FR 9792) aimed at providing additional protection for spent fuel in pools based on the results of these initial studies.<sup>80</sup> *Although the interim requirements imposed by these orders are not available to the public because they contain sensitive information, but they addressed strategies to restore or maintain core cooling and provide containment and spent fuel cooling under circumstances associated with the loss of large areas of the plant due to explosion or fire.*

**Page 100, ¶2.** NRC requirements for regulatory compliance are not accurately described; compliance is not based entirely on a performance assessment as stated. Recommend revising text as:

As critical as the form and stringency of the standards to be applied to a disposal facility is the decision about what approach or methodology will be used to determine whether they have been met. Current U.S. regulations *for Yucca Mountain use a performance assessment as a focal point for organizing the information used to support the rely* ~~entirely on a compliance demonstration based on a probabilistic performance assessment to project that repository performance complies with for comparison with~~ quantitative standards over very long time periods - 10,000 years in the case of WIPP and 1,000,000 years for Yucca Mountain. Over the last decade or more, however, there has been increasing attention worldwide to integration of both quantitative and qualitative lines of argument to show that a repository will remain safe after our ability to

monitor a repository is lost. Instead of focusing on comparison of comprehensive calculations of projected dose levels to populations hundreds of thousands of years or more in the future, for example, the safety analysis supporting regulatory demonstration of compliance might use such calculations for an initial period for which they would be most defensible, and then follow the evolution of troublesome radionuclides in the given geologic environment over the long term, using existing and compelling scientific knowledge. Finnish regulators require quantitative assessment where possible, but also call for use of complementary considerations when quantitative analyses are not feasible or are too uncertain. *Current U.S. regulations also contain requirements for a performance confirmation program and empirical observations to support compliance demonstrations.*

**Page 100, ¶3.** For geologic disposal, the equivalent levels of protectiveness represented by “reasonable assurance” and “reasonable expectation” are not clearly represented. When Part 63 was finalized the Commission stated that “the Commission will adopt EPA’s preferred standard of “reasonable expectation” for purposes of judging compliance with the numerical postclosure performance objectives. However, the Commission wants to make clear that its proposed use of “reasonable assurance” as a basis for judging compliance was not intended to imply a requirement for more stringent analyses...” (66 FR 55740, November 2, 2001). It is still NRC’s view that use of either term, “reasonable assurance” or “reasonable expectation,” conveys the concept that proof cannot be had in the ordinary sense of the word. This is because of the uncertainties inherent in the understanding of geologic setting, biosphere, and engineered barriers. The implementation of the concept would be expected to be the same, regardless of the difference in terminology, in the context of long-term safety of geological disposal. Suggested revisions paragraph 3:

~~By contrast, the traditional and more stringent NRC standard of proof, “reasonable assurance,” applies to standards for disposal facility operations before closure.<sup>197</sup> The NRC originally used “reasonable assurance” for both pre-closure and post-closure standards, but it has since NRC adopted EPA’s approach of applying a “reasonable expectation” standard to the post-closure period, however, NRC uses while retaining a “reasonable assurance” standard for the pre-closure period, consistent with the NRC’s practice for other licensed operating facilities subject to active licensee oversight and control (66 FR 55740; November 2, 2001).~~

**Page 111, ¶2.** The NRC is not planning to change the statutory definition of HLW. Recommend revising text:

~~Additionally, in developing the framework for licensing potential fuel reprocessing facilities, the NRC staff is considering how best to distinguish high level waste (HLW) from low level waste (LLW) resulting from reprocessing. Expansion of NRC’s regulatory framework to include licensing of potential reprocessing facilities is not expected to include changing the statutory definition of HLW the NRC staff is planning to identify a number of options for changing the definition of as part of developing a framework for licensing fuel reprocessing plants and plans to send a paper on the framework to the NRC Commissioners by the end of fiscal year 2011.~~

**Page 141, endnote 79.** The date and information in the endnote corresponds to a Commission Notation Vote paper rather than a Staff Requirements Memorandum. The comments referred to BRC report are in the revised web link. Recommended correction:

<sup>79</sup> *Commission paper* ~~Staff Requirements Memorandum~~ dated Aug. 26, 2010 (SECY-10-0114, Enclosure 1), found at <https://adamsxt.nrc.gov/WorkplaceXT/getContent?id=release&vsId=%7B1214CFFE-E9C0-4742-B109-74DCD84A1B84%7D&objectStoreName=Main...Library&objectType=document>

**Page 141, endnote 80.** Publicly available information relating to EA-02-026 was published in the *Federal Register*. Recommend adding reference to this information:

<sup>80</sup> EA-02-026, “Order for Interim Safeguards and Security Compensatory Measures,” (the ICM order), February 25, 2002; *publicly available information relating to the order was published in the Federal Register (March 4, 2002, 67 FR 9792).*”

## 2) Recommendations to Improve Clarity About NRC Regulations, Programs, or Information

Note: insertions in italicized text, deletions in strike-out.

**Page 14, ¶4.** The discussion of radiation hazard in preceding paragraphs 1-3 could be enhanced by including additional text at the end of paragraph 4:

It is worth mentioning, however, that (1) radiation levels in HLW and spent fuel drop considerably over time and (2) very long-lived isotopes also tend to pose less of a radiation hazard. By comparison the most dangerous isotopes tend to be those that decay more quickly (the more rapid the decay, the higher the initial level of radioactivity). *Geologic disposal achieves safety by isolating radioactive waste from humans and the environment such that close contact with high concentrations of waste and the associated high exposure is precluded, allowing short-lived radionuclides to decay to negligible levels, and limiting releases of long-lived radionuclides to very low levels.*

**Page 22.** The NWPA was not signed into law until January 7, 1983:

Passage of the Nuclear Waste Policy Act (NWPA) ~~in~~ of 1982 marked the beginning . . .

**Page 24.** Upon receipt of the application, the staff completed an initial examination to determine whether DOE's application contained sufficient information for a detailed technical review. Suggest adding "detailed technical" for clarity.

Submitted to the NRC in June 2008, the license application was deemed suitable for a *detailed technical* review 3 months later.

**Page 39, ¶1.** Suggest revising to be consistent with language of the NRC waste confidence decision.

While current storage arrangements have been judged adequately safe and secure by the relevant regulatory authorities—in fact, as discussed in chapter 3, the NRC in 2010 updated its "Waste Confidence Decision" to state that at-reactor or away-from-reactor spent fuel could be stored safely for up to 60 years after the termination of an operating reactor's license ~~(with extensions up to 60 more years which may include the term of a revised or renewed license)~~ . . .

**Page 50, last paragraph.** Suggest clarifying NRC's regulatory role:

NRC *regulations establish* ~~is also primarily responsible for~~ security requirements at for ISFSIs.

**Page 86.** The NWPA was not signed into law until January 7, 1983:

Since the establishment of the NWF ~~in 1982~~, Congress enacted several budget . . .

**Page 96, Section 9.1, first sentence.** Suggest revising to be consistent with language of the NRC waste confidence decision:

As noted in chapter 3 of this report, the NRC recently extended its “Waste Confidence Decision” to up to 60 years after the termination of an operating reactor’s license ~~(with extensions up to 60 years which may include the term of a revised or renewed license).~~

**Page 99, ¶3.** Although the technical criteria for 10 CFR Part 60 were published in 1983, licensing process criteria for Part 60 were published in 1981 (46 FR 13971). Minor revisions to Part 60 were made in 1987 to reflect the NRC’s organizational structure, however, revisions in 1989 (54 FR 27864) reflected environmental requirements from the NWPA. A minor misspelling occurs in Part 60’s cited title. Recommend revising text as:

NRC regulations for all sites other than Yucca Mountain are defined under 10 CFR Part 60, “Disposal of High-Level Radioactive Wastes in ~~Geological~~ *Geologic* Repositories.” ~~These regulations~~ *Technical criteria for this regulation* were originally issued in 1983 (before EPA’s standards had been completed) and revised in ~~1987~~ 1989 to reflect the NWPA Amendments Act of 1987. NRC’s regulation incorporates EPA’s generally applicable standards by reference, and includes additional performance requirements for specified individual barriers in the repository system.

**Page 102, Item 1, ¶1.** In principal, some focused aspects of a generic regulation for geologic disposal would likely need to contain some site-specific requirements. The National Research Council recommendations regarding the Technical Bases for Yucca Mountain Standards (TBYMS) published in 1995 pointed out the exposure scenario should be specified through rulemaking: “In our view, however, it is not possible for a reasonable standard for the protection of human health to avoid the use of some specified assumptions about future populations, patterns, and lifestyles around a proposed repository site” (page 98 in TBYMS report). Flexibility to consider, in principal, the need for appropriate site-specific requirements could be achieved by revising text:

~~While there may be advantages to developing standards and requirements that recognize the specific features and characteristics of a particular site, experience~~ *Experience* with Yucca Mountain indicates ~~site-specific regulations that this approach~~ can create suspicions that regulations are being tailored to make a pre-selected site work. Generally-applicable regulations are more likely to earn public confidence. A generic standard will also support the efficient consideration of multiple sites. *Standards and regulations should make use of generic safety limits and generic requirements to the maximum extent practical. It is recognized that certain aspects of exposure calculations (e.g., identification of future populations and individuals) could require some site-specific treatment in regulations (TBYMS report, 1995), however, this should be kept to a minimum.*

**Page 103, Item 4, ¶2.** Current regulations provide for regulatory decisions at stable, well-defined points that have logical links to the safety case such as construction authorization, license to receive and possess radioactive material, and permanent closure. Although decisions regarding design, construction and operations can be amended during licensing,

leaving such decisions open could undermine the transparency of the regulatory process. Recommended revision to the text:

In general, ~~adaptive staging~~ *such open decisions* could make the licensing process more complex by increasing the number of changes made in the course of the process. This in turn would increase the number of regulatory review steps and the potential need for license amendments.<sup>203</sup> Recent NRC planning documents suggest the agency has already recognized that it may need to develop new performance assessment tools that are flexible enough to accommodate different scenarios for the management of spent fuel and HLW (in part to respond to the findings of the BRC).<sup>204</sup> More broadly, we believe ~~a revised~~ *the* regulatory structure for future repository development should *ensure* ~~be designed with express attention to providing the flexibility and needed to support an~~ adaptive, staged process.

**Page 105, ¶3 and Page 135, ¶1.** NRC considers the designation of a “lead” agency to develop a repository safety standard is not needed, because close cooperation and coordination between NRC and EPA is appropriate, ongoing, and consistent with statutory direction for each agency.

**Page 106, Item 8, ¶1.** The text should be revised to reflect that the NRC is considering enhancements to U.S. security regulations associated with SNF and HLW disposal. Suggested revisions to the existing text:

Robust security arrangements are needed at storage and disposal facilities for SNF and HLW, as well as during the transport of these materials, to prevent unauthorized access and acts of sabotage or theft. From a security standpoint, the most sensitive stages at a deep geological repository are when materials are above ground (transported or in a pre-load stage) and during the pre-closure period when materials are emplaced in the disposal facility, but the facility itself is not sealed and could therefore be accessed more easily. As the IAEA has recommended, the regulatory authority will need to provide guidance to the implementing organization concerning the effective application of security measures. *Current NRC regulations for geologic disposal provide requirements for physical protection (10 CFR 60.21(b)(3) and 63.21(b)(3), Part 73) and material control and accounting (10 CFR 60.78 and 63.78). The NRC is currently conducting a rulemaking to enhance these requirements. Such measures could include physical protection, control and accounting, and verification procedures.* ~~Such measures could include physical protection, control and accounting, and verification procedures.~~ Recognizing the importance of international rules, the United States should offer to place all future geologic disposal facilities under IAEA safeguards monitoring.

**Pages 107-111.** Low-Level Waste (LLW) is not classified under the Waste Classification System until it is ready to be disposed of, either in an NRC or Agreement State-licensed LLW site. Recommend adding text in two places to clarify this fact:

- 1) Add at the end of the Low-Level Waste paragraph in the box on page 107:  
“Note that LLW is not classified under the Waste Classification System in 10 CFR Part 61 until it is ready to be disposed of in either an NRC or Agreement State licensed LLW site.”

- 2) Add at the end of the first paragraph under Section 9.5 – Waste Classification on page 108: “Note that LLW is not classified under the Waste Classification System in 10 CFR Part 61 until it is ready to be disposed of in either an NRC or Agreement State licensed LLW site.”