



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 9, 2009

The Honorable Edward J. Markey
Chairman, Subcommittee on Energy
and Environment
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am responding to your letter of March 19, 2009, in which you expressed concerns about the safe and secure disposal of depleted uranium (DU) and the impacts of a recent NRC decision about the disposal of DU. This letter also responds to the related question on DU disposal contained in your March 10, 2009 letter. After careful and lengthy deliberations on the technical, regulatory, and statutory aspects of the disposal of large quantities of DU, the Commission concluded that the most prudent course of action was to require a site-specific analysis prior to disposal to ensure continued protection of public health and safety and the environment.

DU's classification as Class A low level waste (LLW) has existed since 1981, and the waste classification system contained in 10 CFR Part 61 was statutorily recognized in the LLW Policy Amendments Act of 1985. As discussed in more detail in the enclosure, the technical analysis that was done to support the staff's recommendation to the Commission was not intended nor constructed to support a change to the waste classification structure. In summary, the Commission believes that, in the absence of comprehensive technical and legal analyses, changing the waste classification of DU would be premature, could have significant and unforeseeable consequences, and would not provide for more protection of public health and safety and the environment.

The Commission determined that for waste streams consisting of significant amounts of DU, there may be a need to place additional restrictions on the disposal of the DU or deny such disposal based on unique site characteristics, and that those restrictions should be determined by a site-specific analysis. Therefore, the NRC will proceed with rulemaking to specify a requirement for a site-specific analysis for the disposal of large quantities of DU and the technical requirements for such an analysis. Recognizing the complexity of this issue, the NRC plans to conduct a public workshop inviting stakeholders, including Federal agencies, States, and licensees, to discuss the issues associated with the disposal of DU, the rulemaking, and the technical requirements necessary to perform the site analysis so that informed decisions can be made until the rulemaking is final. Based on current information, it is highly unlikely that any disposals of large quantities of DU will occur before early 2011, by which time the technical basis for this rule will have been completed and the rulemaking process will be well underway.

In addition to these immediate actions, the NRC will, as a longer-term action, budget for a comprehensive revision to risk-inform the 10 CFR Part 61 waste classification framework using updated assumptions and referencing the latest International Committee on Radiation Protection methodology to address explicitly the waste classification for DU. The NRC will also consider the need to propose, if any, changes to the Low-Level Radioactive Waste Policy Amendments Act of 1985 as part of this comprehensive revision.

Detailed responses to the questions contained in your letter are provided in the enclosure, and the copies of all records relating to this issue as requested in your letter will be provided under separate cover. The enclosure also provides the response to Question 5 concerning DU, which was contained in your March 10, 2009 letter.

The NRC staff is available to provide a briefing for your staff if you desire. If you have additional questions on this matter, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Dale E. Klein", written in a cursive style.

Dale E. Klein

Enclosure:
Response to Information Request

cc: Representative Bart Gordon



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The Honorable Jim Matheson
United States House of Representatives
Washington, D.C. 20515

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Response to Information Request

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NRC Response to March 19, 2009 Information Request

Question 1:

The Draft Environmental Impact Statement (DEIS) for 10 CFR Part 61 proposed that only depleted uranium below the concentration of $0.05 \mu\text{Ci}/\text{cm}^3$ could be considered Class A. Why should depleted uranium at ten times this concentration be treated as Class A waste?

Answer 1:

The risk from DU is site-dependent and can vary widely depending on specific disposal conditions. The concentration limit developed in the DEIS for 10 CFR Part 61 was based conservatively on potential disposal at a "reference" humid, eastern low-level waste disposal site. Therefore, the methodology used in the DEIS created a uranium concentration limit that could be overly restrictive for sites not represented by the "reference" disposal site. In the Final Environmental Impact Statement (FEIS) which supported the concentration limits utilized in 10 CFR Part 61, there were no concentration limits established for DU. Consequently, there was no regulatory determination regarding the validity of the values for DU in the DEIS. While this does not have a big impact on most radionuclides, it has a very large impact for radionuclides such as uranium, because the dominant exposure pathways are water-related or from inhalation of radon. Water-related pathways are strongly impacted by site-specific conditions (infiltration rates, distribution coefficients, solubility limits, and groundwater flow rates), and the risk from radon is also very site-specific due to the transport characteristics of radon in the subsurface. NRC staff analysis concluded that near surface disposal of large quantities of DU may be appropriate at certain sites.

Question 2:

What disposal procedures have been required for depleted uranium? Are these different in any way from the disposal procedures commonly required for Class A waste? Are these procedures similar in any way to the disposal procedures commonly required for Class C waste?

Answer 2:

Prior to reaching our recent decision, NRC communicated with State regulators that oversee existing or proposed low-level waste disposal facilities (i.e., the States of South Carolina, Texas, Utah, and Washington) on their approaches to the disposal of depleted uranium. In general, State regulators agreed with the need to handle large quantities of DU as a unique waste

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stream, regardless of its current waste classification, and agreed that additional analysis should be conducted prior to its disposal. The Utah Division of Radiation Control indicated that EnergySolutions has completed site-specific performance modeling for disposal of natural uranium at its Clive, Utah site and compared the risk from natural uranium to the risk associated with DU. Similarly, the Texas Commission on Environmental Quality (TCEQ) requires its licensees and applicants to perform additional analysis prior to disposal of large quantities of DU. According to the TCEQ Response to Public Comments on a license application for a low-level waste disposal facility, the TCEQ Executive Director recommends a prohibition on the receipt and disposal of large quantities of DU at the proposed disposal facility, in excess of 10 nanocuries per gram (10 nCi/g), absent an application for amendment to the draft license that provides more specific information and performance analysis related to DU. The State of Washington Department of Health has completed a performance assessment for the U.S. Ecology low-level waste disposal facility related to site closure that does not currently include large quantities of DU; however, this analysis could be modified to include the impacts from DU disposal. The State of South Carolina indicated that the only specific requirement related to the disposal of DU at the Barnwell low-level waste disposal facility is that it be rendered non-pyrophoric. Although each of the affected states has a state-approved methodology for disposal of wastes, including DU, there is no uniform analysis methodology across the various states. The Commission's recent decision to proceed with rulemaking to require a site-specific analysis prior to disposal of large quantities of DU will allow more alignment across the disposal sites by specifying the technical parameters (e.g., an intruder analysis) that must be evaluated in a site-specific assessment. In coordination with the final rule, the NRC will also publish regulatory guidance on implementation of the analytical methodology to help ensure more uniformity in the implementation of the rule requirements.

The procedures noted above are different than disposal procedures commonly required for Class A waste because they rely on site-specific analysis to ensure the safe disposal of large quantities of DU. These procedures may or may not result in disposing of DU at a specific site at greater depths than normally allowed for class A waste, but there is no established minimum depth for the disposal of DU at all sites. These procedures, however, are not similar to the disposal requirements for Class C waste as set forth in 10 CFR 61.52 (a)(2), and generally described as a minimum disposal depth of 5 meters or protection against inadvertent intrusion for a minimum of 500 years.

Question 3:

Could uranium tailings be considered Class A under the actions taken by the Commission?

Answer 3:

No. Uranium mill tailings are "byproduct material" as specified in Section 11e. (2) of the Atomic Energy Act and are specifically regulated under the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). Uranium mill tailings are not low-level waste and, therefore, would not be considered Class A waste under the actions taken by the Commission.

Question 4:

Could any other materials be classified as Class A under the action taken by the Commission?

Answer 4:

The Commission action did not change the existing definition of Class A waste as applied to DU or any other material. Under the referenced action, the NRC plans to 1) proceed with rulemaking to specify a requirement for a site-specific analysis for the disposal of large quantities of DU or other unique waste streams (as currently envisioned, unique waste streams could include those that may result from spent fuel reprocessing, or other types of waste streams that could emerge in the future from new kinds of facilities that generate significantly different concentrations and quantities of waste not previously considered in the Part 61 FEIS) and to specify the technical requirements for such an analysis, and 2) to develop a guidance document that outlines the parameters and assumptions to be used in conducting such site-specific analysis. These actions will not impact waste classifications currently applied to materials. However, the NRC also plans to perform a comprehensive revision to risk-inform the 10 CFR Part 61 waste classification framework. After this revision is performed, there may be some potential that other materials could be classified as Class A. At this point, it would be speculative for the NRC to express an opinion on the results of this comprehensive revision to the waste classification framework.

NRC Response to Question 5 in the March 10, 2009 Information Request

It is my understanding that EnergySolutions also seeks to dispose of depleted uranium at the Clive facility. I further understand that the Utah state license under which EnergySolutions operates specifies that the facility shall not be allowed to dispose of any radioactive waste greater than Class A, as defined in 10 CFR 61.55. Does depleted uranium pose health or safety risks different in any way from wastes commonly classified as Class A? Over time, would depleted uranium pose health or safety risks different in any way from wastes commonly classified as Class A?

Answer 5:

As discussed by the staff in "Response to Commission Order CLI-05-20 Regarding Depleted Uranium" (attached), dated October 7, 2008, depleted uranium (DU) is a unique waste stream with potential health and safety risks that are very site-specific. The dominant exposure pathways are water-related or from radon. Water-related pathways are strongly impacted by site-specific conditions (infiltration rates, distribution coefficients, solubility limits, and groundwater flow rates). Similarly, the risk from radon is very site-specific due to the highly-nonlinear transport characteristics of radon in the subsurface (primarily as a function of moisture content). Most other radionuclides do not experience such a strong dependence on site conditions. During development of the attached document, the NRC staff performed a technical

analysis to evaluate the impacts of near-surface disposal of large quantities of DU and to determine if amendments to NRC regulations are necessary to ensure that large quantities of DU are disposed of in a manner that meets the NRC's performance objectives. The technical analysis concluded that near-surface disposal may be appropriate for large quantities of DU under certain conditions and that small quantities (approximately 1 – 10 metric tons) of DU could be disposed of at shallow depths. Over time, radioactive decay of DU results in increasing hazard with time until after 1 million years, as a result of increasing concentrations (and higher mobility) of decay products. However, the technical analysis evaluated disposal of DU at these long performance periods and determined that the degree of impacts from DU disposal are strongly site-specific and that these impacts can be managed to meet the NRC's performance objectives.

To address concerns associated with disposal of DU, the Commission directed the staff to proceed with rulemaking in 10 CFR Part 61 to specify a requirement for a site-specific analysis for the disposal of large quantities of DU and the technical requirements for such an analysis. The Commission determined that, for waste streams consisting of significant amounts of DU, there may be a need to place additional restrictions on the disposal of the DU at a specific site or deny such disposal based on unique site characteristics, and that those restrictions should be determined by a site-specific analysis. The Commission believes it is more appropriate to use updated, risk-informed analytical techniques accounting for the site-specific behavior of uranium to determine the risks from large quantities of DU rather than rely solely on a waste classification system developed several decades ago that was based conservatively on potential disposal at a "reference" humid, eastern low-level waste disposal site; did not consider large quantities of DU; and did not consider the in-growth of radon, all of which are best evaluated on a site-specific basis.

The Commission recognized in the recent direction to staff that in the longer term, the waste classification for DU should be explicitly addressed; however, it should be addressed using updated assumptions and referencing the latest methodologies from the International Committee on Radiation Protection, thereby ensuring that future actions revising waste classifications would be risk-informed. The Commission recognizes the complexity of this issue and has directed the staff to promptly conduct a public workshop inviting all stakeholders, including Federal agencies, States, and licensees. The workshop will discuss the issues associated with the disposal of DU, the potential issues to be considered in rulemaking, and technical parameters of concern in the analysis so that informed decisions can be made in the interim period until the rulemaking is final. The Commission recognizes the timely nature of this issue given the U.S. Department of Energy's plans for DU disposal, as well as the commercial uranium enrichment facilities recently licensed or submitting license applications, and is first and foremost committed to ensuring DU will be disposed of in a manner that protects public health and safety. Safe disposal (rather than storage) of all low-level waste, including DU, is the preferred option because it is a permanent solution.